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Aircraft accident investigation bureau

Final Report No 1886 by the Aircraft Accident Investigation Bureau

concerning the serious incident (airprox)

between SWR 1579, EMB 145, HB-JAG

and HB-LKU, Cessna C 340

on 18.04.2004

TMA Zurich

Bundeshaus Nord, CH-3003 Berne

Final Report

This report has been prepared solely for the purpose of accident/incident prevention. The legal assessment of accident/incident causes and circumstances is no concern of the incident investigation (Art. 24 of the Air Navigation Law). The masculine form is used in this report regardless of gender for reasons of data protection.

All times in this report are in the UTC format (local time = UTC +2 h)

Place/date/time	TMA Zurich, 18.04.2004, 13:57 UTC
Aircraft	SWR 1579, EMB 145, HB-JAG, Swiss Int. Airlines Vienna (LOWW) – Zurich (LSZH) HB-LKU, Cessna C 340, EFOS Flight Charter AG Basel (LFSB) – Zurich (LSZH)

ATC unit	Approach Control Zurich
Air traffic controllers	Approach Controller East Reserve

Airspace	C
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1. History

In the early afternoon of 18 April 2004, the Cessna C 340 HB-LKU was on a training flight from Colmar via Basel and back to Zurich. There were four persons on board: the flying instructor as the responsible pilot, the trainee pilot and two passengers with no flying function. The training flight was taking place as part of the trainee pilot's instruction on this aircraft type.

After making contact with the approach control office (APP), the flight crew asked about the possibility of performing a go-around on runway 14 with a subsequent second approach. Clearance was given for this and the aircraft was instructed by air traffic control (ATC) to turn left heading 020° after initiating the go-around and to climb to 4000 ft/QNH.

After the go-around, the aircraft made contact with the approach controller East (APE ATCO) in accordance with instructions and at 13:51:26 UTC received an instruction to continue climbing to 5000 ft/QNH.

At 13:52:21 UTC SWR 1579, an Embraer EMB 145 on a scheduled flight from Vienna to Zurich, passing flight level (FL) 130 in descent, reported on the frequency for the first time. The aircraft, flying in a westerly direction, was heading for holding pattern SAFFA. The APE ATCO immediately cleared it to descend to FL 90. At this time, the two aircraft were more than 20 NM apart. At 13:52:51, the APE ATCO instructed HB-LKU to climb to 7000 ft/QNH and at 13:54:39 the APE ATCO instructed the Cessna to turn left onto heading 320°. At the time, the aircraft was still in a climb passing 6000 ft/QNH. Between these last two instructions to HB-LKU, the APE ATCO instructed SWR 1579 to maintain its current, approximately westerly heading, with the instruction that he would guide it using radar vectoring to the runway 14 instrument landing system (ILS).

When SWR 1579 approached the cleared FL 90, the APE ATCO instructed it at 13:55:15 UTC to descend to FL 80. At this time the two aircraft were at a lateral separation of about 7.3 NM and were converging at an acute angle.

A little later, at 13:55:59 UTC, HB-LKU had reached 7000 ft/QNH and almost at the same time SWR 1579 reached its cleared flight level, FL 80. The Zurich QNH was 994 hPa and the transition level (TL) was FL 80. The two aircraft had converged to a lateral distance of about 4.6 NM. At the same time, it is possible to ascertain an altitude difference of about 500 ft, on the basis of the atmospheric pressure conditions. At this time the two aircraft were just within a 20 NM range of the radar antenna in use. Thus in the absence of the required minimum altitude separation of 1000 ft, a minimum radar separation of 3 NM applied.

The Zurich radar computers are configured so that recorded flight levels below the TL are automatically converted to the current Zurich QNH and displayed on the ATCOs' radar monitors as altitudes on the basis of the Zurich QNH. In this context, even a small change in flight level below the TL is sufficient to cause this change in the display.

In this phase of the incident, the APE ATCO issued each aircraft with traffic information about the other aircraft, with information to SWR 1579 that the Cessna was flying 1000 ft below it at 7000 ft. These traffic information messages occurred routinely according to the APE ATCO's statement, not because he had detected any conflict at this time. After reading back the traffic information the flight crew of SWR 1579 reported that

they had visual contact with the Cessna; the flight crew of HB-LKU did not confirm the traffic information.

At 13:56:15 UTC, an STCA (short-term conflict alert - visual warning) appeared on the APE ATCO's radar monitor, making the APE ATCO aware of the impending separation violation. Four seconds before this, the radar computer had displayed the flight level of SWR 1579 on the radar monitor for the first time as 7500 ft on the basis of the Zurich QNH. The lateral distance between the two aircraft was about 4 NM with an unchanged altitude difference of 500 ft.

At 13:56:35 UTC, minimum separation was violated, according to the radar recording; the lateral distance was still 2.8 NM and the altitude difference was 500 ft. Shortly afterwards, at 13:56:47 UTC, the Swiss crew reported and informed the APE ATCO of the apparent ATC error in relation to flight level allocation.

The APE ATCO recognised the error immediately and asked SWR 1579: "*Can you pass visual*". The Swiss flight crew answered in the affirmative. The APE ATCO then contacted HB-LKU and instructed it to turn left onto heading 250°. Together with the confirmation of this instruction, HB-LKU reported that it had visual contact with the other aircraft. At this time the lateral distance between the two aircraft, according to the radar recording, was still 1.1 NM and the altitude difference was now 400 ft.

SWR 1579 then reported a TCAS climb and in the course of this climbed to FL 86. During this action, the flight paths of the two aircraft crossed. HB-LKU was flying on the assigned heading of 250° and SWR 1579 was flying on an approximately westerly heading.

In the meantime the Swiss aircraft had overtaken the distinctly slower Cessna and shortly began to descend again to the originally cleared flight level, FL 80. Consequently a new separation violation occurred. The radar recording shows values of 1.6 NM and a 300 ft altitude difference and 2.0 NM and a 200 ft altitude difference respectively. At a lateral distance between the two aircraft of about 2.0 NM the APE ATCO cleared SWR 1479 to descend to 5000 ft/QNH. As a result, the altitude difference between the two aircraft reduced to 100 ft, according to the radar recording, whilst because of the marked difference in speed the lateral distance continuously increased, finally reaching 3 NM at 13:59:11 UTC. This further separation violation did not represent any direct risk of collision.

During the phase of the most serious lateral convergence of the two aircraft, the flight level of HB-LKU, according to the radar recording, varied within a band between 7000 ft and 7300 ft. This deviation from the assigned flight level of 7000 ft, according to the flying instructor's statement, is in flight instruction practice still within the tolerable bandwidth on training flights, without any intervention from the flying instructor being necessary.

However, at the time of his statement the flying instructor could not recall this altitude deviation, otherwise he would have instructed the trainee pilot to make a correction. At the time of his statement the trainee pilot also could not recall this altitude deviation or any intervention from the flying instructor.

