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Aircraft accident investigation bureau

Final Report No 1869 by the Aircraft Accident Investigation Bureau

Concerning the serious incident (airprox)

between PAC529

and SWR289 and SWR2591

on 17 November 2003

TMA Zurich, 10 NM W/NW Kloten DVOR/DME

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 of names also refers where appropriate to the feminine form.

All times in this report are in the UTC format (local time = UTC +1 h)

PLACE/DATE/TIME	Zurich, 17 November 2003, 04:49 UTC
AIRCRAFT	PAC529, B747-259B, N924FT, Polar Air Cargo Inc.
	Liège (EBLG) – Zurich (LSZH)
	SWR289, MD11, HB-IWO, Swiss International Air Lines
	Johannesburg (FAJS) – Zurich (LSZH)
	SWR2591, A319, HB-IPV, Swiss International Air Lines
	Benghazi (HLLB) – Zurich (LSZH)
ATC UNITS	Zurich Area Control Centre (ACC)
AIR TRAFFIC CONTROLLERS	RE-S (Radar Executive South)
	Approach Control Office (APP)
	APW (Approach Control West)
AIRSPACE	**C**

1. HISTORY

SWR289

On Monday 17 November 2003, SWR289, a MD-11, was on a scheduled flight from Johannesburg (FAJS) to Zurich. At 04:29:17, the Commander, on flying into Switzerland, made first contact with Swiss Radar and reported that their aircraft was descending to FL300. The air traffic controller (ATCO) assigned transponder code 2743 to the flight crew and instructed them to fly to the EKRIT holding pattern via the standard instrument arrival route KELIP 3 ECHO and to continue their descent to FL140. The CMDR, who was pilot non flying (PNF) and handling radio communications with air traffic control, confirmed this instruction.

A few minutes later, the ATCO informed the crew that their aircraft was scheduled to land first in Zurich, but that this could not take place before 05:04. He instructed the crew at 04:38:57 to descend further to FL130.

At 04:43:42, the ATCO instructed the crew to join the EKRIT holding pattern, as they would have to expect a short delay. He then asked them to change to the Zurich Arrival frequency, 118.000 MHz.

The CMDR then made contact with Approach Sector West (APW) and reported to the ATCO that he was in possession of airport weather INFORMATION ALPHA. The ATCO repeated the instruction to join the EKRIT holding pattern and said the crew should expect a VOR/DME approach on runway 34 at 04:57.

At 04:47:45, the CMDR reported that his Traffic Collision Avoidance System (TCAS) had generated a Traffic Advisory (TA). The ATCO, whose Short Term Conflict Alert (STCA) system had not generated an alarm, answered that there was an aircraft above him, but that it was cleared to FL140.

The CMDR mentioned in addition that this aircraft was apparently descending and was only 700 ft above him.

SWR2591

On this morning, SWR2591, an A319, was on a scheduled flight from Benghazi (HLLB) to Zurich. The aircraft was flying into Swiss airspace approximately 5 minutes behind SWR289 which was ahead of it and the First Officer (FO), who was pilot non flying (PNF), contacted Swiss Radar at 04:31:05. He informed ATC that their aircraft was descending to FL320.

The ATCO answered that he had identified the aircraft on his radar screen and also instructed the crew to fly, via STAR KELIP 3 ECHO, to the EKRIT holding pattern and to continue their descent to FL200. The ATCO subsequently cleared SWR2591 to FL150 and also instructed the crew to join the EKRIT holding pattern.

At 04:48:44, the ATCO issued the following traffic information to SWR2591: *"SWR2591 for information traffic just below you, level 144 is supposed to maintain 140 in the EKRIT holding".*

The FO answered that their TCAS system had just generated a TCAS Resolution Advisory (RA). However, they had not had to carry out an evasive manoeuvre in the form of a climb and remained at FL150.

The ATCO further informed the crew of SWR2591 that the B747 was on the Zurich Arrival frequency and that this aircraft was descending and climbing. He did not know what was wrong.

Before the ATCO handed SWR2591 over to the Zurich Arrival frequency, the FO also informed him that according to TCAS information there was an altitude difference of only 500 ft between their aircraft and the B747.

PAC529

PAC529, a cargo aircraft type B747-200, had flown from Dubai (OMDB) to Liège (EBLG) on the previous evening. After 6 hours 35 minutes aircraft ground time, the crew, who were already in Liège, took over the aircraft in the early morning of 17 November, to fly from Liège via Zurich to Dehli under flight number PAC529.

At 04:40:38 the FO, as pilot non flying (PNF), made contact for the first time with Swiss Radar on frequency 135.675 MHz and reported that their aircraft was descending to FL200 and that they would be reducing their speed to 240 KIAS.

The ATCO answered that he had identified the aircraft on his radar screen and instructed the crew to continue descending to FL140.

The FO asked the ATCO to confirm once more the approach route via BLM 3 ECHO ARRIVAL.

At 04:44:10, the ATCO instructed PAC529 to join the EKRIT holding pattern, as the crew could expect a short delay. The FO confirmed this instruction.

