Havarikommissionen
Accident Investigation Board Denmark

BULLETIN

Serious incident

17-7-2019

involving

Cirrus SR22

N830CD

and

Piper PA38

OY-BRP

FOREWORD

This bulletin reflects the opinion of the Danish Accident Investigation Board regarding the circumstances of the occurrence and its causes and consequences.

In accordance with the provisions of the Danish Air Navigation Act and pursuant to Annex 13 of the International Civil Aviation Convention, the safety investigation is of an exclusively technical and operational nature, and its objective is not the assignment of blame or liability.

The safety investigation was carried out without having necessarily used legal evidence procedures and with no other basic aim than preventing future accidents and serious incidents.

Consequently, any use of this bulletin for purposes other than preventing future accidents and serious incidents may lead to erroneous or misleading interpretations.

TABLE OF CONTENTS

BULLETIN

General

File number:	2019-310
UTC date:	08:43
UTC time:	17-7-2019
Occurrence class:	Serious incident
Location:	Kolding /Vamdrup (EKVD)
Injury level:	None

Aircraft A

Aircraft registration:	N830CD
Aircraft make/model:	Cirrus SR22
Current flight rules:	Instrument Flight Rules (IFR)
Operation type:	Private
Flight phase:	Approach
Aircraft category:	Fixed wing
Last departure point:	Hilversum (EHHV)
Planned destination:	Kolding /Vamdrup (EKVD)

Aircraft B

Aircraft registration:	OY-BRP
Aircraft make/model:	Piper PA38
Current flight rules:	Visual Flight Rules (VFR)
Operation type:	Instructional
Flight phase:	Approach
Aircraft category:	Fixed wing
Last departure point:	Billund (EKBI)
Planned destination:	Billund (EKBI)

SYNOPSIS

Notification

All times in this report are UTC.

The Aviation Unit of the Danish Accident Investigation Board (AIB) was notified of the serious incident by the Danish Transport, Construction and Housing Authority (DTCHA) on 18-7-2019 at 08:53 hours (hrs).

The AIB notified the National Transportation Safety Board (NTSB), the European Aviation Safety Agency (EASA), the Directorate-General for Mobility and Transport (DG MOVE) and the DTCHA on 31-7-2019.

The NTSB appointed a non-travelling accredited representative to the AIB safety investigation.

Summary

On the final approach segment of the instrument approach to runway 01 at EKVD, aircraft A descended into visual meteorological conditions (VMC) and the pilot and the instructor in aircraft A obtained visual contact with EKVD.

A loss of situational awareness likely prevented the pilot and the instructor from locating and observing aircraft B on an extended right downwind leg to runway 01.

The pilot and the instructor decided to deviate to the right of the extended centreline and continue with visual reference to EKVD on a parallel track east of the aerodrome. They did not state their intention to Vamdrup Aerodrome Flight Information Service (AFIS).

Aircraft A and B flew on conflicting opposite tracks, and the aircraft passed each other at a horizontal distance of approximately 0.1 nautical miles (nm) and vertically within 150 feet (ft).

The pilot and the instructor in aircraft A did not observe aircraft B, and the student pilot in aircraft B did not observe aircraft A in time to perform an avoiding action.

The serious incident occurred in daylight and under VMC.

FACTUAL INFORMATION

History of the flight

Aircraft A was conducting a private IFR flight from EHHV to EKVD.

The owner of aircraft A (the pilot) sat in the left hand pilot seat. The pilot had scheduled a private meeting in Denmark.
A friend of the pilot (the instructor), who was an instrument rating instructor, sat in the right hand pilot seat.
One passenger, who was a pilot and a flight examiner and a common friend of both the pilot and the instructor, sat in one of the rear seats of the aircraft.

As *the pilot had limited instrument flight experience and was not IFR current*, the pilot and the instructor agreed to conduct the flight as an informal IFR training flight. Being *more familiar with the system* and prior to the flight, the instructor filed an air traffic control (ATC) IFR flight plan.

The instructor was the pilot in command (PIC) of aircraft A, and none of the three occupants in aircraft A were familiar with EKVD.

During the flight, the pilot was the pilot flying (PF), while the instructor handled the ATC radio communication and "guided" the pilot as pilot monitoring (PM).

Aircraft B was conducting a local VFR instructional solo flight from EKBI. The student pilot intended to perform touch and go landing exercises at EKVD.

Vamdrup AFIS communicated in English with the instructor in aircraft A, and in Danish with the student pilot in aircraft B.

At 08:32:00 hrs, aircraft A was approximately 33 nm south of EKVD and in radio contact with Skrydstrup Approach on frequency124.100 megahertz (MHz). The instructor in aircraft A requested to fly the area navigation (RNAV) global navigation satellite system (GNSS) runway (RWY) 01 approach via the ROSRA initial approach fix (IAF) at EKVD. Skrydstrup Approach acknowledged the request and informed that the local QNH at EKVD was 1015 hectopascal (hPa).

At 08:34:29 hrs, the student pilot in aircraft B contacted Vamdrup AFIS on 120.500 MHz and informed that the intention was to perform touch and go landing exercises at EKVD.

Vamdrup AFIS communicated the following landing details:

- local traffic was one aircraft approaching IFR from the south on the RNAV RWY 01 approach, *seven minutes out*

- runway 01 was in use
- wind was 220º/5 knots (kt), variable between 190º and 080º
- QNH was 1015 hPa.

The student pilot in aircraft B replied that he would keep a lookout for the IFR traffic and that QNH was 1015 hPa.

At 08:38:50 hrs, Skrydstrup Approach cleared aircraft A for the RNAV (GNSS) RWY 01 approach via the ROSRA IAF at 2300 ft – see appendix 1

At 08:39:04 hrs, Skrydstrup Approach informed that local traffic at EKVD was a Piper 38 doing landing circuits and instructed the pilot in aircraft A to contact Vamdrup AFIS on frequency 120.500 MHz for further traffic information. The instructor in aircraft A acknowledged the traffic information and the instruction.

At 08:39:36 hrs, the student pilot in aircraft B reported a minor technical problem with the aircraft flaps to Vamdrup AFIS. Vamdrup AFIS informed that aircraft A was approaching from the south, and that the student pilot in aircraft B could turn onto the taxiway if he needed to replace the next touch and go with a full stop landing. The student pilot in aircraft B acknowledged the information and reported that he would continue his right hand landing circuit and inform if the technical issue remained.

