DUTCH
SAFETY BOARD

Traffic in vicinity of departing commercial traffic

Airspace Eindhoven Airport

Traffic in vicinity of departing commercial traffic

Airspace Eindhoven Airport, March 2012

The Hague, September 2013

Dutch Safety Board

The aim in the Netherlands is to limit the risk of accidents and incidents as much as possible. If accidents or near accidents nevertheless occur, a thorough investigation into the causes, irrespective of who are to blame, may help to prevent similar problems from occurring in the future. It is important to ensure that the investigation is carried out independently from the parties involved. This is why the Dutch Safety Board itself selects the issues it wishes to investigate, mindful of citizens' position of independence with respect to authorities and businesses. In some cases the Dutch Safety Board is required by law to conduct an investigation.

	Dutch Safety Board		
Chairman:	T.H.J. Joustra E.R. Muller P.L. Meurs		
General Secretary:	M. Visser		
Visiting address:	Anna van Saksenlaan 50 2593 HT The Hague The Netherlands	Postal address:	PO Box 95404 2509 CK The Hague The Netherlands
Telephone:	+31 (0)70 333 7000	Fax:	+31 (0)70 333 7077
Website:	www.safetyboard.nl		

NB: 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.

CONTENTS

SUMMARY

In a relatively short period, a number of twin engined commercial aircraft departing from Eindhoven Airport encountered traffic in their flight path during the departure.

Despite the fact the occurrences were classified as incidents, they were investigated by the Dutch Safety Board as part of an investigation into reported occurrences with Traffic Collision Avoidance Systems (TCAS) in relation to the airspace structure over Eindhoven Airport.

During the first event a twin engined passenger aircraft departed from Eindhoven Airport and came close to a single engine piston aircraft crossing the Eindhoven Special Rules Zone. Insufficient information was known by Dutch Mil Info about the altitude flown by the propeller aircraft. This caused a situation in which it was temporarily unclear if separation between the two aircraft was guaranteed. Minimum separation during the occurrence was 0,4 NM and 1500 feet vertically.

During the second event a twin engine passenger aircraft was in the climb after take off from Eindhoven Airport when a propeller aircraft was crossing the Eindhoven Special Rules Zone. The ATC controller saw the propeller aircraft had made a turn and was flying to the west, on a collision course with the passenger aircraft. In an attempt to maintain separation, the ATC controller instructed the crew of the propeller aircraft to turn to heading 360, the most logical solution for him at the time. The passenger aircraft was instructed to level off at 3000 feet if the crew did not have contact with the other traffic. After the turn to 360 the propeller aircraft was on a heading directly towards the passenger aircraft and the pilot stated to ATC that this turn was not the best option. The crew of the passenger aircraft received a TCAS warning to which they reacted.

In both cases there was no danger of a collision.

In May 2013 the TMA Eindhoven was established to better safeguard the operations in the Eindhoven area. In the TMA, classified as C air space, two-way separation is provided between both IFR-IFR and IFR-VFR traffic.

1.1 Special Rules Zone Eindhoven

The airspace around Eindhoven Airport has been under reconstruction since 2010. This reconstruction was to make it possible to accommodate the expected growth in air traffic to and from Eindhoven Airport and facilitate low noise approaches. In recent years there has been a rise in the number of occurrences in the vicinity of Eindhoven. The occurrences were due to the presence of a mix of controlled and uncontrolled air traffic, in combination with an increase in the number of flights. This situation was cause for the government to take measures. As per 23 August 2011 a Special Rules Zone (SRZ) was created around Eindhoven Airport, creating a safer environment for both IFR and VFR traffic.