During the conflict phase, the APE ATCO did not take any corrective measures which would have guaranteed rapid re-establishment or maintenance of the minimum separation. In his statement he claimed that after detecting the separation violation he had refrained from instructing SWR 1579 to take avoiding action, because he assumed

that the altitude difference of 500 ft between the two aircraft would not further decrease. Instead, he asked the flight crew of SWR 1579 whether they could maintain visual contact with HB-LKU.

Not only the APE ATCO but also the reserve controller claimed that they had not received any recent instruction about the most appropriate procedure to apply in the event of an impending or actual separation violation.

At the time of the incident, three workstations were occupied in the approach control unit: departure control (DEP), approach control WEST (APW) and approach control EAST (APE). The APW workstation was occupied by a coach and a trainee. Occupancy of workstations therefore corresponded to the requirements. Occupancy of the coordinator (CAP) and Final (FIN) workstations was not prescribed at this time of day. The competent APE ATCO had come on duty shortly before the incident at 13:45 UTC, started work at the APE workstation and relieved the reserve controller. This reserve controller had previously relieved another ATCO at the APE workstation and then left the approach control unit for a short break. At the time of the incident, i.e. at 13:57 UTC, the reserve controller had returned to the approach control unit and had relieved the DEP ATCO, whose shift ended at 14:00 UTC.

The volume of traffic in approach sector East in the 10 minutes prior to the incident was medium to high. Between 13:50:44 UTC – the time of the first call from HB-LKU after the go-around – and 13:59:11 UTC, the time when minimum radar separation between the two aircraft was re-established, a total of 78 radio conversations took place on the APE frequency, i.e. one began every 6.5 seconds. During these 8.5 minutes or so, the frequency was sometimes occupied without a break. About 3 minutes before the first separation violation, an Austrian Piper 32 (OE-KMW), which was flying according to visual flight rules (VFR) and requesting IFR joining clearance to continue its flight according to instrument flight rules (IFR), reported on the APE frequency. The handling of this aircraft was very labour-intensive, because on the one hand there was no flight plan for it and on the other hand communication with it was poor. In addition, coordination conversations with the ARFA Sector about this flight had to be conducted by the APE ATCO. In this phase, the APE ATCO asked the coach on the West sector to support him with these coordination tasks, which the latter did within his limited possibilities.

In his statement, the APE ATCO claimed further aggravating circumstances which considered in their entirety led to a complex and demanding traffic control task. Thus, for example gliding zones SN and SS (Schaffhausen North and South) had become active and parachuting activities were in progress over Schwenningen. The APE ATCO also mentioned that it was common practice about this time (i.e. shortly before 14:00 UTC) for the reserve controller, if available, to be deployed to the CAP or FINAL workstation, because experience showed that the volume of traffic increased greatly at that time.

According to his statement, the APE ATCO received a standard briefing on taking over the APE workstation, during which he noted the low pressure conditions. According to usual practice, specifying the TL was not part of the briefing. He had apparently consulted the current instructions in the briefing room beforehand. The weather was good, so he did not further consult the Infonet, where, among other things, the TL is shown. Moreover, there is also a detailed checklist for the handover briefing which, however, is hardly used in practice.

Weather according to skyguide INFONET data:

INFO HOTEL LDG RWY 14 ILS APCH. DEP RWY 28

QAM LSZH 1320Z 18.04.2004

Wind: 160 DEG, 3 KT

VIS 25 KM

FEW 4000 FT

+15°C, +06°C

QNH 994 NINE FOUR

QFE THR 14 945

QFE THR 16 945

QFE THR 28 944

NOSIG

SPEED LIMITATION

NOSIG

TRL 80 DAY 0405 NGT 1856 QNH TICINO 1200Z: 999 HPA

TROPO: 38000FT, MS60

2. Analysis

2.1 Determining the transition level as a function of the local QNH

The transition level is the lowest flight level which can be used above the transition altitude. It is determined automatically as a function of the local atmospheric pressure (QNH), disseminated over the Infonet and displayed in various forms on the ATCOs' workstations. For a QNH of at least 1013 hPa, the TL in Zurich is FL 70. The TL is automatically adapted to changing pressure conditions, in order to meet the requirement that aircraft which receive altitudes based on QNH can be separated by an altitude difference of at least 1000 ft from aircraft which receive altitudes based on standard pressure (flight levels based on an altimeter setting of 1013.2 hPa).

In the present case, the TL was FL 80 as a result of the low Zurich QNH (994 hPa). The ATCO responsible would therefore have had to assign FL 90 to SWR 1579 in order to be able to guarantee an altitude difference of at least 1000 ft to HB-LKU, which was flying at 7000 ft/QNH at the same time. FL 80 could not be assigned in this traffic situation, because it could not guarantee minimum vertical separation.

Establishing the TL at FL 70, in so far as the atmospheric pressure is above the standard pressure of 1013.2 hPa, means that approach control simultaneously has to assign altitudes to aircraft under its control based both on the local QNH (altitudes) as well as altitudes based on standard pressure (flight levels). This procedure can lead to misunderstandings and if the Zurich QNH deviates below standard pressure it means that an individual flight level cannot be used. In the present case, the altitude of 7000 ft/QNH was occupied by HB-LKU. Thus in order to guarantee vertical separation because of the low atmospheric pressure, the next higher flight level which could be used was FL 90.

2.2 Handling of the situation by the approach controller East

The APE ATCO, licensed since 1995, was surprised by the notification from SWR 1579 concerning the separation violation. His immediate reaction – asking SWR 1579: “...okay, can you pass visual?” is understandable, but should have been followed by an instruction regarding avoiding action, in order to re-establish and maintain minimum vertical separation. He omitted to do this and subsequently left the initiative completely in the hands of the SWR 1579 flight crew. Shortly afterwards, this led to a climb command from their TCAS.

Just one minute later – SWR 1579 had in the meantime passed HB-LKU – the Swiss aircraft began to descend again to its originally assigned FL 80, because its TCAS was obviously no longer able to recognise the danger of a collision because of the increasing lateral separation.

However, this development led to minimum separation being violated once more and this was aggravated because the APE ATCO cleared SWR 1579 to descend to 5000 ft/QNH, before the minimum radar separation of 3 NM had been achieved.

2.3 The hand-over procedures in Zurich approach control

For each workstation in the approach control unit there is a hand-over checklist, which according to the departmental management should be used as an aid and not as a working tool. Citing the transition level in this hand-over checklist is not expressly provided for. The statements of the two ATCOs concerned permit the conclusion that this checklist is not used consistently and systematically. In practice, a corresponding, situation-based briefing tends to be used; as a rule it does not include citing the transition level. The latter is on the one hand visible on the Infonet screen present at every workstation and on the other hand it is also indicated in a small window on the ICWS (integrated controller workstation) screen together with other information.

According to his statement, the APE ATCO was essentially aware of the low pressure conditions. Within the framework of this investigation it cannot be established whether the lack of consistent use of the hand-over checklist, which moreover does not include citing the TL, contributed to the incident.