At 08:40:11 hrs, the instructor in aircraft A contacted Vamdrup AFIS and reported that aircraft A was established on the RNAV (GNSS) RWY 01 approach.

Vamdrup AFIS communicated the following landing details:

- runway 01 was in use
- wind was 340º/3 kt variable between 160º and 080º
- visibility was more than 10 kilometres (km)
- ceiling was a broken cloud layer at 1100 ft
- temperature was 15° Celsius (C), dew point was 13° C
- QNH was 1015 hPa
- local traffic was a VFR flight shortly on a right hand downwind.

The instructor in aircraft A replied that the information was copied.

Vamdrup AFIS repeated that runway 01 was in use, and the QNH was 1015 hPa.

There was no reply from aircraft A.

Vamdrup AFIS requested acknowledgement from aircraft A.

There was no reply from aircraft A.

At 08:41:13 hrs, Vamdrup AFIS informed the student pilot in aircraft B of loss of radio contact with aircraft A and suggested that the student pilot extended the right hand downwind leg until obtaining visual contact with aircraft A.

The student pilot in aircraft B reported extension of the right hand downwind leg and maintaining an altitude of 1000 ft.

At 08:41:34 hrs, Vamdrup AFIS called aircraft A. The instructor in aircraft A replied *go ahead*. Vamdrup AFIS asked, how aircraft A received Vamdrup AFIS on frequency 120.500 MHz. The instructor in aircraft A replied that the transmission was fine.

Vamdrup AFIS informed that *traffic on right downwind and he will prolong his downwind and QNH was 1015 and runway 01*.

The instructor in aircraft A read back the QNH information of 1015 hPa and runway 01 in use.

At 08:41:58 hrs, Vamdrup AFIS requested the position of aircraft A, to which the instructor in aircraft A replied that they had just passed the final approach fix (FAF).

Vamdrup AFIS informed that the present wind was variable 2 kt and that there was no traffic on runway 01. The instructor in aircraft A acknowledged the information.

At 08:42:18 hrs, the Vamdrup AFIS informed the student pilot in aircraft B that inbound traffic was on a 4 nm final and suggested that the student pilot continued on the extended downwind leg until obtaining visual contact. The student pilot in aircraft B replied that he would comply with the suggestions from Vamdrup AFIS. The student pilot concentrated his lookout for aircraft A in the 1-2 o'clock direction at an expected altitude below 1000 ft.

Aircraft A descended through the bottom of the broken cloud layer into VMC and obtained visual contact with EKVD. Initially, a few scattered clouds intermittently blocked the forward vision, but shortly after aircraft A descended below the scattered clouds.

The pilot and the instructor in aircraft A did not observe any aircraft in the area around the aerodrome, even though the instructor had the impression that one aircraft was on left base, one aircraft was on final and one aircraft was on the runway. For that reason, the instructor suggested to the pilot that they either performed the RNAV (GNSS) RWY 01 published missed approach procedure, or *stayed at altitude* and to the right of the final approach track in order to avoid the other aircraft in the left hand circuit.

The pilot and instructor in aircraft A decided, with visual reference to EKVD, to turn right of track and maintain an altitude of 1000 feet or above.

At 08:42:56 hrs, the student pilot in aircraft B reported to Vamdrup AFIS that aircraft A was passing almost directly overhead aircraft B.

The radar presented horizontal separation between aircraft A and B was 0.1 nm – see appendix 2

Vamdrup AFIS acknowledged and asked the pilot in aircraft A, if they were passing the aerodrome east of runway 01.

At 08:43:15 hrs, the instructor in aircraft A replied *you were blocked out many times, we are just overhead the field*.

Vamdrup AFIS asked if aircraft A experienced any problems with the RNAV equipment.

The instructor in aircraft A replied *we are VFR at the moment, so we can make a right hand downwind*.

Vamdrup AFIS replied *Roger – report right downwind.*

At 08:43:47 hrs, Vamdrup AFIS asked aircraft A for *the reason for the go around*. The instructor in aircraft A replied *we missed the final approach fix*.

Personnel information

License and medical certificate – pilot (aircraft A)

The pilot – male, 62 years – was the holder of an American private pilot license (PPL) (single engine (SE) Land (airplane (A)) (instrument rating (IR)(A)) issued by the Federal Aviation Administration (FAA) on 21-5-1993 and an American commercial pilot license (CPL) (multi engine (ME) Land (A) (IR(A))) issued by the FAA on 1-11-2010.

At the time of the serious incident, the IR(A) was not current.

The medical certificate (first class) was valid until December 2019. The medical certificate held the limitation *Must wear corrective lenses for near and distant vision*.

Flying experience

Information concerning the flying experience of the pilot was not provided to the AIB.

License and medical certificate – instructor (aircraft A)

The instructor – male, 55 years – was the holder of a valid American CPL (SE/ME Land(A) (IR(A))) issued by the FAA on 18-6-2011.
The flight instructor license (SE/ME (A) (IR(A))) was valid until 30-11-2019.

The American medical certificate (second class) was valid until 26-7-2020. The medical certificate held the limitation *Must have available glasses for near vision.*

Flying experience

	Last 24 hours	Last 90 days	Total
All types	-	18	1500
Flight instructor	-	-	850
Flight instructor instrument	-	-	445

License and medical certificate – student pilot (aircraft B)

The student pilot – male, 21 years – attended an integrated airline transport pilot airplane (ATP(A)) course at a Danish approved training organisation (ATO).

The medical certificate (class 1) was valid until 22-6-2020.

Flying experience

	Last 24 hours	Last 90 days	Total
All types	-	33	39
This type	-	-	-
Landings this type	-	-	-

Meteorological information

Terminal Aerodrome Forecast (TAF)

TAF ekvd 170657z 1707/1715 29005kt 9999 bkn008 becmg 1707/1709 bkn010 becmg 1709/1711 sct020=

Aviation Routine Weather Report (METAR)

METAR ekvd 170720z 30004kt 220v340 9999 few006 ovc007 13/11 q1015=
METAR ekvd 170750z 26003kt 9999 bkn010 14/12 q1015=
METAR ekvd 170820z 29003kt 9999 bkn011 14/12 q1015=
METAR ekvd 170850z vrb03kt 9999 bkn012 15/12 q1015=
METAR ekvd 170950z 20005kt 160v270 9999 few016 sct190 18/13 q1015=

Aftercast – winds aloft

2000 ft: Variable 1-8 kt
5000 ft: Variable 1-8 kt

Communication

The pilot and the instructor in aircraft A were in radio contact with Skrydstrup Approach on frequency 124.100 MHz. The radio communication was in English.