A little later, the ATCO handed PAC529 over to the Zurich Arrival frequency with the following words: *"PAC529 maintain level 140 on reaching, call arrival on 118.000 MHz bye-bye*".

The FO confirmed the cleared flight level, asked for the frequency to be repeated and expressed his thanks.

At 04:46:05, he made contact with Approach Control West (APW) and reported that he had reached FL140.

The ATCO greeted the crew with the instruction: *"PAC529 Zurich Arrival good morning, maintain FL140, hold at EKRIT, expected approach time 59, expect VOR/DME approach runway 34*".

The FO answered: *"Roger and hold and expect the approach 34 DME".*

As the radar plots showed, after passing waypoint GOLKE, PAC 529 continued on a southeasterly heading. About 3.7 NM south of EKRIT, PAC529 turned left on a northeasterly heading. Approximately 7 NM east of EKRIT the aircraft turned right in accordance with the procedure for joining the holding pattern. According to the crew statements, the autopilot was already switched off in this phase.

At 04:47:45, PAC529 had just passed FL140 and subsequently descended to FL138; the CMDR of SWR289 informed APW of a TCAS-TA alert, to which the ATCO answered that the B747 was cleared to FL140.

The ATCO then had the FO of PAC529 confirm that their aircraft was actually at FL140. The FO answered that they were at FL140.

Thirty seconds later APW again intervened and informed the crew of PAC529 that on his radar screen the altitude of their aircraft was displayed as FL144. At that time,

PAC529 had violated the separation minima with SWR2591, which was flying at FL150. The ATCO urgently instructed PAC529 to strictly maintain FL140, as other aircraft were above and below it.

The FO's response was indistinct "*Yes Sir, we're maintaining er…*",

In this phase, SWR2591 reported a TCAS-RA on the Swiss Radar frequency.

Weather according MeteoSwiss:

ATIS ZURICH
INFO ALFA
QAM LSZH 0420Z 17.11.2003
220 DEG 6 KT
VIS 20 KM
RAIN
FEW 1300 FT. SCT 2400 FT. OVC 4800 FT
+05 / +04
QNH 1023 TWO THREE
QFE THR 14 973
QFE THR 16 973
QFE THR 28 972
NOSIG
TRL 70

2. ANALYSIS

2.1 The start of PAC529's approach to Zurich complied with normal procedures. The approach sequence envisaged that PAC529 would land on runway 34 after SWR289, followed by SWR2591. Since according to the runway utilisation concept in Zurich landings are permitted only after 05:00, these three aircraft had to wait for approximately 10 minutes. RE-S therefore instructed the crews to reduce the speed of their aircraft and to join the EKRIT holding pattern.

Immediately after first contact with RE-S, approximately 5 minutes before reaching waypoint EKRIT, the crew of PAC529 asked for confirmation that their approach would be via STAR BLM 3 ECHO. The ATCO confirmed this.

The instruction to PAC529 to join the EKRIT holding pattern was given approximately 2 minutes before the holding pattern was reached, i.e. about 6 NM to the west of GOLKE.

At 04:45:29, the crew were requested by RE-S to switch to the APW frequency and after reaching FL140 to maintain this altitude. The FO asked for the frequency to be repeated and expressed his thanks. At that time, the aircraft was approximately passing FL150.

A little later, at 04:46:05, contact was made with APW, who again instructed the crew to maintain FL140 and to wait in the EKRIT holding pattern until the approach time at 04:59.

At this time, PAC529 had already passed waypoint GOLKE and instead of turning left in the direction of EKRIT had maintained their southeasterly heading. About 5 NM southeast of GOLKE, the crew turned their aircraft left on a northeasterly heading. This heading corresponded approximately to the heading from GOLKE to EKRIT.

PAC529 subsequently passed approximately 3.7 NM to the south of EKRIT and turned right one minute later into the putative holding area.

After PAC529 had turned onto a northeasterly heading, the aircraft reached the cleared altitude of FL140. It can be assumed that this was the point in time from which the crew occasionally felt overtaxed. This was related above all to the air traffic control instruction to join the EKRIT holding pattern, which in their opinion was issued too late. It must remain an open question whether the overburdened crew missed the approach to waypoint EKRIT because of a navigation error or because of working procedures in the cockpit.

It is quite possible that the B747-200 was misstrimmed when the autopilot was switched off. This would explain the aircraft's sudden descent of 200 ft. If the hard pulling of the control column coincides with the advancing of the levers, in order to maintain both the altitude and the assigned speed of 240 KIAS, the resulting moment around the transverse axis could be in such a way that exceeding of FL140 by 400 ft is quite possible. This would explain the two violations of separation minima with SWR289 and SWR2591.

PAC529, which was in a right turn, crossed the flight path of SWR2591 0.6 NM in front of it with an altitude difference of 600 ft. Despite the RA generated by their TCAS, the crew of PAC529 needed almost 30 seconds to stabilise their aircraft at FL140.