2.4 Modalities of the deployment of reserve controllers in the approach control unit/the deployment plan

From early morning to late in the evening, according to the deployment plan for the combined tower/approach control unit, a continuous reserve is prescribed, provided by three reserve controllers at staggered times. Deployment of the reserve controllers takes place according to the instructions of the daily operations manager (DOM).

Normally, a reserve controller reports to the DOM in the tower at the start of his shift to determine scheduled deployments. This was also the case here. According to the deployment plan, neither the CAP workstation nor the FINAL workstation is occupied between 12:30 UTC and 14:15 UTC. During this period, the APW workstation takes over the CAP function. Within the time frame of the present incident, no absences were registered. In the situation under consideration, the reserve controller was present in the approach control unit, allowing reliefs in the form of short breaks. After he had been relieved at the APE workstation by the APE ATCO at the start of the latter's shift, at about 13:45 UTC, he himself took a short break of a few minutes outside the unit. Before the conflict occurred shortly before 14:00 UTC, the reserve controller had returned to the workroom and had relieved a DEP duty controller, whose shift ended at 14:00.

This action corresponds to normal practice. In the absence of any instructions from an independent CAP (at the time of the incident, the workstation did not have to be occupied, according to the deployment plan), who is responsible to the DOM for operations in the approach control unit, the ATCOs in the approach control unit themselves relieve each other by mutual agreement, independently of the DOM. However, it also emerges from the statements of the two ATCOs involved that it is also common practice for any available reserve controller to be deployed shortly before 14:00 UTC as CAP or FINAL, because experience has shown that the volume of traffic increases greatly at this time.

From this representation of conditions it is clear that in practice, at certain times and in particular when no absent duty controllers have to be replaced, no structured rules exist or are complied with concerning deployment of the reserve controller in the approach control unit. Rather, it seems to be the case that decisions are taken on an *ad hoc* basis. Naturally, in this situation different interests conflict: sometimes the ATCOs' need to fit in an additional short break, at other times there is a need to be prepared for all eventualities by means of the timely occupancy of an additional workstation.

At the time of the incident, an average to high volume of traffic, in some cases with a high degree of complexity, was having to be handled. Of the five available workstations, only three were occupied, according to plan. This degree of occupancy was not appropriate for the volume of traffic prevailing at the time of the incident.

2.5 Training air traffic controllers in intervention behaviour in the event of separation violations, with the aim of re-establishing minimum separation as quickly as possible

Both of the ATCOs involved stated that they had recently had no training in intervention behaviour in the event of separation violations with the aim of re-establishing minimum separation as quickly as possible. In the present case, the application of such procedures would have led to a quicker and safer resolution of the conflict.

On the occasion of investigations of AIRPROX incidents (e.g. CRX 3443/RMC 2032 on 18.2.2002), the AAIB has submitted a corresponding safety recommendation to the Federal Office for Civil Aviation as the supervisory authority. Likewise, the German AAIB submitted a corresponding safety recommendation to the supervisory authority (see section 4) as a consequence of the results of the investigation into the mid-air collision over Überlingen on 1 July 2002.

2.6 Maintaining of altitude by HB-LKU

The trainee pilot was flying HB-LKU manually, without using the autopilot. The incorrect climb to 7300 ft/QNH occurred mainly during the phase of the greatest lateral convergence of the two aircraft. At this time SWR 1579 had already carried out the TCAS climb. This TCAS climb began shortly before the start of the left turn onto heading 250° as instructed by the ATCO. The correction of pitch attitude and/or power setting required as a result of this change in attitude obviously caused the trainee pilot briefly to lose control over accurate maintaining of altitude. When this occurred, the flying instructor did not intervene or intervened insufficiently to make a correction. His usual practice of allowing a tolerance of up to 300 ft from the required altitude was impermissible.

2.7 TCAS (traffic collision and avoidance system)

The TCAS functions essentially according to the following principle: calculation of the time to the closest point of approach (CPA) and of the vertical distance at the CPA of two aircraft. A minimum altitude difference (ALIM) at the CPA between the aircraft concerned is ensured by means of instructions to fly vertical manoeuvres. The TCAS resolution advisories (RAs) to the crews are sub-divided into two stages:

1. preventive RA
2. corrective RA

The objective of a preventive RA is to stop the crew from making a further descent or climb if this would not guarantee the minimum vertical miss distance (ALIM) at the time of the closest point of approach (CPA). It is the objective of the TCAS to resolve a conflict if possible using preventive RAs, so that other aircraft in the vicinity are not involved as a result of a corrective RA and the consequent change in the vertical flight path due to a transition to a climb or descent.

The present case is a so-called "uncoordinated" TCAS encounter, i.e. only one of the aircraft involved, the Swiss EMB 145, was equipped with TCAS; the other aircraft, HB-LKU, was equipped only with a transponder with automatic altitude transmission. Consequently only the crew of the EMB 145 were able to benefit from the TCAS resolution advisories; the flight crew of the Cessna 340 were dependent on the "traffic information" provided by air traffic control.

Version 7.0 software was installed in the TCAS system of the EMB 145. This software works with different, altitude-dependent sensitivity levels. In the altitude range between 5000 ft and 10,000 ft AMSL it is designed, in sensitivity level 5, for a vertical distance of <600 ft, to issue a preventive RA "*don't descend*" (aural call-out: "*monitor vertical speed*"), as long as a vertical miss distance (ALIM) of 350 ft is not violated. This applies only if both aircraft are in horizontal flight. At its flight level of FL 80, which for a QNH of 994 hPa corresponds to about 7460 ft, there was a vertical distance of about 460 ft, which, given stable flight levels of the two aircraft, should have led to a vertical miss distance of 460 ft and therefore to a preventive RA in the EMB 145. On the basis of the available data, it remains an open question why the TCAS calculated a minimum vertical distance (ALIM) at the CPA of less than 350 ft which is why this led to a "climb, climb" corrective RA being issued.