The pilot and instructor in aircraft A and the student pilot in aircraft B were in radio contact with Vamdrup AFIS operator on frequency 120.500 MHz.

The radio communication between the pilot and instructor in aircraft A and Vamdrup AFIS was in English, while the radio communication between the student pilot in aircraft B and Vamdrup AFIS was in Danish.

The radio transmissions were recorded, The AIB obtained the recordings, which were of good quality and useful to the safety investigation.

From 08:37:50 hrs and until 08:47:55 hrs, the sole three radio frequency users at EKVD were the AFIS operator, the instructor in aircraft A, and the student pilot in aircraft B. None of the recorded radio transmissions during this period were blocked.

All time references in the history of flight are according to timestamps of Vamdrup AFIS recordings.

Aerodrome information

General information

Aerodrome Reference Point:	55 26 11N 009 19 52E
Elevation:	143 feet
Runway directions:	015° and 195°
Runway dimensions (01/19):	1006 meters (m) x 23 m
Runway surface:	Asphalt

Vamdrup traffic information zone (TIZ)/radio mandatory zone (RMZ) (class G airspace) was defined by a 1.5 nm radius circle around the aerodrome reference point and extending from the surface and up to 1500 ft mean sea level (msl).

The aerodrome chart from the Aeronautical Information Publication (AIP) Denmark – see appendix 3

Direction of traffic circuit

According to the information provided on the EKVD Kolding Airport webpage (in Danish, German and English) by the owner of the aerodrome (Kolding Lufthavn Aps) to pilots/operators, environmental restrictions prompted (in extract):

Traffic patterns should be flown as varying between left-hand and right-hand circuits, though only after agreement with AFIS.

This was a local practise, which was not stated in the AIP Denmark.

Additional information

Aircraft A – track and circuit height

According to the instructor in aircraft A:

- *The pilot experienced at the beginning of the approach some problems with keeping the track, and he stayed a little on the right side of the track.*
- *The MDA was 560 ft but the circuit altitude was 700 ft, but we did not see any airplanes so we decided to stay at 1000 ft, or above, and made a right hand circuit and then we landed. Normally the circuit altitude of a VFR airport is 700 ft, and then the MDA should also be 700 ft.*

The AIB superimposed the RNAV (GNSS) RWY 01 approach track (IAF, intermediate fix (IF), FAF and missed approach point (MAPt)) onto a software system presentation of the radar recorded approach track of aircraft A.

The IAF, IF, FAF and MAPt lat/long positions were obtained from the AIP Denmark and inserted into the software system in a 6-digit lat/long format – see appendix 4

The radar presented groundspeeds of aircraft A between the FAF and closest aircraft passage were 156-176 kt, presenting 167 kt at aircraft passage.

The VFR circuit height of EHHV was 700 ft above ground level (agl), according to the AIP Netherlands Part 3 Aerodromes EHHV AD 2.22 Flight Procedures, and the “For pilots” information provided by the webpage of Stichting Vliegveld Hilversum.

Aircraft B – track and circuit height

In agreement with Vamdrup AFIS, the student pilot alternated between left and right hand circuits.

According to the procedures of the ATO, the student pilot in aircraft B normally used 1000 ft agl as circuit height.

In order to maintain some distance to the broken cloud layer overhead EKVD, the student pilot lowered the height of his traffic circuit to 850 ft agl, i.e. the student pilot flew at an indicated altitude of approximately 1000 ft.

Circuit height – generic use in Denmark

To the knowledge of the AIB, most or all Danish operators, ATOs and many private pilots generically used a circuit height of 1000 ft agl at all aerodromes, unless otherwise stated in the AIP or through individual aerodrome pilot information briefing sites, or because of specific operational reasons.

Minimum separation

The student pilot estimated the vertical separation between aircraft A and B to be approximately 150 ft, while aircraft A passed overhead aircraft B.

The radar presented altitude (referred to a QNH setting of 1013 hPa) of aircraft A was 1000 ft. As the software system only presented radar data in increments of 100 ft, the radar recorded altitude of aircraft A was between 950-1049 ft.

When correcting for the local QNH of 1015 hPa, the altitude of aircraft A was approximately 60 ft higher, i.e. 1010-1109 ft msl.

The position of aircraft A when passing aircraft B was approximately 0.5 nm right of the final approach of track (cross-track deviation) and with a distance of approximately 1.0 nm to the MAPt.

The AIB superimposed EKVD, the RNAV (GNSS) RWY 01 MAPt, the extended centreline of runway 01, the tracks of aircraft A and B, and the approximate position of the minimum separation between aircraft A and B onto a Google Maps image – see appendix 5

Speeds – instrument approach procedures

Aircraft categories and speeds for use during instrument approach procedures were defined according ICAO Doc 8168 Volume I, Aircraft Operations (in extract):

> *1.4.2 The criterion taken into consideration for the classification of aeroplanes by categories is the indicated airspeed at threshold (Vat).*
>
> *1.4.3 Aircraft categories will be referred to by their letter designations as follows:*
> *Category A: less than 169 km/h (91 kt) indicated airspeed (IAS)*

Category B: 169 km/h (91 kt) or more but less than 224 km/h (121 kt) IAS
1.4.6 Alternatively, the procedure may specify a maximum IAS for a particular segment without reference to aircraft category. In any case, the pilot shall comply with the procedures and information depicted on instrument flight charts and the appropriate flight parameters shown in Tables II-5-1-1 and II-5-1-2 to ensure that the aircraft remains in the areas developed for obstacle clearance purposes. – see appendix 6

According to the Cirrus SR22 pilot's operating handbook (POH) the normal approach speed was 77 kt indicated airspeed (IAS) and the stall speed in landing configuration (Vso – flaps 100% (down)) was 59 kt IAS at maximum landing mass. Stall speed at maximum landing mass at most forward center of gravity with flaps 50% was 67 kt IAS and with flaps 0% (up) was 70 kt IAS.

Professional courtesy

The AIB is aware of several cases of "professional courtesy" between pilots, where one or more pilots changed behaviour and either postponed a necessary action or failed to perform a necessary action.

This typically resulted in an increased level of risk, which in extreme cases led to an accident.

ANALYSIS

Weather conditions

The weather conditions of the 1707/1715 UTC forecast for EKVD was at the time of the serious incident reflected in the actual weather conditions at EKVD. No adverse weather was forecasted or observed.