Both violations of separation minima were accompanied by an intervention from the ATCO at APW, who urgently instructed the crew of PAC529 to strictly maintain FL140. On both occasions the crew confirmed that they would maintain FL140.

Since the ATCO at APW could not exclude the possibility that the crew of PAC529 might be having to cope with technical difficulties, in view of their deviations from the assigned route and altitude, he subsequently guided the aircraft by radar in a southerly direction, by agreement with RE-S, in order to avoid any further incidents with other aircraft in the EKRIT holding pattern.

2.2 Approach procedure RNAV STAR BLM 3 ECHO

In their statement, the crew of PAC529 complained that the air traffic control instruction to join the EKRIT holding pattern was given too late (less than 3 minutes before passing EKRIT), and that this led to an excessive burden on the crew in the short term.

The standard approach procedure BLM 3 ECHO, published in the Aeronautical Information Publication (AIP) Switzerland, extends as far as waypoint EKRIT, according to the publication. In the absence of further instructions from air traffic control, or in the event of radio failure, the crew is obliged to join the EKRIT holding pattern. Moreover, each flight crew must expect to have to fly one or more loops, for traffic reasons. This is why a crew, as part of their approach briefing, must also make themselves acquainted with possible joining of the EKRIT holding pattern. Special attention should be paid to this by crews who are not very well acquainted with the circumstances and procedures of an aerodrome. In this case, the CMDR was new to his function on this aircraft type and was flying to Zurich for the first time. The FO too had not flown to Zurich for at least 12 months.

The crew of PAC529 were indeed aware of approach procedure BLM 3 ECHO. It was no longer possible to determine the extent to which they had briefed themselves on it. It is a fact that the crew asked for confirmation of this procedure on their first call to Zurich, but did not subsequently fly it in accordance with the published procedures.

The instruction from RE-S at 04:44:10 to join the EKRIT holding pattern can be considered a normal procedure and cannot be adduced by the crew as a reason for an excessive short-term burden in the cockpit. In addition, the crew should have been aware, within the framework of their flight briefing, that landings are not normally permitted in Zurich before 05:00.

During their subsequent onward flight from Zurich to Dehli, air traffic control were again confronted by the fact that the crew of PAC529 were not able to maintain the standard instrument departure (SID) route and therefore had to be handed over to Munich on a radar heading.

3. CONCLUSIONS

3.1 Findings

- The incident occurred at night in Zurich TMA in class C airspace.
- PAC529 and SWR289 were on the Zurich Arrival Sector West frequency, 118.000 MHz.
- The Zurich Arrival Sector West and Departure Control sectors were coupled and the frequencies 118.000 MHz and 125.950 MHz were being operated in coupling mode.
- SWR2591 was in contact with Swiss Radar Zurich Lower Sector South.
- The Lower Sectors Swiss Radar Zurich South, West, East and North were combined at the Sector South workstation and the frequencies 128.050 MHz, 135.675 MHz, 133.900 MHz and 136.150 MHz were being operated in coupling mode.
- SWR289 and SWR2591 were both on standard approach procedure KELIP 3 ECHO and had received an instruction to join the EKRIT holding pattern. SWR2591 was following SWR289 at a distance of approximately 8-10 NM.
- The CMDR of PAC529 had a total of more than 9800 flying hours. He had converted from aircraft type B747-400 to the B747-200. The FO of PAC529 had more than 4000 flying hours on the B747-200 and the FE more than 12,000 flying hours.
- The B747-400 has an EFIS cockpit. The B747-200 on the other hand is equipped with analogue electromechanical instruments.
- According to regulations, the CMDR has to complete the first 100 flying hours as pilot flying (PF). Up to the incident, he had flown 30 hours on the B747-200 as CMDR.
- The CMDR of PAC529 was flying into Zurich Airport for the first time.
- During the previous 12 months, according his statements the FO had made no flights to Zurich. He had previously flown to Zurich two or three times. On 17 November, the FO was acting as pilot non flying (PNF).
- The operator was unable to prove, if and to what extent the commander of PAC529 had been made acquainted with local conditions before the flight.
- Flight crews of Polar Air Cargo Inc. do not have a personal route manual.
- The crew of PAC529 completed TCAS simulation training in 2003.
- According to PAC529 and SWR2591 crew statements, instrument meteorological conditions (IMC) applied.
- The three aircraft were flying according to instrument flight rules (IFR).
- N924FT was equipped with the following systems, among others:

  a) Honeywell SPZ-1 Dual Channel autopilot system

b) Triple Litton 92 Navigation system

c) Dual Apollo 2101 NMC GPS system

d) Collins TCAS II, TTR 920 system

- The crew had no information about any system malfunction which might have influenced the events during the incident.
- At the commencement of the descent to Zurich, the crew were using the autopilot. Cleared altitudes were accordingly pre-selected in the flight management system in order to comply with them when they had been reached.
- At 04:40:49, PAC529 was cleared by RE-S to FL140 and instructed to reduced speed to 240 KIAS. Approximately 2 minutes (6 NM west of GOLKE) before reaching waypoint EKRIT the instruction was given to join the EKRIT holding pattern.
- The crew of PAC529 stated that this clearance at short notice had overtaxed them. This apparently had subsequently had a negative effect on their joining the EKRIT holding pattern.
- According to information from the crew of PAC529, the autopilot was also switched off during this phase.
- The CMDR of PAC529 also stated that the airplane pitched down strongly and lost around 150 ft. During the attempt to correct this circumstance, he probably pulled up a little too hard on the control column, so the B747-200 climbed approx. 300 ft above the assigned altitude of flight level 140. According to his statements, the whole event took place very quickly. In addition to the altitude deviation, the FO should also have ascertained a speed deviation and noted it accordingly.
- Approach procedure BLM 3 ECHO ARRIVAL is routed via omnidirectional radio range BLM DVOR/DME (Basle-Mulhouse), along waypoints ZH675 and GOLKE to EKRIT. The EKRIT holding pattern is then joined by executing a right turn.
- After passing GOLKE, PAC529 did not follow the published flight path to EKRIT and then failed to join the holding pattern.
- At the same time, SWR289 at FL130 and SWR2591 at FL150 were also en route to join the EKRIT holding pattern.
- When minimum separation between PAC529 and SWR289 was violated, the crew of SWR289 received a TCAS traffic advisory (TA).
- The crew of SWR289 were unable to establish visual contact with PAC529.
- The crew of PAC529 were unable to establish visual contact with either SWR289 or SWR2591 behind them.
- According to his statements, the FO of SWR289, who was PF, noticed another aircraft in front of him on his navigation display. After he had informed the CMDR of this aircraft, a TCAS-TA was generated.
- According to the radar plot, at 04:47:54 SWR289 passed PAC529 with a lateral separation of 2.1 NM and an altitude difference of 800 ft.
- When minimum separation between PAC529 and SWR2591 was violated, a TCAS-RA *"adjust climb rate"* was triggered in the cockpit of PAC529.
- The CMDR of SWR2591 stated that after passing KLO DVOR/DME he noticed an aircraft on the navigation display to the north of them which was descending some 1100 ft below them. Shortly afterwards, he established that this aircraft was starting to climb.

- At 04:48:44, RE-S sent SWR2591 traffic information: *"SWR2591 for information traffic just below you, level 144 is supposed to maintain 140 in the EKRIT holding".*
- According to information from the CMDR of SWR2591, a TCAS-TA was triggered shortly after receiving the traffic information. At that time he noted that the other aircraft was stabilising 500 ft lower. It was not possible to establish visual contact at that time. A few seconds after the TCAS-TA, a preventive TCAS-RA *"monitor vertical speed"* was generated.
- The CMDR also stated that *"although in principle IMC conditions applied, the FO first saw the position lights of the other aircraft passing under us on the right and then I saw them on the left side".*
- The CMDR of SWR2591 classified the incident as very dangerous.
- According to the statements of the ATCO at APW, he had observed how PAC529 twice descended below FL140. The first time the aircraft briefly descended to FL139 after reaching the cleared altitude of FL140. The second time he noted a descent to FL138, which led to the violation of separation minima with SWR289.
- When PAC529 descended below FL140 for the second time, a short-term conflict alert (STCA) was generated for the first time on the APW's radar monitor.
- When PAC529 began to climb again after descending to FL138 and continued the climb to FL144, APW again received an STCA alert.
- The ATCO at APW intervened both on the descent of PAC529 to FL138 and on the subsequent climb to FL144.
- The ATCO at RE-S had observed the descent of PAC529 to FL138. According to his statements, he was unable to observe the subsequent climb to FL144, as he had turned his attention to other traffic. The STCA alerted him to the violation of separation minima with SWR2591. He then issued corresponding traffic information to the crew of SWR2591.
- According to the radar plot, at 04:48:43 PAC529 crossed the flight path of SWR2591 with a lateral separation of 0.6 NM and an altitude difference of 600 ft.

3.2 Cause

The incident is attributable to the fact that the crew of PAC529 was briefly overburdened and as a result used the flight management systems inappropriately. Consequently, the assigned flight level was not maintained correctly.

Berne, 15 December 2005 Aircraft Accident Investigation Bureau

TRANSCRIPT OF TELEPHONY

OR RADIOTELEPHONY COMMUNICATION TAPE-RECORDINGS

Investigation into the **incident** that occured on **17.11.2003**

- Subject of transcript:	**PAC529 / SWR289 / SWR2591**
- Centre concerned:	Swiss Radar Area East
- Designation of unit:	Swiss Radar Lower Sector South / Zurich Arrival Sector West
- Frequency / Channel:	128.050 MHz / 118.000 MHz
- Date and period (UTC) covered by attached extract:	17.11.2003 04:29 - 05:04 UTC
- Date of transcript:	19th November 2003
- 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, 19th November 2003

Claudio DI PALMA

Abbreviations

Sector		Designation of sector
S RE	-	Radar Lower Sector South (coupled with West, North and East)
APW	-	Arrival Sector West