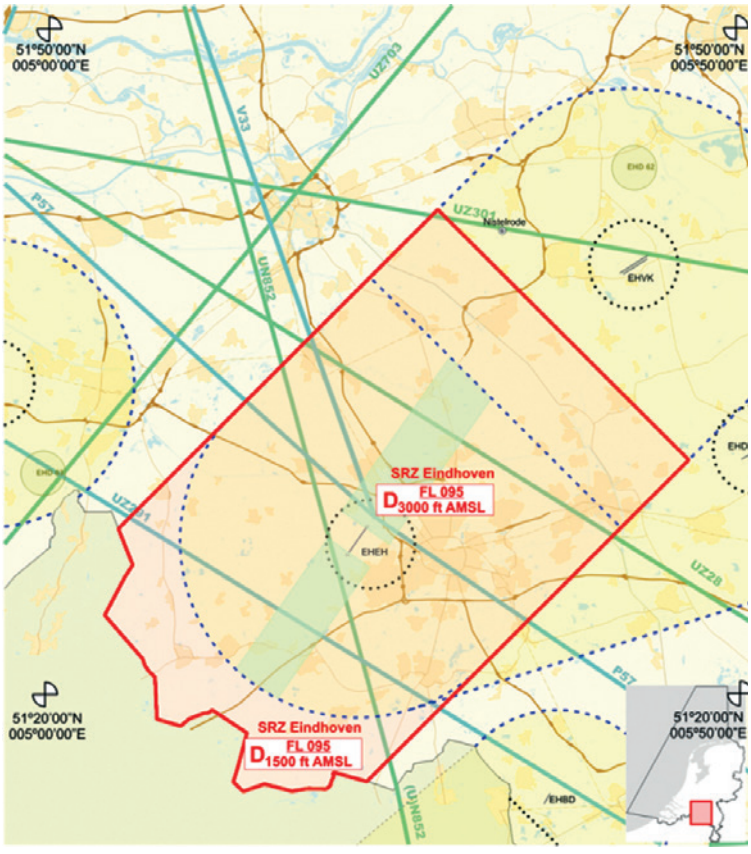

Figure 1: Eindhoven SRZ with altitude restriction between 1500 feet and FL095.

The SRZ Eindhoven was established from 1 September 2011 until 31 December 2012 with the intent to create an Eindhoven Terminal Area (TMA) before December 2012. The construction of Eindhoven TMA was delayed and therefore the SRZ was extended until further notice.

By creating the SRZ the airspace category in the area changed from ICAO class E to class D.[1] There is however no requirement for traffic separation service between IFR and VFR traffic in D air space.

All traffic that wanted to make use of the SRZ was obliged to file a flight plan, ask for entry clearance with the military ATC agency (Dutch Mil Info) and maintain two way radio contact with the military ATC agency. Furthermore all traffic had to have a working transponder on board.

As per 2 May 2013 TMAs Eindhoven (TMA 1 to 4) are effective. The TMAs are staggered in altitude and are classified as C airspace. In C airspace, ATC maintains separation between IFR and IFR traffic, and between VFR and IFR traffic, in both ways. Only controlled traffic is allowed in the TMAs, equipped with two-way radio and working transponder. ATC is performed by Eindhoven Tower control (inside CTR), Eindhoven Arrival (Dutch Mil) for incoming and departing IFR traffic, and Dutch Mil (Rapcon South en Dutch Mil Info) for other IFR and VFR traffic in the TMA's.