Both IFR and VFR operations were possible with good margins to minimum ceiling and visibility requirements. The visibility below the broken cloud layer was reported to be above 10 km, representing no obvious restrictions in regard to observing aircraft in the area/traffic circuit around EKVD.

Licenses, medical certificates and flight experience

The license, ratings and medical certificate of the instructor in aircraft A had no influence on the sequence of events. The total and recent flight experience of the instructor, suggests that neither flight experience nor training level had influence on the sequence of events.

The license and medical certificate of the pilot in aircraft A, had no influence on the sequence of events. The IR of the pilot was not current and a wish to regain validity had an influence on the sequence of events.

Formally, as the flight of aircraft A was conducted as a private flight with the instructor as PIC, the license status of the pilot was irrelevant.

The medical certificate and the ATO endorsement of the student pilot in aircraft B had no influence on the sequence of events.

Aircraft A – status of flight and definitions of roles

The purpose of the flight was to a certain degree twofold:

- A private business flight (meeting in Denmark).
- An informal IFR training flight for the pilot, who could not legally act as PIC of the IFR flight.

Due to the relationship between the pilot and the instructor, the instructor seemingly accepted the role of an accompanying friend, willing to give suggestive input in order to assist the pilot in regaining IFR proficiency.

The instructor perceived the flight as a private flight and not as an instructional flight, and he accordingly filed the ATC flight plan, officially stating himself as the PIC.

Because no formal training was planned or performed, and taking into consideration that the pilot was the PF and also the owner of aircraft, it is likely that the PIC status eroded during the flight.

The split of flight duties between the pilot (flying) and the instructor (navigating/communicating) was an informal sharing, based on mutual agreement prior to the flight.

This probably constituted a situation without clear definitions of responsibilities and thereby introduced a possible decrease to flight safety, as uncertainty regarding planning, decision making and execution of planned actions during flight might occur.

The personal friendship between the pilot and the instructor, and the passenger in the rear seat, likely supported the informal atmosphere during the flight, and might have supported a behaviour of "professional courtesy".

Radio communication

It has not been possible for the AIB to reveal, why the instructor in aircraft A stated that several radio transmissions were blocked, as no blocked transmissions were recorded.

One possible explanation might be that Vamdrup AFIS and the student pilot in aircraft B communicated in Danish, which might have been perceived as blocked transmissions.

Another explanation might be that another radio set in aircraft A was simultaneously receiving transmissions on another frequency, thereby introducing an effect perceived as radio transmission blockage.

Finally, internal communication between the three occupants on board aircraft A might have "blocked" radio transmissions.

Instrument approach aircraft A

The RNAV (GNSS) RWY 01 was only approved for aircraft category A and B.

The range for final approach speeds according to ICAO Doc 8168 Vol I, table II-5-1-2 for a category A aircraft was 70-100 kt, and for a category B aircraft 85-130 kt.

Taking the Cirrus SR22 POH approach speed of 77 kt and the stall speed in landing configuration (Vso – flaps 100%) of 59 kt or (Vslg – flaps 0% / 50%) 70 / 67 kt into consideration, aircraft A was classified as a category A aircraft, i.e. Vat < 91 kt.

For reasons unknown to the AIB, the pilot and the instructor in aircraft A might have decided to operate aircraft A as a category B aircraft, however none of the information obtained by the AIB suggested this.

The winds aloft during the approach was variable 1-8 kt, while the radar recorded groundspeeds of aircraft A between the FAF and closest aircraft passage were 156-176 kt.

If applying the entire maximum wind aloft (8 kt) as a tailwind component, the likely lowest IAS of aircraft A during this segment was 148-168 kt IAS, which were substantially above the approach speed ranges for both categories A and B aircraft.

Recorded ATC radar data consistently presented aircraft A to the right of the final approach track during the RNAV (GNSS) RWY 01 approach; from 1 nm before the FAF (VDO12) and until passing the missed approach point (MAPt) located at the threshold of runway 01.

This was supported by the radio transmission (*we missed the FAF*) and the statement (*stayed a little on the right side of the track*) from the instructor in aircraft A.

With reference to the above, aircraft A final approach speed and track deviation indicated that aircraft A was not stabilised/established during the final approach segment.

It is fair to assume this caused an increased workload for the pilot and the instructor during the approach.

Traffic circuit

In line with the procedures of the ATO and what was often generically used in Denmark, the student pilot in aircraft B normally used a circuit height of 1000 ft agl.

However, due to the weather conditions at EKVD, the student pilot in aircraft B decided to fly at a lower height than normal, i.e. at approximately 850 ft agl or 1000 ft msl. This action, which may be considered as providence (luck), actually increased the vertical distance between aircraft A and B, and thereby decreased the risk of collision.

The pilot and the instructor in aircraft A were unfamiliar with operations at EKVD, but had the impression that standard VFR circuit height at EKVD was 700 ft agl. It seems like this was based on previous experience from elsewhere, including operations at EHHV, and they did not seek confirmation from Vamdrup AFIS. They were also unaware of the local practise of changing circuit direction due to environmental considerations.

The AIB fails to understand the link between VFR circuit altitude and IFR MDA, as stated by the instructor in aircraft A. To the AIB, this seems like a mix of two different set of flight rules (VFR vs IFR), where one should not be limiting or dependent upon the other.

Situational awareness

The sequence of events suggested that Vamdrup AFIS and the student pilot in aircraft B had one mental picture of the traffic situation at EKVD, whereas the pilot and the instructor in aircraft A had another.

Based on information from Skrydstrup approach and from position reports from aircraft A, Vamdrup AFIS informed the student pilot in aircraft B of the progress of aircraft A, approaching IFR from the south on a RNAV approach to runway 01.

Vamdrup AFIS suggested that aircraft B extended the right hand downwind leg, until aircraft A had passed on final for runway 01, and the student pilot in aircraft B by visual means had obtained sufficient separation to aircraft A.

The student pilot in aircraft B informed that he would act accordingly, and expected to see aircraft A to his right at a lower altitude.

In contrast to the above, the instructor in aircraft A had the perception that one aircraft was on left downwind, one on left base and one was on final for runway 01. When aircraft A descended below the cloud layer and obtained visual contact with EKVD, the pilot and the instructor looked for VFR traffic at these positions, assuming *a circuit altitude of 700 ft*. It is unclear, whether the 143 ft elevation of EKVD was taken into consideration at this stage, i.e. if the 700 ft was agl or msl.