Aircraft	-	Callsign		Type of acft	Flight rules	ADEP	-	ADES
289	**-**	**SWR289**	**Swiss**	**MD11**	**IFR**	**FAJS**	**-**	**LSZH**
2591	**-**	**SWR2591**	**Swiss**	**A319**	**IFR**	**HLLB**	**-**	**LSZH**
132	-	BAW132	Speedbird	B772	IFR	OEJN	-	EGLL
155	-	SWR155	Swiss	A332	IFR	VABB	-	LSZH
6934	-	WDL6934	WDL	F27	IFR	EDDK	-	LSZH
89	-	SWR89	Swiss	A332	IFR	CYUL	-	LSZH
529	**-**	**PAC529**	**Polar**	**B742**	**IFR**	**EBLG**	**-**	**LSZH**
1851	-	SWR1851	Swiss	A319	IFR	LGTS	-	LSZH
139	-	SWR139	Swiss	MD11	IFR	VHHH	-	LSZH

OZEO-dc / 19th November 2003

To Col.1	From Col.2	Time Col.3	Communications Col.4	Observations Col.5

Frequency: 128.050 MHz Radar Lower Sector South

S RE	**289**	**04:29:17**	**Swiss Radar "grüezi" SWR289 level three one eight descending level three zero zero**
289	**S RE**	**:22**	**"Guete Morge" SWR289 squawk two seven four three**
S RE	**289**	**:28**	**Two seven four three squawking SWR289**
289	**S RE**	**:30:10**	**SWR289 is identified, cleared KELIP three Echo continue descent flight level one four zero**
S RE	**289**	**:16**	**Descend level one four zero KELIP three Echo SWR289**
S RE	**2591**	**:31:05**	**Swiss Radar "grüezi" SWR2591 level three four eight descending three two zero inbound CANNE**
2591	**S RE**	**:11**	**"Guete Morge" SWR2591 identified, cleared CANNE KELIP three Echo, descend to flight level two zero zero**
S RE	**2591**	**:19**	**CANNE KELIP three Echo, descend level two hundred SWR2591**
S RE	**289**	**:36**	**SWR289 äh… do we have to äh… expect some delay at Zurich?**
289	**S RE**	**:42**	**I have to check äh… with the Arrival, I call you back**
S RE	**289**	**:45**	**Okay "merci"**
289	**S RE**	**:33:20**	**SWR289?**
S RE	**289**	**:22**	**Go SWR289**
289	**S RE**	**:23**	**Okay, a little delay because runway three four is in use, earliest landing time zero five zero four, so you may adjust your speed**
S RE	**289**	**:33**	**Yes right now we have a landing time of zero five zero four, so we are not number one we re… äh… are reducing speed anyway thank you**
289	**S RE**	**:39**	**Äh… SWR289 for the time you're number one, number two is behind you**

To Col.1	From Col.2	Time Col.3	Communications Col.4	Observations Col.5
S RE	**289**	**04:33:43**	**Ah okay, so we keep the speed**	
S RE	132	:34:52	Radar good morning BAW132 flight level four zero zero	
132	S RE	:56	BAW132 Swiss Radar good morning squawk two seven seven two	
S RE	132	:35:01	Two seven seven two BAW123	says "BAW123"
132	S RE	:59	BAW132 is identified cleared inbound to Hochwald, Luxeuil	
S RE	132	:36:07	BAW132 cleared äh… say again please	
132	S RE	:10	Cleared to Hotel Oscar Charlie then Lima Uniform Lima	
S RE	132	:14	Thank you, cleared to Hotel Oscar Charlie then Lima Uniform Lima BAW132	
289	**S RE**	**:37:20**	**SWR289 what is your present speed now?**	
S RE	**289**	**:24**	**Our present speed is two five five SWR289**	
289	**S RE**	**:26**	**"Merci"**	
2591	**S RE**	**:30**	**SWR2591 for sequencing make speed two four zero knots**	
S RE	**2591**	**:34**	**Roger make speed two four zero knots SWR2591**	
S RE	155	:38:24	"Züri schöne guete Morge" SWR155 level two niner zero down to level two four zero	
155	S RE	:29	"Guete Morge" SWR155 identified, cleared to SAFFA and descend flight level one six zero	
S RE	155	:37	To SAFFA down to level one six zero SWR155	
S RE	6934	:44	Radar WDL6934 good morning maintaining one five zero inbound IBINI	
6934	S RE	:49	Good morning WDL6934 identified cleared RILAX SAFFA	
S RE	6934	:54	Cleared RILAX SAFFA WDL6934	
289	**S RE**	**:57**	**SWR289 descend to flight level one three zero**	
S RE	**289**	**:40:00**	**Descend level one three zero SWR289**	