2.8 Findings

- Both aircraft were flying according to instrument flying rules in Class C controlled airspace.
- Both aircraft were in uninterrupted radio contact with the responsible air traffic controller (APE ATCO).
- HB-LKU was being controlled manually by the trainee pilot. The flying instructor was supervising him.
- The Zurich QNH was 994 hPa and the transition level (TL) was FL 80.
- The Zurich radar computers are configured so that recorded flight levels below the TL are automatically converted to the current Zurich QNH and displayed as altitude on the basis of the Zurich QNH.
- At 13:52:56 UTC, HB-LKU received the instruction to climb to 7000 ft/QNH.
- At 13:55:15 UTC, SWR 1579 received the instruction to descend to FL 80.
- At 13:56:00 UTC, SWR 1579 received the following traffic information: *"And Swiss one five seven niner er...expect traffic actually one thousand feet below you but more or less same direction at your ten o'clock four miles at seven thousand feet"*. The Swiss flight crew answered: *"Er... Swiss one five seven niner negative contact"*.
- At 13:56:12 UTC the APE ATCO repeated the traffic information: *"Jo Swiss one five seven niner Cessna three-forty at your eleven now three miles one thousand feet below, I confirm to maintain eight zero for you"*. The Swiss aircraft answered as follows: *"...eight zero and traffic in sight Swiss one five seven niner"*.
- At 13:56:30 UTC, HB-LKU received the following traffic information: *"Hotel Kilo Uniform you have the tr... er the traffic the Embraer as well in sight at your three o'clock three miles above?"*The Cessna did not answer this question.
- At 13:56:47 UTC SWR 1579 reported: *"Just for information Swiss er one five seven niner this traffic is only four hundred feet below us because he is flying a QNH whereas we're on flight level"*. At this time the two aircraft were 2.1 NM apart, and the altitude difference was 500 ft.
- At 13:56:54 UTC, the APE ATCO answered as follows: *"That's a???? mistake from my side, okay can you pass visual?"*The Swiss aircraft answered as follows: *"We passed visual Swiss one five seven..."* During this transmission, a TCAS RA "climb, climb" can be heard in the background.
- At 13:57:07 UTC, the flight crew of SWR 1579 reported a TCAS climb. According to the radar recording, the aircraft had already initiated the climb.
- At 13:58:36 UTC, the APE ATCO issued the following instruction to descend to SWR 1579: *"Swiss one five seven niner now descend again please to five thousand feet on QNH niner niner four"*. According to the radar recording, at this time HB-LKU was maintaining an altitude of 7300 ft/QNH with SWR 1579 at 7500 ft/QNH. The radar distance between the two aircraft was 2.0 NM and increasing.

- At 13:59:11 UTC, the minimum radar separation of 3 NM was reached; HB-LKU was maintaining an altitude of 7200 ft/QNH and SWR 1579 was passing 7300 ft/QNH in descent.
- The prevailing volume of traffic was medium to high with high complexity in some cases.
- At the time of the incident, three workstations were occupied in the approach control unit. This workstation occupancy corresponded to the requirement.
- A reserve controller was working. He was busy with reliefs for short breaks.
- Both flight crews and the competent air traffic controller were in possession of the licences necessary to exercise their activities.
- The CMDR of SWR 1579 submitted an ATIR to the AAIB on 18 April 2004. The air navigation services company skyguide submitted an ATIR to the AAIB on 8 June 2004.

3. Cause

The incident is attributable to incorrect vertical separation.

4. Safety recommendation

Training air traffic controllers in the intervention behaviour in the event of separation violations with the aim of re-establishing minimum separation as quickly as possible

Safety deficit

In the present case, after detecting the separation violation the air traffic controller responsible asked the flight crew of SWR 1579 whether they could pass HB-LKU visually ("*...can you pass visual*"). The latter answered in the affirmative, but shortly afterwards initiated a TCAS climb. The air traffic controller did not take any further measures to re-establish or ensure minimum separation. Subsequently, SWR 1579 descended again to its originally assigned flight level, resulting in another separation violation, which was further aggravated by the fact that the air traffic controller gave SWR 1579 a further clearance to descend through HB-LKU's flight level before minimum radar separation had been established.

The following safety recommendations have already been submitted by the Swiss AAIB and the German Federal Bureau of Aircraft Accidents Investigation to the Federal Office for Civil Aviation on the occasion of the investigation into serious incident involving CRX3443 on 18.2.2002 and on the occasion of the investigation into the mid-air collision over Überlingen on 1 July 2002.

Safety recommendation No. 284

The Federal Office for Civil Aviation should arrange for all ATCOs to practise emergency scenarios systematically, regularly, theoretically and practically (in the simulator), with particular reference to rapid re-establishment of the required minimum separation after it has been violated. In this context, the highest attention must be paid to the use of appropriate phraseology.

Safety recommendation No. 375

The FOCA should ensure that air traffic controllers receive initial and continuing training which includes theoretical and practical (simulator) emergency procedures, especially the following aspects:

- Recognising potential traffic conflicts and ensuring separation in accordance with international standards.
- Rapid re-establishment of minimum separation when it has been violated.
- The use of appropriate phraseology with the emphasis on resolving the situation in the shortest possible time and with a minimum of transmission time.

Berne, 12 January 2006

Aircraft Accident Investigation Bureau

This report has been prepared solely for the purpose of accident/incident prevention. The legal assessment of accident/incident causes and circumstances is no concern of the incident investigation (Art. 24 of the Air Navigation Law). The masculine form is used in this report regardless of gender for reasons of data protection.

**TRANSCRIPT OF TELEPHONY
OR RADIOTELEPHONY COMMUNICATION TAPE-RECORDINGS**

Investigation into the **incident** that occurred on **18.04.2004**

- Subject of transcript: **SWR1579 / HB-LKU**

- Centre concerned: Swiss Radar Area East

- Designation of unit: Zurich Arrival Sector East

- Frequency / Channel: 120.750 MHz

- Date and period (UTC) covered by attached extract: 18.04.2004
13:50 - 14:09 UTC

- Date of transcript: 28th April 2004

- Name of official in charge of transcription: Claudio DI PALMA

- Certificate by official in charge of transcription:

I hereby certify:

- That the accompanying transcript of the telephony or radiotelephony communication tape-recordings, retained at the present time in the premises of the Analysis Department, has been made, examined and checked by me.
- That no changes have been made to the entries in columns 2, 3 and 4, which contain only clearly understood indications in their original form.

Zürich, 28th April 2004

Claudio DI PALMA



Abbreviations

Sector Designation of sector

APE - Zurich Arrival Sector East

<u>Aircraft</u>	-	<u>Callsign</u>		<u>Type of acft</u>	<u>Flight rules</u>	<u>ADEP</u>	-	<u>ADES</u>
H-KU	-	HB-LKU		C340	IFR	LSZH	-	LSZH
1019	-	SWR1019	Swiss	E145	IFR	EDDL	-	LSZH
401	-	STY401	Styrian	CRJ2	IFR	EPKK	-	LSZH
1579	-	SWR1579	Swiss	E145	IFR	LOWW	-	LSZH
280	-	MAK280	Makedonian	B733	IFR	LWSK	-	LSZH
O-MW	-	OE-KMW		P32R	IFR	EDTF	-	LOLW
81R	-	SWR81R	Swiss	RJ1H	IFR	EDDV	-	LSZH
1487	-	SWR1487	Swiss	RJ1H	IFR	LKPR	-	LSZH
169	-	SWR169	Swiss	A343	IFR	RJAA	-	LSZH

OZEO-dc / 28th April 2004

TRANSCRIPT SHEET

Occurrence: SWR1579 / HB-LKU of 18.04.2004



To	From	Time	Communications	Observations
<u>Col.1</u>	<u>Col.2</u>	<u>Col.3</u>	<u>Col.4</u>	<u>Col.5</u>