As the pilot and instructor in aircraft A did not observe any aircraft, they decided to turn right of track and maintain an altitude of 1000 feet msl or above, and with visual reference to EKVD to position aircraft A onto a right hand downwind to runway 01.

Because the instructor in aircraft A did not inform Vamdrup AFIS of this non-standard manoeuvre, neither Vamdrup AFIS nor the student pilot in aircraft B changed their mental picture of the traffic situation.

It remains unclear, how the pilot and the instructor in aircraft A failed to transfer the twice relayed traffic information of VFR aircraft on right downwind (aircraft B) correctly into their mental picture.

But it seems fair to suppose that the pilot not being IFR current, the supposedly high workload due to the unstabilised approach, the informal command structure and the use of the flight as a training flight negatively influenced the mental capacity of the pilot and the instructor.

This might explain why the instructor in aircraft A multiple times failed to respond/or inconclusively responded to radio transmissions from Vamdrup AFIS.

It is also possible that professional courtesy or peer pressure, due to the combination of people on board aircraft A, influenced the decision making processes of the pilot or the instructor in aircraft A.

CONCLUSIONS

On the final approach segment of the instrument approach to runway 01 at EKVD, aircraft A descended into VMC and the pilot and the instructor in aircraft A obtained visual contact with EKVD.

A loss of situational awareness likely prevented the pilot and the instructor from locating and observing aircraft B on an extended right downwind leg to runway 01.

The pilot and the instructor decided to deviate to the right of the extended centreline and continue with visual reference to EKVD on a parallel track east of the aerodrome. They did not state their intention to Vamdrup AFIS.

Aircraft A and B flew on conflicting opposite tracks, and the aircraft passed each other at a horizontal distance of approximately 0.1 nm and vertically within 150 ft.

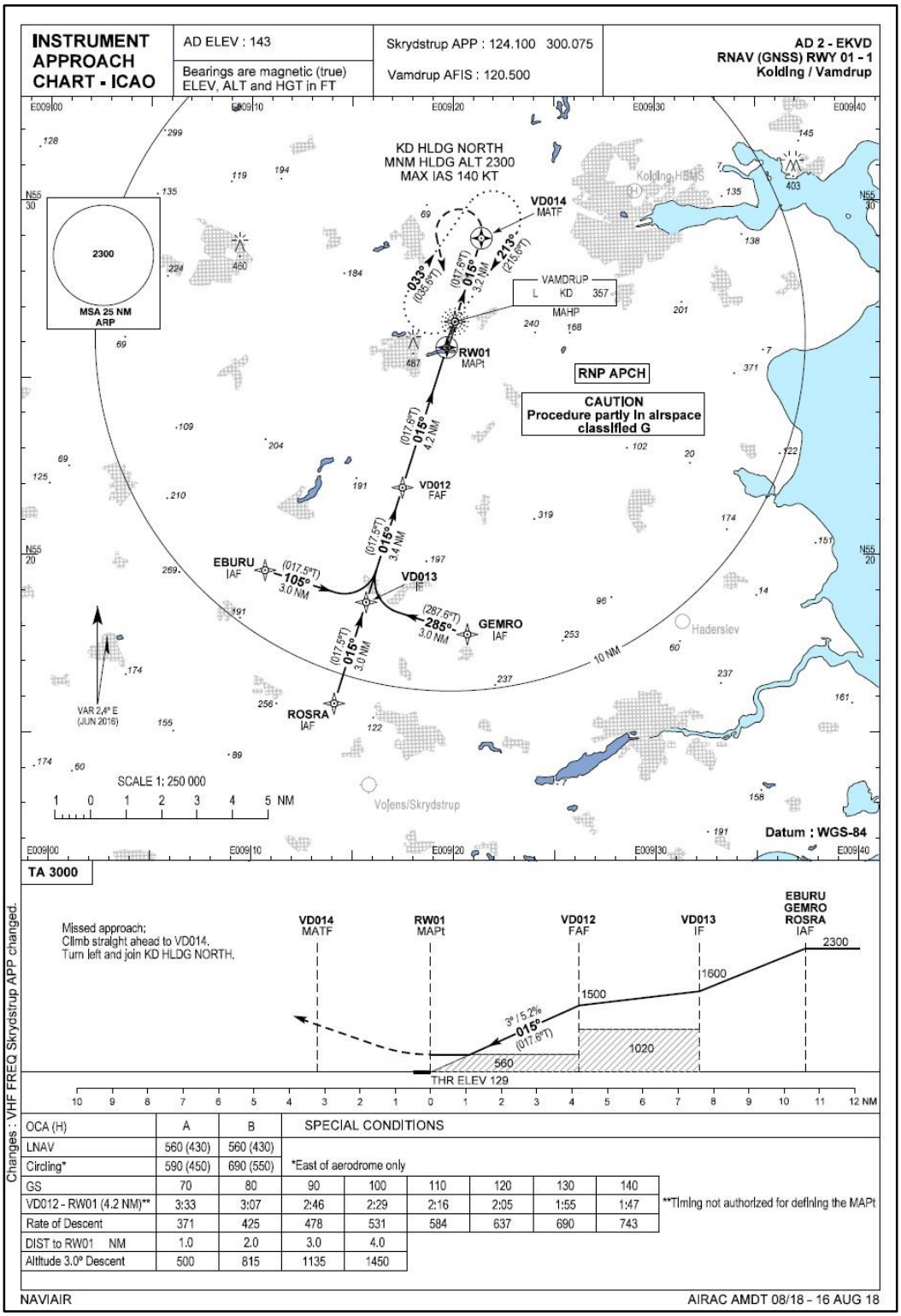
The pilot and the instructor in aircraft A did not observe aircraft B, and the student pilot in aircraft B did not observe aircraft A in time to perform an avoiding action.

The below factors probably contributed to the loss of situational awareness of the pilot and the instructor in aircraft A:

- The relationship between the pilot and the instructor.
- The undefined status of the flight.
- The informal definition of roles.
- The informal split of flight duties.
- Unfamiliarity with EKVD traffic procedures.
- Incorrect transferral of ATS traffic information.
- High workload.