TRANSCRIPT SHEET

Occurence: PAC529 / SWR289 / SWR2591 of 17.11.2003

To Col.1	From Col.2	Time Col.3	Communications Col.4	Observations Col.5
S RE	89	04:40:12	"Züri SWR89 guete Morge" out of two seven five for level two hundred	
89	S RE	:18	"Guete Morge" SWR89 identified, cleared Bravo Lima Mike three Echo	
S RE	89	:23	Bravo Lima Mike three Echo and speed request?	
89	S RE	:27	Äh… what is your present speed?	
S RE	89	:29	Two-seventy	
89	S RE	:31	Okay maximum speed for the time two six zero knots	
S RE	89	:35	Thank you SWR89	
S RE	**529**	**:38**	**Äh… Zurich good morning PAC529 ..... flight level two zero zero descending flight level two zero zero, slowing to two four zero knots, is that correct?**	says two times "two zero zero"
529	**S RE**	**:49**	**PAC529 Swiss Radar good morning identified, affirm speed back two four zero knots and descend to flight level one four zero**	
S RE	**529**	**:57**	**Two four zero knots, one four zero PAC529**	
132	S RE	:41:03	BAW132 call now Swiss Radar on one three four six zero five bye-bye	
S RE	132	:10	One three four six zero five BAW132 good day	
S RE	**529**	**:22**	**And Zurich PAC529 you'd like us to proceed via the Bravo Lima Mike three Echo?**	
529	**S RE**	**:28**	**Yes, ?????**	unreadable, could be "do so"
155	S RE	:42:23	SWR155 descend flight level one three zero, to keep you in sequence with fifteen hundred feet or more	
S RE	155	:30	Roger down to level one three zero and äh… fifteen hundred or more SWR155	
289	**S RE**	**:43:42**	**SWR289 join the holding at EKRIT for short delay**	
S RE	**289**	**:47**	**Joining holding at EKRIT SWR289**	

Signature of person
in charge of transcription :

TRANSCRIPT SHEET

Occurence: PAC529 / SWR289 / SWR2591 of 17.11.2003

To Col.1	From Col.2	Time Col.3	Communications Col.4	Observations Col.5
289	**S RE**	**04:43:49**	**Roger and contact now Arrival on one one eight zero "ade"**	
S RE	**2591**	**:55**	**SWR2591 reaching level two hundred**	
2591	**S RE**	**:58**	**2591 descend flight level one six zero and cleared Kloten EKRIT to hold**	
S RE	**2591**	**:44:05**	**Kloten EKRIT to hold, descend level one six zero SWR2591**	
529	**S RE**	**:10**	**PAC529 cleared to join the holding at EKRIT for a short delay**	
S RE	**529**	**:15**	**…er holding at EKRIT PAC529**	
289	**S RE**	**:22**	**SWR289?**	
89	S RE	:25	SWR89 descend to flight level one eight zero reduce speed to minimum clean, cleared GOLKE EKRIT to hold	
S RE	89	:33	Reducing and down level one eight zero, EKRIT to hold SWR89	
155	S RE	:45:03	SWR155 cleared to join the holding at SAFFA	
S RE	155	:08	Cleared to join the hold at SAFFA SWR155	
6934	S RE	:15	WDL6934 cleared to join the holding at SAFFA	
S RE	6934	:20	Cleared to join the holding at SAFFA WDL6934	
529	**S RE**	**:29**	**PAC529 maintain level one four zero on reaching, call Arrival on one one eight zero bye-bye**	
S RE	**529**	**:35**	**One four zero and say the frequency?**	
529	**S RE**	**:38**	**One one eight decimal zero**	
S RE	**529**	**:40**	**Thanks**	
2591	**S RE**	**:46:01**	**SWR2591 cleared to join the holding at EKRIT, continue descent flight level one five zero**	
S RE	**2591**	**:07**	**Descend level one five zero EKRIT to hold SWR2591**	
S RE	1851	:17	Swiss Radar "guete Morge" SWR1851 level two seven three descending level two four zero	

Signature of person
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To Col.1	From Col.2	Time Col.3	Communications Col.4	Observations Col.5
1851	S RE	04:46:23	"Guete Morge" SWR1851 identified, cleared inbound to SAFFA	
S RE	1851	:28	Direct to SAFFA SWR1851	
2591	**S RE**	**:47:14**	**SWR2591 descend to flight level one five zero**	
S RE	**2591**	**:19**	**Descend level one five zero SWR2591**	
89	S RE	:22	SWR89 descend level one seven zero	
S RE	89	:25	Descend level one seven zero SWR89	
S RE	139	:48:38	"Züri Radar guete Morge" SWR139, two six zero descending for one seven zero	
2591	**S RE**	**:44**	**SWR2591 for information traffic just below you, level one four four is supposed to maintain one four zero in the EKRIT holding**	
S RE	**2591**	**:52**	**SWR2591 we had a TCAS RA**	
2591	**S RE**	**:57**	**Thank you, the other traffic is with Arrival, I check äh… what happened, I call you back shortly**	
S RE	**2591**	**:49:02**	**Roger we could maintain one five zero SWR2591**	
S RE	**2591**	**:08**	**And SWR15… äh… correction SWR2591 we had a TCAS but äh… no climb issued but I have to write an ATIR report**	
2591	**S RE**	**:21**	**Thank you for information äh… I'll call Arrival about the other traffic because that one is descending and climbing, I don't know, I call you back shortly**	
S RE	**2591**	**:29**	**Roger**	
S RE	139	:32	Swiss Radar "guete Morge" SWR139 two four seven descending for one seven zero	
139	S RE	:39	SWR139 good morning roger, descend äh… to flight level one six zero	
S RE	139	:45	Descend flight level one six zero SWR139	
139	S RE	:48	139 cleared RILAX SAFFA, reduce the speed äh… to minimum clean	