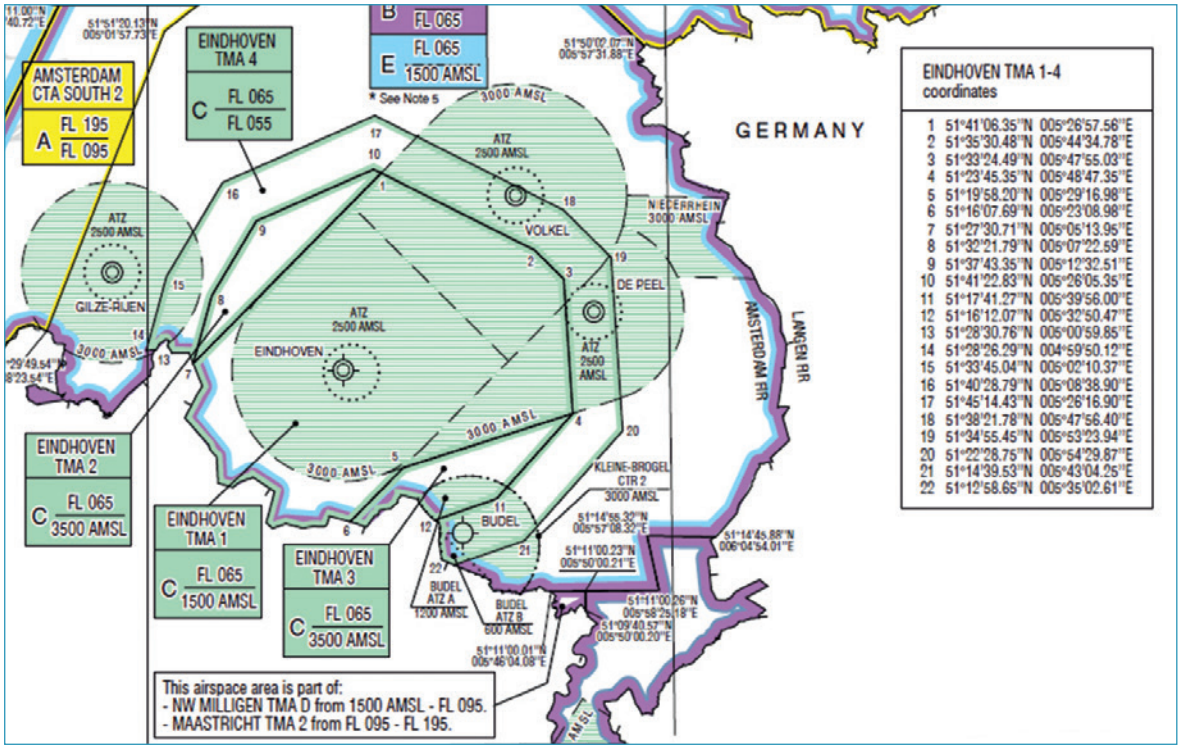

Figure 2: New TMA's Eindhoven. (Source: AIP Netherlands)

1 In class E airspace it is not mandatory to file a flight plan, obtain entry clearance of maintain two way radio contact with ATC. In class D airspace these restrictions do apply.

2 EVENT 1

2.1 General information

Identification number:	2012037
Classification:	Incident
Date, time of occurrence:	9 March 2012, 13.50 hours
Location of occurrence:	Eindhoven Airport Special Rules Zone
Light conditions:	Daylight
Registration aircraft 1:	HA-LWA
Aircraft Type:	Airbus A320
Aircraft category:	Twin engined passenger aircraft
Type of flight:	Carrier / commercial
Phase of operation:	Departure
Damage to aircraft:	None
Flight crew:	2 + 4
Passengers:	167
Injuries:	None
Damage:	None
Registration aircraft 2:	OO-WVS
Aircraft Type:	Cessna 172
Aircraft category:	Single engine piston
Type of flight:	Private
Phase of operation:	Cruise
Damage to aircraft:	None
Flight crew:	2
Passengers:	None
Injuries:	None
Damage:	None