Frequency: 120.750 MHz Zurich Arrival Sector East

APE	H-KU	13:50:44	"Züri Arrival grüezi" Hotel Bravo Lima Kilo Uniform on missed approach procedure three thousand feet climbing to four thousand feet	
H-KU	APE	:50	Hotel Bravo Lima Kilo Uniform "grüessech" roger, continue for the moment as cleared I call you back	
APE	H-KU	:56	Continue as cleared Hotel Kilo Uniform	
1019	APE	13:51:09	Swiss one zero one niner no speed restriction	
APE	1019	:11	Copied Swiss one zero one niner	
H-KU	APE	:21	Hotel Kilo Uniform äh... climb to five thousand feet	
APE	H-KU	:26	Climb to five thousand feet Hotel Kilo Uniform	
APE	1019	:30	And Swiss one zero one niner fully established one four	
1019	APE	:35	Swiss one zero one niner "dankeschön" contact Tower one one eight decimal one "ade"	
APE	1019	:38	One one eight one "adieu" Swiss one zero one niner	
401	APE	:46	Styrian four zero one, two six track miles	
APE	401	:50	Enough for us Styrian four zero one	
401	APE	:52	Roger than and äh... XXXXX no more speed restriction	unreadable, could be "to confirm"
APE	401	:56	Roger XXXXX	unreadable, could be "affirm"
APE	1579	13:52:21	Arrival "grüezi" Swiss one five seven niner flight level one three zero direct SAFFA Embraer one four five ????? knots information India	unreadable
1579	APE	:28	Swiss one five seven niner Arrival "grüeziwohl" descend to flight level niner zero	
APE	1579	:31	Level niner zero Swiss one five seven niner	

TRANSCRIPT SHEET

Occurrence: SWR1579 / HB-LKU of 18.04.2004



To <u>Col.1</u>	From <u>Col.2</u>	Time <u>Col.3</u>	Communications <u>Col.4</u>	Observations <u>Col.5</u>
280	APE	13:52:35	Makedonian two eight zero reduce to one six zero knots	
APE	280	:39	Reducing one-sixty Makedonian two eight zero	
401	APE	:41	Styrian four zero one we have to increase separation for a moment äh... reduce now please speed to two one zero knots	
APE	401	:48	Reducing speed two-ten Styrian four zero one	
401	APE	:50	Thank you	
H-KU	APE	:51	Hotel Kilo Uniform continue climb to seven thousand feet	
APE	H-KU	:56	Continue to seven thousand feet Hotel Kilo Uniform	
1579	APE	:58	Swiss one five seven niner continue on present heading please, vectoring to the ILS runway one four	
APE	1579	13:53:03	Present heading Swiss one five seven niner	
APE	280	:06	Fully established Makedonian two eight zero	
280	APE	:08	Thank you Makedonian two eight zero no further speed restriction contact Tower one one eight decimal one "adieu"	
APE	280	:13	Eighteen-one thank you	
APE	O-MW	:16	Zürich Approach Oscar Echo Kilo Mike Whisky goo... good-day	
O-MW	APE	:25	Oscar Echo Kilo Mike Whisky go ahead please	
APE	O-MW	:27	Oscar Echo Kilo Mike Whisky on an IFR flight, still VFR from Freiburg to äh... Lima Oscar Lima Tango twenty miles North-East of Tango Romeo Alfa in five thousand five hundred feet in a P A thrity two request IFR pick-up	
O-MW	APE	:44	Oscar Echo Mike Whisky roger for the moment squawk six three zero four please	
APE	O-MW	:48	Say again Oscar Mike Whisky	
O-MW	APE	:50	Oscar Echo Kilo Mike Whisky squawk six three zero four	

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Occurrence: SWR1579 / HB-LKU of 18.04.2004



To <u>Col.1</u>	From <u>Col.2</u>	Time <u>Col.3</u>	Communications <u>Col.4</u>	Observations <u>Col.5</u>
APE	O-MW	13:53:56	Say again squawk	
O-MW	APE	:58	Stand-by stand-by, call you back	
401	APE	13:54:00	Styrian four zero one descend to four thousand feet turn left heading two five zero	
APE	401	:05	Heading two five zero descending four thousand Styrian four zero one	
401	APE	:07	Styrian four zero one correct and reduce the speed to one eight zero knots now	
APE	401	:11	Reducing speed one eight zero knots Styrian four zero one	
O-MW	APE	:14	Oscar Echo Kilo Mike Whisky squawk one four zero four	
APE	O-MW	:20	Squawk one f... zero four Oscar Echo Kilo Mike Whisky	
O-MW	APE	:24	I do confirm squawk one four zero four	
APE	O-MW	:29	One four zero four Oscar Echo Kilo Mike Whisky	
O-MW	APE	:32	Correct	
H-KU	APE	:39	Hotel Kilo Uniform fly heading three two zero	
APE	H-KU	:42	Fly heading three two zero Hotel Kilo Uniform	
401	APE	:45	Styrian four zero one turn left heading one six zero cleared ILS approach runway one four	
APE	401	:49	Left one six zero cleared ILS one four Styrian four zero one	
1579	APE	13:55:15	Swiss one five seven nine descend to flight level eight zero	
APE	1579	:17	Level eight zero Swiss one five seven niner	
1579	APE	13:56:00	And Swiss one five seven niner äh... expect traffic actually one thousand feet below but more or less same direction at your ten o'clock four miles at seven thousand feet	

TRANSCRIPT SHEET

Occurrence: SWR1579 / HB-LKU of 18.04.2004



To Col.1	From Col.2	Time Col.3	Communications Col.4	Observations Col.5
APE	1579	13:56:12	Äh... Swiss one five seven niner negative contact	
1579	APE	:16	"Jo" Swiss one five seven niner Cessna three-forty at your eleven now three miles one thousand feet below, I confirm to maintain eight zero four you	
APE	1579	:26	XXXXX eight zero and traffic in sight Swiss one five seven niner	unreadable, could be "doing"
H-KU	APE	:30	Hotel Kilo Uniform you have the tr... äh... the traffic the Embraer as well in sight at your three o'clock three miles above	
APE	81R	:39	Arrival "guete Tag" Swiss eight one Romeo level one four four for one three zero R J one Hotel information India	
APE	1579	:47	Just for information Swiss äh... one five seven niner this traffic is only four hundred feet below us because he is flying a QNH whereas we're on flight level	
1579	APE	:54	That's a ?????? mistake from my side, okay can you pass visual	unreadable
APE	1579	:57	We passed visual Swiss one five seven...	climb RA audible in the background
1579 / H-KU	APE	:59	"Danke vielmol" Hotel Kilo Uniform turn now left heading two five zero	
APE	H-KU	13:57:03	Turn left heading two five zero Hotel Kilo Uniform and traffic in sight	
APE	1579	:07	Swiss one five seven niner TCAS climb	
1579	APE	:09	Okay	
APE	81R	:39	Arrival swiss eight one Romeo "guete Tag" level one three five for one three zero with India R J one Hotel	
81R	APE	:41	Swiss eight one Romeo f... Arrival "guete Tag wohl" continue inbound to Trasadingen please	
APE	81R	:47	To Trasadingen Swiss eight one Romeo	