APPENDIX 1 INSTRUMENT APPROACH CHART

Return to history of flight

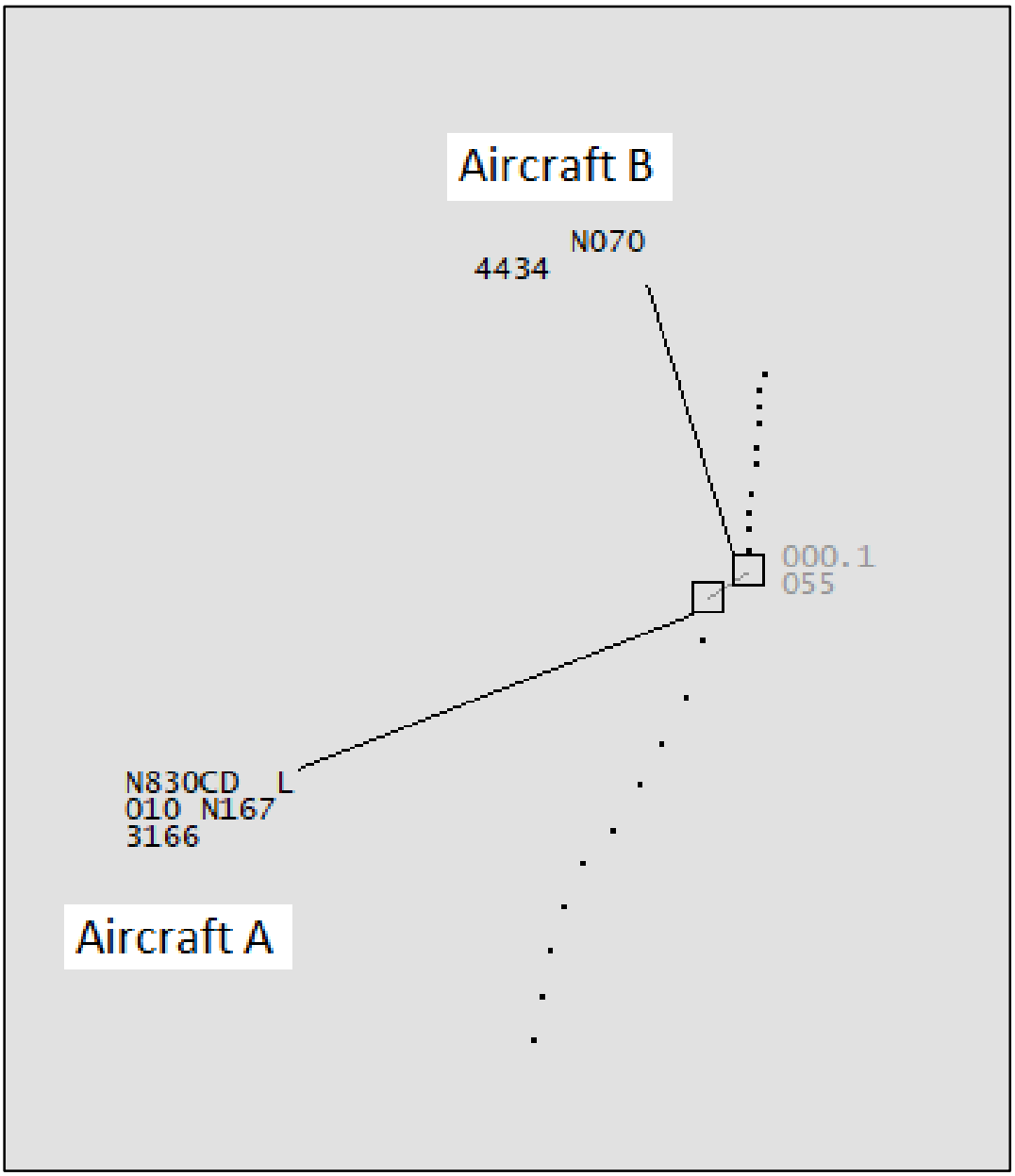


OCA (H)	A	B	SPECIAL CONDITIONS					
LNAV	560 (430)	560 (430)						
Circling*	590 (450)	690 (550)	*East of aerodrome only					
GS	70	80	90	100	110	120	130	140
VD012 - RW01 (4.2 NM)**	3:33	3:07	2:46	2:29	2:16	2:05	1:55	1:47
Rate of Descent	371	425	478	531	584	637	690	743
DIST to RW01 NM	1.0	2.0	3.0	4.0				
Altitude 3.0° Descent	500	815	1135	1450				