3 FACTUAL INFORMATION

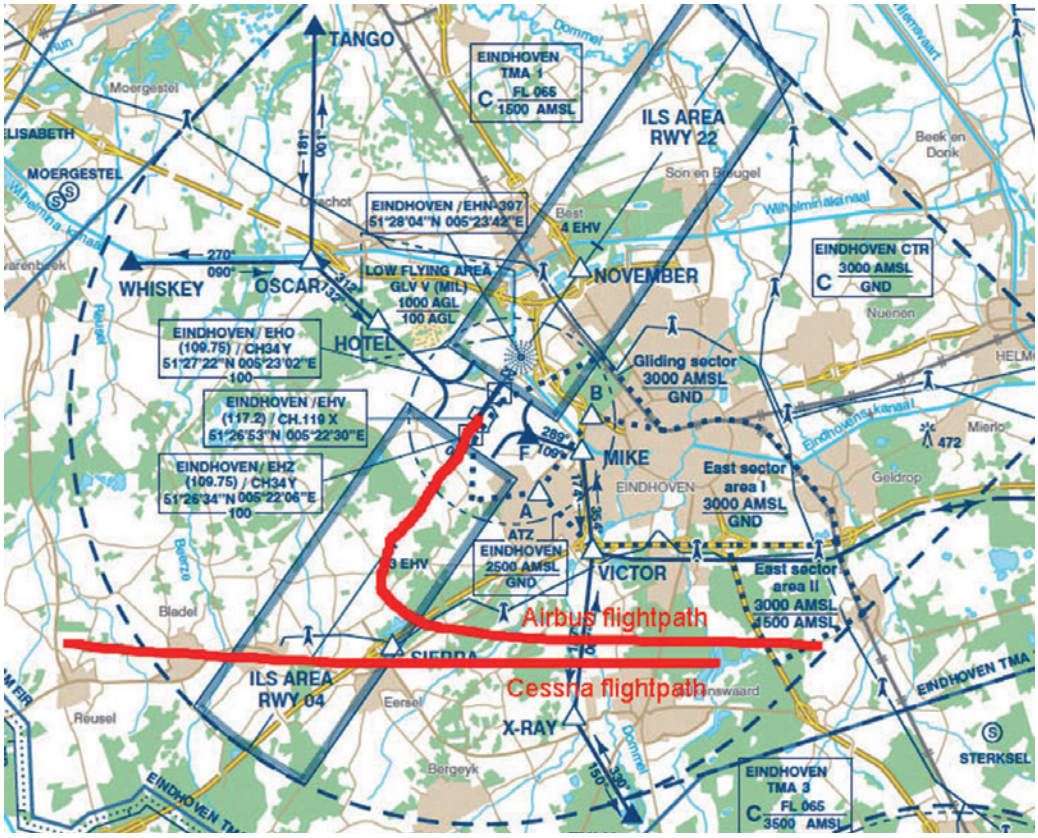

Figure 3: Routes of trafic involved.

On 9 March 2012, OO-WVS was flying from Kortrijk Wevelgem airport (EBKT) in Belgium to Schönhagen airport (EDAZ) in Germany at an altitude of 3500 feet. OO-WVS was flying VFR in contact with Dutch Mil Info (135.35 MHz). OO-WVS was squawking the general VFR[2] transponder code (7000).

HA-LWA was ready for take off from runway 22 at Eindhoven Airport for an IFR flight to Riga (EVRA) in Lithuania. Shortly after take off HA-LWA was instructed by Eindhoven Tower Control not to climb above 2000 feet because of a possible conflict with OO-WVS approaching from the south. At the time HA-LWA was in the climb after take off at an altitude just above 2000 feet and started a descent back to 2000 feet.

2 Visual Flight Rules (VFR) apply to all traffic flying under Visual Meteorological Conditions (VMC). Because VFR traffic is not equipped to fly under Instrument Flying Conditions (IMC), certain limitations apply to VFR traffic in controlled airspace. Traffic under Instrument Flight Rules (IFR) is more strictly regulated and is always under control of air traffic control agencies.

On the assumption that OO-WVS was flying at an altitude of 2500 feet, Dutch Mil info instructed OO-WVS to climb to 3500 feet and turn to a heading of 080 degrees. HA-LWA was in a standard departure route from Eindhoven Airport and was flying at the ordered 2000 feet. HA-LWA started a left turn, to the east as part of the standard departure, thus flying in the same direction as OO-WVS. The crew of HA-LWA had OO-WVS visible during the entire event. The planes at one time were on converging tracks and closed in to each other. The minimum horizontal separation was 0,4 NM with a vertical separation of 1500 feet. Both aircraft continued their flights to their destinations uneventfully.