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Occurrence: SWR1579 / HB-LKU of 18.04.2004



To <u>Col.1</u>	From <u>Col.2</u>	Time <u>Col.3</u>	Communications <u>Col.4</u>	Observations <u>Col.5</u>
1579	APE	13:57:50	Okay Swiss one five seven niner then continue still on the present heading please and reduce the speed to one eight zero knots	
APE	1579	:57	Heading, flight level eight zero and speed one eight zero knots Swiss one five seven niner	
1579	APE	13:58:01	And I really do apologise about this calculating problem and äh... can you continue or actually descend again please "ja" disregard I call you back for the descent we make it a safe separation five miles, call you back	
APE	1579	:14	Swiss one five seven nine Roger	
1579	APE	:16	Okay	
1579	APE	:36	Swiss one five seven niner now descend again please to five thousand feet on QNH niner niner four	
APE	1579	:42	Five thousand niner niner four Swiss one five seven niner	
H-KU	APE	:49	Hotel Kilo Uniform make it an orbit left at present position please	
APE	H-KU	:53	Make an orbit to the left present position Hotel Kilo Uniform	
81R	APE	13:59:09	Swiss eight one Romeo turn left inbound to SAFFA please	
APE	81R	:13	Left to SAFFA Swiss eight one Romeo	
401	APE	:15	Styrian four zero one you're cleared to land runway one four the wind is two two zero degrees four knots, on the ground please Tower one one eight decimal one	
APE	401	:22	On ground eighty-one and cleared to land one four Styrian four zero one	
APE	1487	:26	Arrival "grüezi" Swiss one four eight seven level one four zero inbound RILAX speed two seven zero R J one hundred information India	
1487	APE	:35	Swiss one four eight seven Arrival "grüeziwohl" hold at RILAX level one four zero	

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Occurrence: SWR1579 / HB-LKU of 18.04.2004



To Col.1	From Col.2	Time Col.3	Communications Col.4	Observations Col.5
APE	1487	13:59:39	Holding at RILAX one four zero Swiss one four eight seven and the expected approach time please?	
1487	APE	:44	It's only one orbit	
APE	1487	:45	Roger	
81R	APE	:46	Swiss eight one Romeo descend to flight level niner zero	
APE	81R	:49	Swiss eight one Romeo leaving one three zero for level niner zero	
APE	169	:54	Zurich hello Swiss one six niner heavy Airbus information India	
169 / 1579	APE	:58	Swiss one six niner heavy "grüeziwohl" stand by short, break break Swiss one five seven niner turn left heading one seven zero descend to four thousand feet cleared ILS approach runway one four	
APE	1579	14:00:06	????? cleared for the ILS one four Swiss one five seven niner	unreadable
1487	APE	:16	And Swiss one four eight seven descend to level one three zero	
APE	1487	:18	One three zero Swiss one four eight seven and starting to reduce speed	
1487	APE	:21	Roger then no speed restriction for the moment	
APE	1487	:23	"Danke"	
169	APE	:25	Swiss one six niner make it an orbit right-hand overhead RILAX please	
APE	169	:29	Orbit right-hand overhead RILAX Swiss one six niner	
H-KU	APE	:34	Hotel Kilo Uniform continue on heading two seven zero	
APE	H-KU	:38	Continue on heading two seven zero Hotel Kilo Uniform	

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Occurrence: SWR1579 / HB-LKU of 18.04.2004

To Col.1	From Col.2	Time Col.3	Communications Col.4	Observations Col.5
81R	APE	14:00:43	Swiss eight one Romeo descend to eight äh... flight level eight zero now please and reduce the speed to two-ten	
APE	81R	:50	Descend level eight zero speed two-ten Swiss eight one Romeo	
O-MW	APE	14:01:09	Oscar Echo Kilo Mike Whisky continue for the moment VFR I will call you back	
APE	O-MW	:20	Reading you two Oscar Echo Kilo Mike Whisky standing by for XXXXX	Unreadable, could be "joining"
O-MW / H-KU	APE	:25	Oscar Echo Kilo Mike Whisky stand by please, break break äh... Hotel Bravo Lima Kilo Uniform report your speed	
APE	H-KU	:31	Speed is äh... one five zero Hotel Kilo Uniform	
H-KU	APE	:35	Roger	
81R	APE	:37	Swiss eight one Romeo report äh... speed äh... confirm it's two-ten at the moment as given before?	
APE	81R	:44	Äh... passing two-thirty for two-ten Swiss eight one Romeo	
81R	APE	:47	Roger then what is your clean speed?	
APE	81R	:49	Clean two-hundred	
81R	APE	:50	Okay reduce to two zero zero please	
APE	81R	:52	Reducing two zero zero knots Swiss eight one Romeo	
81R	APE	:54	"Dankeschön"	
169	APE	:56	Swiss one six niner descend to flight level one four zero	
APE	169	:59	Cleared level one four zero Swiss one six nine	
1579	APE	14:02:17	Swiss one five seven niner maintain at least one six zero knots please	
APE	1579	:20	One five seven niner roger	

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Occurrence: SWR1579 / HB-LKU of 18.04.2004



To <u>Col.1</u>	From <u>Col.2</u>	Time <u>Col.3</u>	Communications <u>Col.4</u>	Observations <u>Col.5</u>
O-MW	APE	14:02:22	Oscar Echo Kilo Mike Whisky?	
APE	O-MW	:25	Oscar Echo Kilo Mike Whisky Zurich Radar?	
O-MW	APE	:27	Contact Zurich Radar on one one niner decimal niner two please	
APE	O-MW	:33	I'm reading you only one to two Oscar Echo Kilo Mike Whisky	
O-MW	APE	:37	Contact Radar on one one niner decimal niner two	
APE	O-MW	:43	One one five decimal niner two Oscar Echo Kilo Mike Whisky	
O-MW / 81R	APE	:47	Negative stand by Swiss eight one Romeo would you be able to äh... transform the message for me to Oscar Echo Kilo Mike Whisky to contact Radar on one one niner niner two?	
APE	81R	:59	We too we do one one niner niner two	
81R	APE	14:03:01	For the... "ja" can you äh... give the message please to Oscar Echo Kilo Mike Whisky I can't reach them on the frequency any more	
APE / O-MW	81R	:10	To Oscar Echo Kilo Mike Whisky we'll do, Oscar Echo Kilo Mike Whisky from Swiss eight one Romeo?	
81R	O-MW	:16	Oscar Echo Kilo Mike Whisky go ahead	
O-MW	81R	:18	Contact one one niner decimal niner two	
81R	O-MW	:21	Contact one one niner decimal niner two thanks for ????? Oscar Echo Kilo Mike Whisky	unreadable
81R	APE	:26	Swiss eight one Romeo thanks very much turn now right onto heading two five zero please	
APE	81R	:30	Right turn heading two five zero Swiss eight one Romeo	
H-KU	APE	:32	Hotel Kilo Uniform turn left heading two two zero	
APE	H-KU	:36	Turn left heading two two zero Hotel Kilo Uniform	