To Col.1	From Col.2	Time Col.3	Communications Col.4	Observations Col.5
S RE	139	04:49:54	RILAX SAFFA speed two three zero SWR139	
S RE	89	:58	SWR89 maintaining one seven zero	
89	S RE	:50:01	SWR89 roger descend to flight level one six zero	
S RE	89	:05	Descend one six zero SWR89 äh… EKRIT and hold	
89	S RE	:10	Roger	
2591	**S RE**	**:39**	**SWR2591?**	
S RE	**2591**	**:43**	**"Jo" go**	
2591	**S RE**	**:44**	**I talked to Arrival and they told me the other traffic told him to maintain level one four zero but according the radar that wasn't true, so I have to fill out a form again ..... as well I mean and call now Arrival for further information one one eight zero "en guete Tag"**	
S RE	**2591**	**:59**	**"Jo also me händ no uf em TCAS no foifhundert Fuess gha"**	
2591	**S RE**	**:51:03**	**"Jo ich ha gemäss Radar au nume sechshundert Fuess no gha"**	
S RE	**2591**	**:07**	**"Okay, merci"**	

Frequency: 118.000 MHz Zurich Arrival Sector West

APW	**289**	**04:43:57**	**Zurich Arrival "guete Morge" SWR289 MD eleven level one three zero information Alfa**	
289	**APW**	**:44:05**	**SWR289 Zurich Arrival "guete Morge" proceed to EKRIT and hold, expected approach time is five seven, expect VOR DME approach runway three four**	
APW	**289**	**:14**	**EKRIT and hold, expected approach time five seven for VOR DME three four SWR289**	
APW	**529**	**:46:05**	**PAC529 leveling flight level one four zero**	

TRANSCRIPT SHEET

Occurence: PAC529 / SWR289 / SWR2591 of 17.11.2003

To Col.1	From Col.2	Time Col.3	Communications Col.4	Observations Col.5
529	**APW**	**04:46:10**	**PAC529 Zurich Arrival good morning, maintain flight level one four zero, hold at EKRIT expected approach time five niner, expect VOR DME approach runway three four**	
APW	**529**	**:21**	**Roger and hold and expect the approach three four DME**	
APW	**289**	**:47:45**	**Äh… SWR289 we have on TCAS ..... a traffic, descending**	
289	**APW**	**:51**	**SWR289 traffic above restricted one thousand feet above maintaining one four zero**	
APW	**289**	**:57**	**Okay looks it as he is descending, now seven hundred feet only**	
529	**APW**	**:48:01**	**PAC5291 to confirm maintain flight level one four zero**	says "PAC5291"
APW	**529**	**:05**	**Yes Sir, we're one four zero äh… 529**	
529	**APW**	**:41**	**PAC5291 I read flight level one four four, please maintain accurately flight level one four zero, traffic below and above**	says "PAC5291"
APW	**529**	**:48**	**Yes Sir, we're maintaining äh… XXXXX**	unreadable
APW	**289**	**:50:08**	**SWR289 entering ..... entering EKRIT hold**	
289	**APW**	**:12**	**"Danke"**	
529	**APW**	**:30**	**PAC529 turn now left heading one niner zero vectoring VOR DME approach runway three four**	
APW	**529**	**:37**	**Left one niner zero vectors three four, thank you 529**	
529	**APW**	**:40**	**And 529 expect a long approach, report speed?**	
APW	**529**	**:44**	**Äh… two four five knots PAC529**	
529	**APW**	**:48**	**529 roger, reduce to minimum clean**	
APW	**529**	**:50**	**Roger, thanks**	
APW	**2591**	**:51:13**	**Arrival "grüezi" SWR2591 inbound EKRIT to hold, level one five zero information Alfa, an A three-nineteen**	

Signature of person
in charge of transcription :