Visibility during the occurrence was more than 10 kilometres. There were no clouds below 2500 feet. According to the weather report wind was from a direction of 230 degrees with a velocity of around 11 knots. There was no turbulence and a slight chance of light icing above 4000 feet.

4 ANALYSIS

4.1 The occurrence

Conform the local procedures the Eindhoven Tower Controller asked permission from the radar controller of Eindhoven Arrival to let HA-LWA depart via a standard IFR-departure (VELNI). Traffic following this standard departure procedure flies southwest after take off, followed by a left hand turn to the east.

The radar controller of Eindhoven Arrival works at a different location from the local tower controller. The radar controller has a radar screen displaying all traffic in his region of responsibility, in this case the south-eastern part of the Netherlands Flight Information Region (FIR). The radar controller analyses traffic and then judges if departures from Eindhoven are safe and no other traffic is flying in the vicinity of the departure route that can hinder departing aircraft. After the radar controller of Eindhoven Arrival had given permission to Eindhoven tower controller to let HA-LWA take off, the tower controller instructed the crew of HA-LWA to delay take off because of landing traffic. After that, clearance was given for take off and HA-LWA took off as planned.

HA-LWA was initially cleared to climb to FL60 and was re-cleared to 2000 feet due to a single engine piston aircraft (OO-WVS) flying in the neighbourhood. OO-WVS was flying at an altitude between 3500 and 4000 feet, in an easterly direction in contact with Dutch Mil Info (VFR controller).

The radar screen of Dutch Mil Info showed a transponder code (7000) and the call sign of OO-WVS; the digital altitude information was missing however. Dutch Mil Info was in radio contact with OO-WVS. From the initial call the controller of Dutch Mil Info received when OO-WVS was entering the SRZ, he mistakenly understood that OO-WVS was flying at an altitude of 2500 feet. OO-WVS was however flying at an altitude of 3500 feet. Dutch Mil Info ordered OO-WVS to climb to 3500 feet, which was confirmed by the pilot. Because the altitude readings from the transponder were not clear, the controller ordered the pilot to recycle his transponder by switching it off and on again and simultaneously turn to a heading of 080. The controller did so because he expected the HA-LWA was going to fly a departure in a westerly direction. HA-LWA was turning to the east instead, bringing both aircraft on parallel courses.

HA-LWA was on a standard departure from Eindhoven Airport under the control of Eindhoven Arrival. It was climbing and had just passed 2000 feet. HA-LWA descended to 2000 feet and maintained this altitude. HA-LWA then started a left turn to the east according to the standard departure procedure. Both aircraft then flew on roughly the same heading, on converging tracks.

The two aircraft closed in and eventually the distance between the aircraft was 0,4 nautical mile (700 meters) horizontally with a vertical separation of 1500 feet. The minimum required vertical separation between VFR and IFR traffic is 500 feet. There was no TCAS warning on board of HA-LWA.

5 CONCLUSIONS

Because it was unclear to the Dutch Mil Info traffic controller at what altitude OO-WVS was crossing the Eindhoven SRZ, a situation developed whereby the two aircraft were sent on converging headings and there was a possibility to lose separation minima.

The minimum separation between the two aircraft was 0,4 NM and 1500 feet. The crew of HA-LWA had visual contact with the other aircraft at all times.

There was no danger of a collision.