**Timing not authorized for defining the MAPt

APPENDIX 2 RADAR PRESENTED SEPARATION

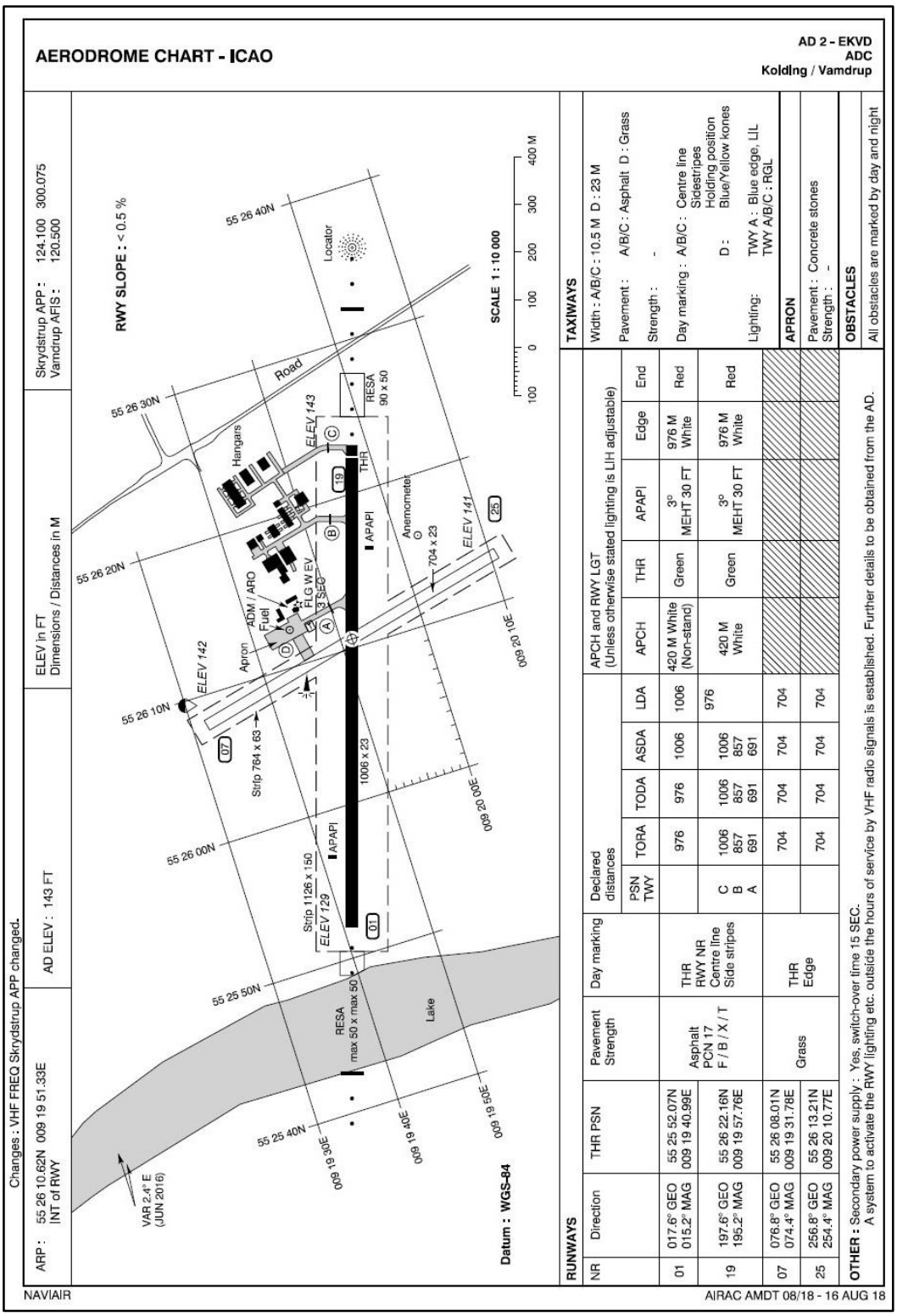
Return to history of flight



AIB software program presented radar data of aircraft A and B.
The minimum horizontal separation was radar presented as 0.1 nm.
The radar presented altitude of aircraft A was 010 (1000 ft), referenced to standard QNH setting of 1013 hPa.
Aircraft B was not equipped with a mode C/S transponder.

APPENDIX 3 AERODROME CHART

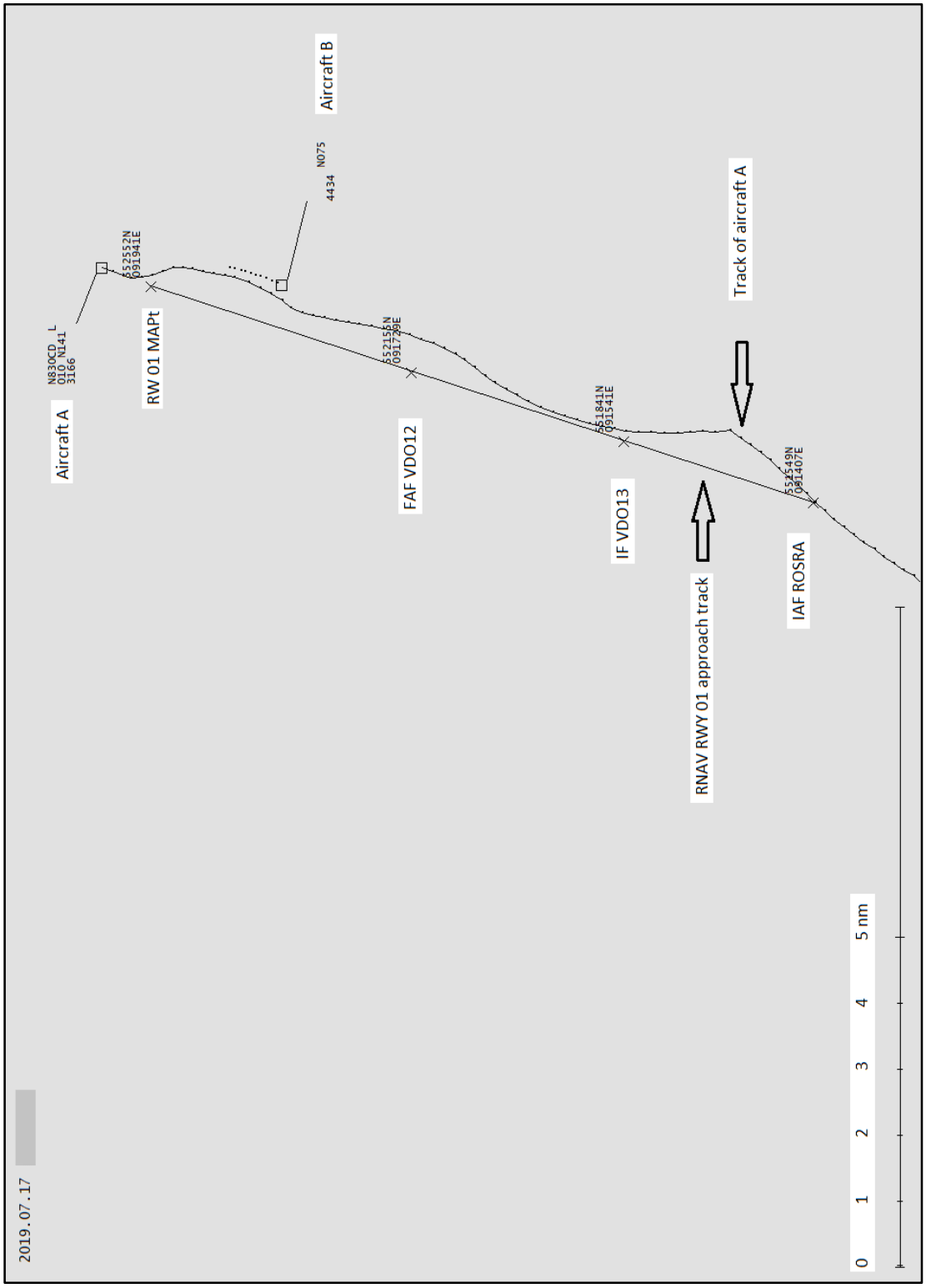
Return to aerodrome information



NR	Direction	THR PSN	Pavement Strength	Day marking	Declared distances PSN TWY	TORA	TODA	ASDA	LDA	APCH and RWY LGT (Unless otherwise stated lighting is LIH adjustable) APCH	THR	APAPI	Edge	End
01	017.6° GEO 015.2° MAG	55 25 52.07N 009 19 40.99E	Asphalt PCN 17 F / B / X / T	THR RWY NR Centre line Side stripes		976	976	1006	1006	420 M White (Non-stand)	Green	3° MEHT 30 FT	976 M White	Red
19	197.6° GEO 195.2° MAG	55 26 22.16N 009 19 57.76E			C 1006 B 857 A 691	1006 857 691	1006 857 691	1006 857 691	976	420 M White	Green	3° MEHT 30 FT	976 M White	Red
07	076.8° GEO 074.4° MAG	55 26 08.01N 009 19 31.78E	Grass	THR Edge		704	704	704	704					
25	256.8° GEO 254.4° MAG	55 26 13.21N 009 20 10.77E				704	704	704	704					