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Occurrence: SWR1579 / HB-LKU of 18.04.2004



To <u>Col.1</u>	From <u>Col.2</u>	Time <u>Col.3</u>	Communications <u>Col.4</u>	Observations <u>Col.5</u>
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1579	APE	14:03:40	Swiss one five seven nine you're number one no speed restriction contact Tower one one eight decimal one	
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APE	1579	:45	One eight one "uf wiederluege" Swiss äh... one five seven niner	
-----	------	-----	---	--

2 stations in between

H-KU	APE	14:04:12	Hotel Kilo Uniform descend to four thousand feet	
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APE	H-KU	:14	Descend to four thousand feet Hotel Kilo...	
-----	------	-----	---	--

2 stations in between

H-KU	APE	:54	Hotel Kilo Uniform reduce the speed to one two zero knots	
------	-----	-----	---	--

APE	H-KU	14:05:01	????? Hotel Kilo Uniform	
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overlapped by other station

H-KU	APE	:04	Hotel Bravo Lima Kilo Uniform reduce speed to one two zero knots turn left heading one seven zero cleared ILS approach runway one four	
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APE	H-KU	:11	Reduce to one two zero knots left turn heading one seven zero Hotel Kilo Uniform	
-----	------	-----	--	--

H-KU	APE	:17	Roger cleared ILS approach runway one four	
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APE	H-KU	:19	Cleared ILS approach runway one four Hotel Kilo Uni...	
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5 stations in between

TRANSCRIPT SHEET

Occurrence: SWR1579 / HB-LKU of 18.04.2004



To <u>Col.1</u>	From <u>Col.2</u>	Time <u>Col.3</u>	Communications <u>Col.4</u>	Observations <u>Col.5</u>
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APE	H-KU	14:06:57	Hotel Kilo Uniform established ILS runway one four	
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H-KU	APE	:59	Hotel Kilo Uniform roger, you're five and a half miles behind a Piper Archer	
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APE	H-KU	14:07:04	Roger Kilo Uniform	
-----	------	----------	--------------------	--

5 stations in between

H-KU	APE	14:08:03	Hotel Kilo Uniform no further speed restriction contact Tower one one eight decimal one "ade"	
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APE	H-KU	:08	One one eight decimal one "ade" Hotel Kilo Uniform	
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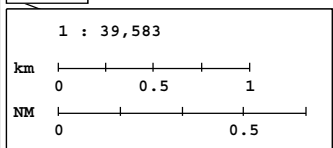
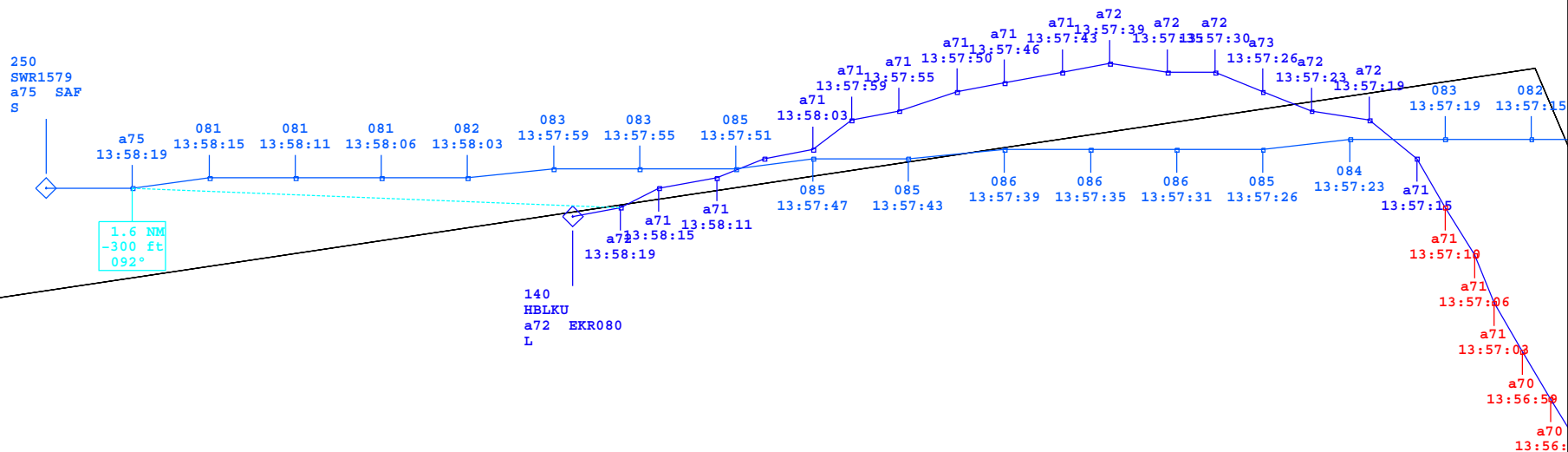
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Src
APN