6 EVENT 2

6.1 General information

Identification number:	2012030
Classification:	Incident
Date, time of occurrence:	21 March 2012, 12.29 hours
Location of occurrence:	Eindhoven Airspace
Light conditions:	Daylight
Registration aircraft 1:	HA-LWK
Aircraft Type:	Airbus A320
Aircraft category:	Twin engined passenger aircraft
Type of flight:	Carrier / commercial
Phase of operation:	Departure
Damage to aircraft:	None
Flight crew:	2 + 5
Passengers:	119
Injuries:	None
Damage:	None
Registration aircraft 2:	D-IBGC
Aircraft Type:	Piper Cheyenne II XL
Aircraft category:	Twin engined piston aircraft
Type of flight:	Business
Phase of operation:	Cruise
Damage to aircraft:	None
Flight crew:	2
Passengers:	1
Injuries:	None
Damage:	None

7 FACTUAL INFORMATION

On 21 March 2012 D-IBGC was flying under VFR3 from Marl-Loemuehle airfield (Germany) to Seppe airfield (Netherlands). After leaving the Maastricht control area (TMA), the captain made radio contact with the military air traffic controller (Dutch Mil Info), requesting to cross the Eindhoven Special Rules Zone (SRZ) at 3500 feet. Dutch Mil gave permission to cross the SRZ. D-IGBC was flying on a north-westerly heading. Dutch Mil ATC was handling both IFR and VFR traffic on two separate frequencies.

Figuur 4: Routes of trafic involved.

At Eindhoven Airport, HA-LWK was ready for take off from runway 22. Dutch Mil requested Eindhoven Arrival control over the phone to let HA-LWK fly in a south-westerly direction after takeoff. At this time D-IBGC entered the Eindhoven SRZ and turned to the west.

3 Visual Flight Rules (VFR) apply to all traffic flying under Visual Meteorological Conditions (VMC). Because VFR traffic is not equipped to fly under Instrument Flying Conditions (IMC), certain limitations apply to VFR traffic in controlled airspace. Traffic under Instrument Flight Rules (IFR) is more strictly regulated and is always under control of air traffic control agencies.

After takeoff from runway 22 at Eindhoven HA-LWK contacted Dutch Mil Info on the radio and reported flying in a south-westerly direction, passing 1700 feet in the climb to flight level 160 (FL160). Dutch Mil Info then instructed HA-LWK to maintain heading and to climb to FL 090. Dutch Mil informed the crew about the presence of VFR traffic to their left at a distance of about 2 NM (3,7 km) flying at 3500 feet.

The crew of HA-LWK confirmed this message and stated they had the other traffic in sight. The crew expected Dutch Mil to bring them to a level above the reported traffic. Five seconds later D-IBGC received information from Dutch Mil that an Airbus 320 had just taken off from Eindhoven Airport and advised the crew of D-IBGC to alter their course to the north (360). The crew asked for confirmation of the instruction, which was given by the Dutch Mil controller.

Dutch Mil Info then asked HA-LWK if they had visual contact with the aircraft one mile to their left, and flying at 3500 feet. If not, they had to stop their climb at 3000 feet. The crew of HA-LWK had visual contact with the other aircraft and saw it passing their flight track when passing 2500 feet. At the same time the crew of D-IBGC stated that the given heading of north was not such a good idea, followed by a call that they had just crossed the flight path of the airliner. The distance between the two aircraft was around 0,5 NM (0,9 km) and 300 feet when passing each other.

The crew of HA-LWK received a TCAS4 Resolution Advisory (TCAS RA) with instructions to descend, to which the crew responded. After they received the TCAS message 'clear of conflict', they continued their climb to FL090.

Weather
Visibility at the time of the occurrence was more than 10 kilometres. There were no clouds and the wind at the time was east-north-easterly with 2 knots.

4 Traffic Collision Avoidance System (TCAS) is installed on board of commercial airliners to give warning signal to the crew whenever two aircraft are getting too close, to prevent possible collisions. TCAS or Airborne Collision Avoidance System ACAS, works autonomously from other systems on board of the aircraft and gives two sequential warning to the crew. These warnings include 'traffic advisory' (TA) and 'resolution advisory' (RA) that are activated depending on the calculated time until a possible collision. TA warns the crew that other traffic is in the vicinity. RA gives the crew a warning for a possible collision and requires action from the crew. RA warnings include altitude instructions (climb, descend) to them that HAVE to be met.