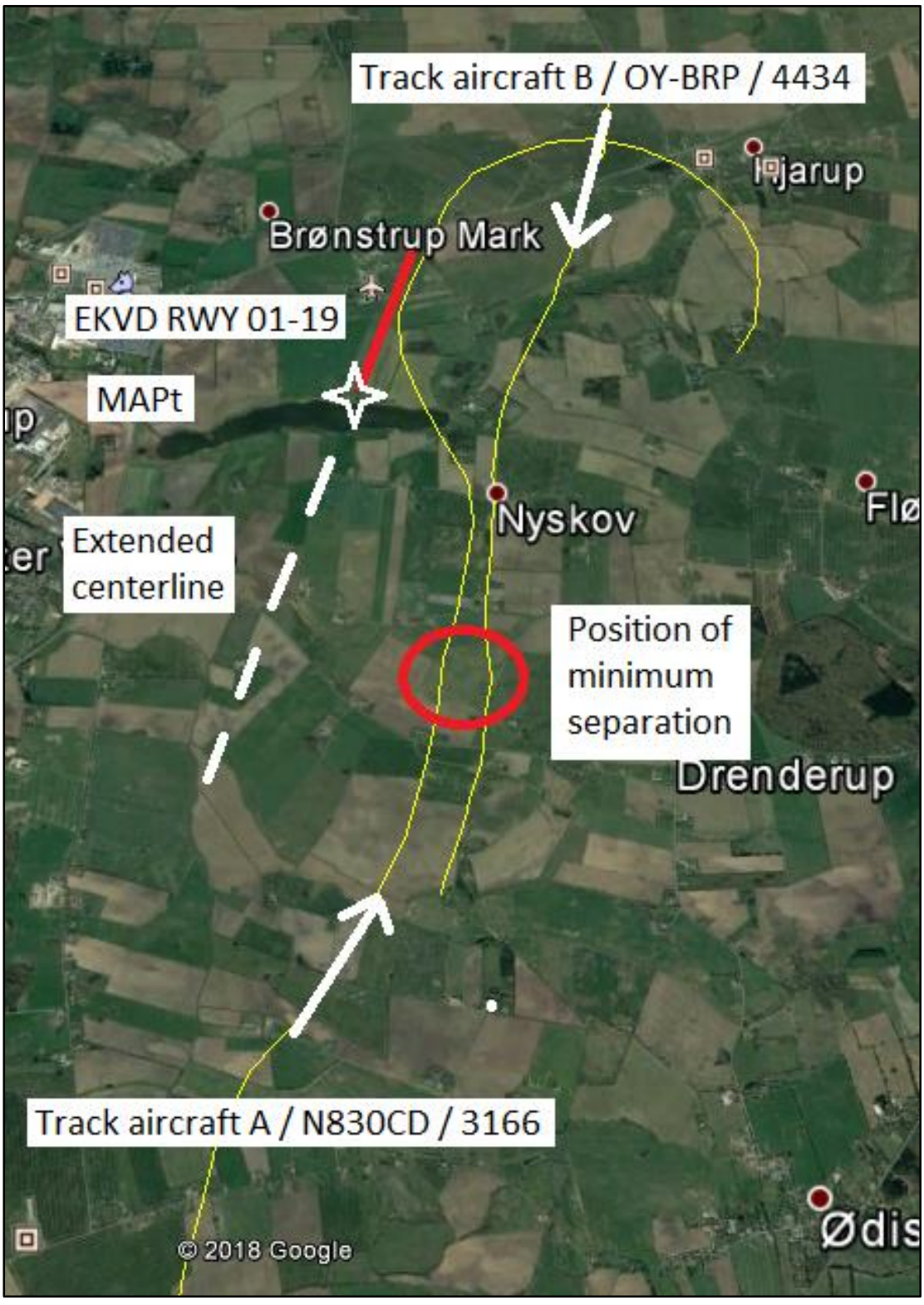
APPENDIX 4 APPROACH TRACK OF AIRCRAFT A

Return to aircraft A – track and circuit height



APPENDIX 5 TRACK OVERVIEW

Return to minimum separation



APPENDIX 6 RANGE OF APPROACH SPEEDS

Return to speeds - instrument approach procedures

Table II-5-1-2. Speeds for procedure calculations in knots (kt)

Aircraft category	V_{at}	*Range of speeds for initial approach*	*Range of final approac h speeds*	*Maximum speeds for visual manoeuvring (circling)*	*Maximum speeds for missed approach*	
					Intermediate	*Final*
A	<91	90/150(110*)	70/100	100	100	110
B	91/120	120/180(140*)	85/130	135	130	150
C	121/140	160/240	115/160	180	160	240
D	141/165	185/250	130/185	205	185	265
E	166/210	185/250	155/230	240	230	275
H	N/A	70/120**	60/90***	N/A	90	90
CAT H (PinS)***	N/A	70/120	60/90	N/A	70 or 90	70 or 90

V_{at} — Speed at threshold based on 1.3 times stall speed V_{so} or 1.23 times stall speed V_{s1g} in the landing configuration at maximum certificated landing mass. (Not applicable to helicopters.)

* Maximum speed for reversal and racetrack procedures.

** Maximum speed for reversal and racetrack procedures up to and including 6 000 ft is 100 kt, and maximum speed for reversal and racetrack procedures above 6 000 ft is 110 kt.

*** Helicopter point-in-space procedures based on basic GNSS may be designed using maximum speeds of 120 KIAS for initial and intermediate segments and 90 KIAS on final and missed approach segments, or 90 KIAS for initial and intermediate segments and 70 KIAS on final and missed approach segments depending on the operational need.

Note.— The V_{at} speeds given in column 2 of Table II-5-1-1 are converted exactly from those in this table, since they determine the category of aircraft. The speeds given in the remaining columns are converted and rounded to the nearest multiple of five for operational reasons and from the standpoint of operational safety are considered