Analysis: SWR1579 HB-LKU Time [UTC]: 18.04.2004 13:58:26



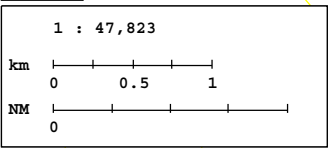
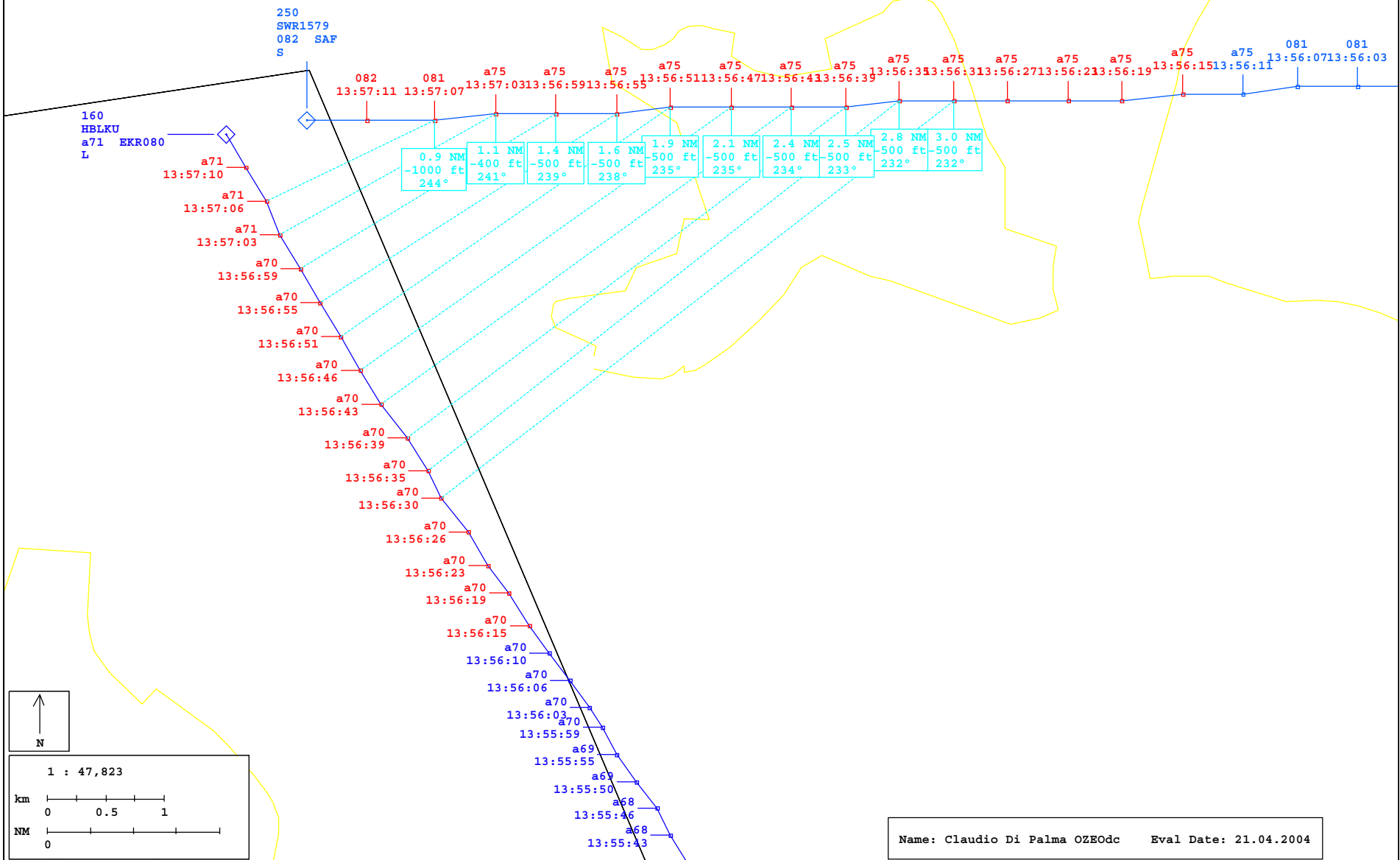
45



Name: Claudio Di Palma OZE0dc Eval Date: 28.04.2004

Src
APN

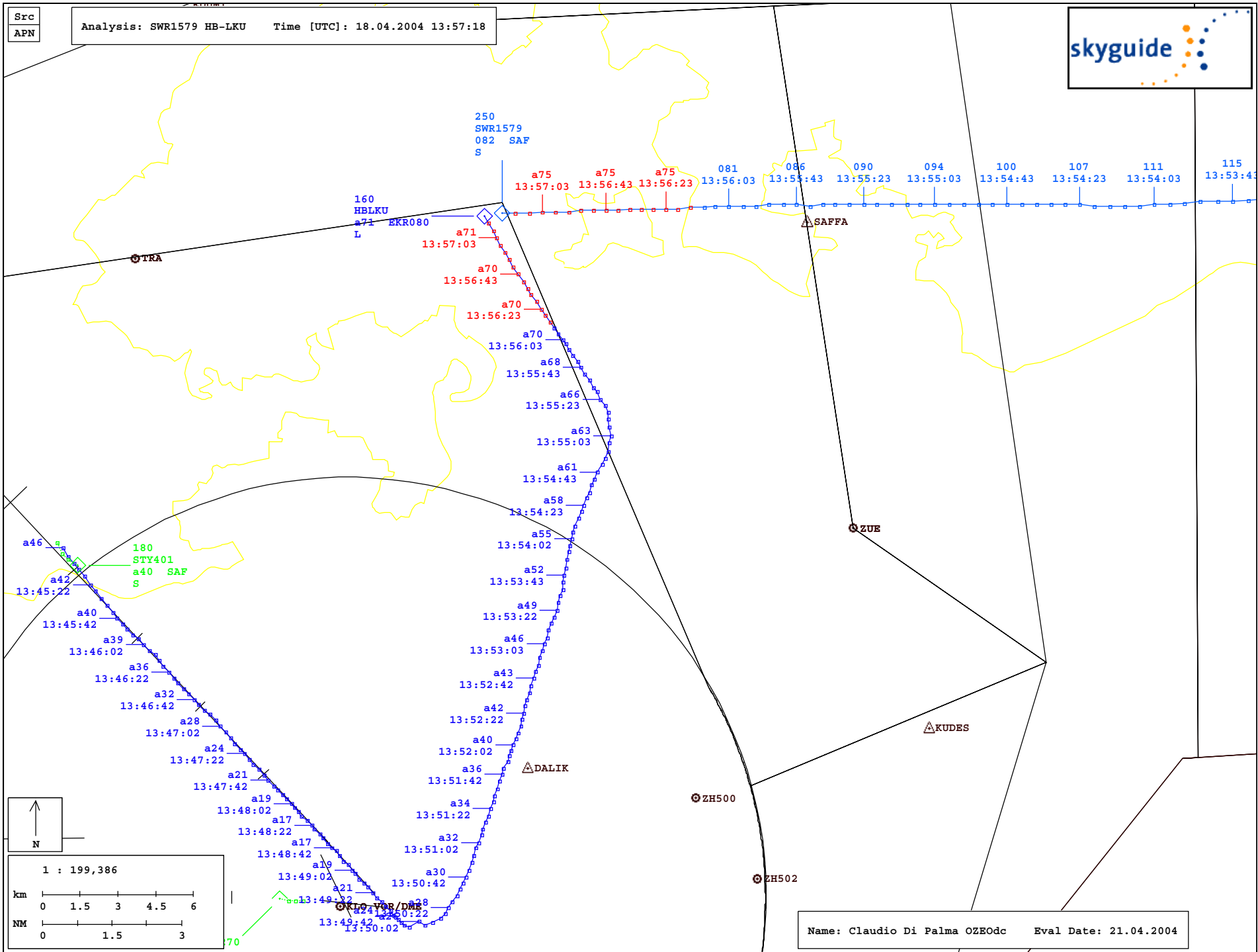
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Name: Claudio Di Palma OZE0dc Eval Date: 21.04.2004

Src
APN

Analysis: SWR1579 HB-LKU Time [UTC]: 18.04.2004 13:57:18



Name: Claudio Di Palma OZE0dc Eval Date: 21.04.2004

Src
APN

Analysis: SWR1579 HB-LKU Time [UTC]: 18.04.2004 13:59:13



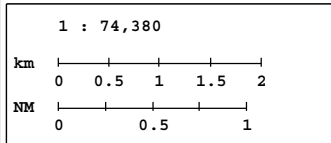
45

220
SWR1579
a73 SAF
S

3.0 NM
-100 ft
101°

TRA

140
HBLKU
a72 EKR080
L



Name: Claudio Di Palma DMO Eval Date: 19.04.2005