8 ANALYSIS

8.1 The occurrence

After take off HA-LWK initially received clearance to climb to FL160. During the climb a twin engined propeller plane (D-IBGC) was crossing the Eindhoven SRZ at 3500 feet, flying west on Dutch Mil Info frequency. The crew of HA-LWK had visual contact on the VFR traffic. Because of altitude and position of HA-LWK the pilot of D-IBGC had no visual contact on HA-LWK.

Because of the heading of D-IBGC the ATC controller ordered HA-LWK to keep flying on runway heading (southwest) and to climb to FL090 initially, given they had visual contact on D-IBGC. Just before crossing the Eindhoven runway, D-IBGC made a left turn towards the west in the direction of Seppe airfield. The Dutch Mil ATC controller did not notice this turn initially.

After HA-LWK switched radios to Dutch Mil Info, both aircraft were on different frequencies and were unable to form a mental picture of the position of the other traffic. The ATC controller then noticed that D-IBGC had turned to the left and was now flying a westerly course, causing it to cross the flight path of HA-LWK. The controller informed both crews on separate frequencies about the presence of the other aircraft and ordered D-IBGC to fly a heading of 360, a heading that seemed most logical to him at the time. He then ordered HA-LWK to stop the climb at 3000 feet if the crew did not have visual contact with D-IBGC. The ATC controller preferred not to give explicit orders to turn because he thought it would be best if the crew reacted to what they saw themselves.

After the controller ordered IBGC to turn to a heading of 360, the crew of D-IBGC responded that 360 was not a good idea and that they had just crossed the flight path of the airliner.

Both flight paths were crossing. HA-LWK received the instruction to maintain 3000 feet unless they were visual on the other aircraft, flying at 3500 feet. Because they were visual, the crew continued the climb and then received a TCAS RA warning to which they reacted. The minimum separation distance was 0,5 nm (0,9 km) laterally and 300 feet vertically.

The ATC controller was unaware of the freedom of movement of D-IBGC within the SRZ, and the potential danger and closing speeds of the two aircraft. He instructed D-IBGC to make a right hand turn to the north, causing it to fly directly towards HA-LWK. The crew of D-IBGC did not see HA-LWK until they had changed their heading. They then warned the ATC controller that the heading change to the north was not such a good idea.

9 CONCLUSIONS

Both aircraft were operating on different frequencies, they were unable hear each other and build an air picture of traffic surrounding them.

Dutch Mil ATC noticed D-IBGC turning left toward the west flying towards the flight path of HA-LWK. He then informed both crews about the presence of the other planes and suggested D-IBGC turn to the north (360) because he thought this was the best solution at the time. HA-LWK was instructed to hold at 3000 feet unless visual with D-IBGC. Because the crew was visual on the other aircraft, the ATC controller decided it was not necessary to make any heading changes.

The crew of HA-LWK received a TCAS RA to which they reacted accordingly.

The minimum distance between the two aircraft was 0,5 NM horizontally, and 300 feet vertically.

The crew of HA-LWK had constant visual contact with the VFR traffic during the event.

There was no danger of a collision.

10 POSTSCRIPT

In May 2013 the TMA Eindhoven was established to better safeguard the operations in the Eindhoven area. In the TMA, classified as C air space, two-way separation is provided between both IFR-IFR and IFR-VFR traffic.

DUTCH
SAFETY BOARD

Visiting Address
Anna van Saksenlaan 50
2593 HT The Hague
T +31(0)70 333 70 00
F +31(0)70 333 70 77

Postal Address
PO Box 95404
2509 CK The Hague

www.safetyboard.nl