TRANSCRIPT SHEET

Occurence: PAC529 / SWR289 / SWR2591 of 17.11.2003

To Col.1	From Col.2	Time Col.3	Communications Col.4	Observations Col.5
2591	**APW**	**04:51:21**	**SWR2591 Zurich Arrival "guete Morge" maintain flight level one five zero, hold at EKRIT expected approach time zero one**	
APW	**2591**	**:28**	**Hold at EKRIT level one five zero SWR2591**	
529	**APW**	**:52:36**	**PAC529 turn right heading three two zero**	
APW	**529**	**:40**	**Right turn three two zero, right turn three two zero PAC529**	
289	**APW**	**:50**	**SWR289 turn right heading zero correction left heading zero niner zero, vectoring VOR DME approach runway three four, descend to six thousand feet QNH one zero two four**	
APW	**289**	**:53:01**	**Left turn heading zero niner zero, vectors VOR DME three four down six thousand, one zero two three, six SWR289**	
289	**APW**	**:08**	**SWR289 the QNH is one zero two four**	
APW	**289**	**:11**	**One zero two four SWR289**	
289	**APW**	**:54:08**	**SWR289 you have five zero miles to touchdown**	
APW	**289**	**:11**	**Five zero miles SWR289**	
529	**APW**	**:16**	**PAC529 descend to flight level one one zero, expect five five miles to touchdown**	
APW	**529**	**:23**	**Descend flight level one one zero PAC529**	
289	**APW**	**:46**	**SWR289 reduce speed two one zero knots**	
APW	**289**	**:49**	**Speed two ten SWR289**	
289	**APW**	**:55:04**	**SWR289 turn left heading zero six zero expect the downwind later on**	
APW	**289**	**:08**	**Heading zero six zero SWR289**	
529	**APW**	**:20**	**PAC529 turn right heading zero four zero descend to flight level niner zero**	
APW	**529**	**:25**	**Zero four zero, niner zero PAC529**	
2591	**APW**	**:33**	**SWR2591 report speed?**	

Signature of person
in charge of transcription :

TRANSCRIPT SHEET

Occurence: PAC529 / SWR289 / SWR2591 of 17.11.2003

To Col.1	From Col.2	Time Col.3	Communications Col.4	Observations Col.5
APW	**2591**	**04:55:35**	**Speed is two ten SWR2591**	
2591	**APW**	**:38**	**SWR2591 thank you, maintain two one zero knots continue left turn heading zero two zero, vectoring VOR DME approach runway three four descend to flight level one four zero**	
APW	**2591**	**:47**	**Left heading zero two zero, speed two ten, descend level one four zero SWR2591**	
2591	**APW**	**:52**	**SWR2591 you have five seven miles to touchdown**	
APW	**2591**	**:56**	**"Dankeschön"**	
289	**APW**	**:56:36**	**SWR289 turn right heading one five zero**	
APW	**289**	**:39**	**Right heading one five zero SWR289**	
2591	**APW**	**:57:12**	**SWR2591 descend to flight level one two zero**	
APW	**2591**	**:15**	**Descend flight level one two zero SWR2591**	
APW	89	:20	Zurich Arrival SWR89 heavy "grüezi" A three-thirty with Charlie out of one six for one five zero	
89	APW	:27	SWR89 Zurich Arrival "guete Morge" expect shortly vectoring for VOR DME approach runway three four	
APW	89	:33	Thank you	
529	**APW**	**:40**	**PAC529 reduce speed to two one zero knots**	
APW	**529**	**:44**	**Reducing two one zero knots 529**	
289	**APW**	**:52**	**SWR289 contact Final one two five decimal three two "schöne Tag"**	
APW	**289**	**:57**	**Two five three two "viele Dank, danke gliichfalls" SWR289**	
2591	**APW**	**:58:04**	**SWR2591 turn right heading zero eight zero**	
APW	**2591**	**:07**	**Right heading zero eight zero SWR2591**	
529	**APW**	**:10**	**PAC529 turn right heading zero eight zero, descend to six thousand feet QNH one zero two four**	

Signature of person
in charge of transcription :

TRANSCRIPT SHEET

Occurence: PAC529 / SWR289 / SWR2591 of 17.11.2003

To Col.1	From Col.2	Time Col.3	Communications Col.4	Observations Col.5
APW	**529**	**04:58:17**	**One zero two four ..... zero eight zero on the heading, six thousand äh… feet PAC529**	
529	**APW**	**:59:14**	**PAC529 turn right heading one four zero for downwind**	
APW	**529**	**:19**	**Right turn one four zero PAC529**	
2591	**APW**	**:25**	**SWR2591 turn right heading one five zero, further descent in five miles**	
APW	**2591**	**:30**	**Right heading one five zero SWR2591**	
89	APW	:45	SWR89 descend to flight level one two zero, report speed?	
APW	89	:50	Descend level one two zero SWR89 two-twenty	
89	APW	:53	SWR89 roger maintain two two zero knots turn right heading zero niner zero, vectoring VOR DME approach runway three four, five five miles to touchdown	
APW	89	05:00:02	Heading zero niner zero for three four, two-twenty the speed SWR89	
2591	**APW**	**:34**	**SWR2591 turn right heading one six zero**	
APW	**2591**	**:38**	**Right heading one six zero SWR2591**	
529	**APW**	**:01:19**	**PAC529 turn right heading one six zero**	
APW	**529**	**:23**	**Right turn one six zero PAC529**	
529	**APW**	**:27**	**PAC529 contact Final one two five decimal three two**	
APW	**529**	**:32**	**Two five three two and äh… thanks for the help, have a good morning**	
529	**APW**	**:36**	**Thanks**	
2591	**APW**	**:48**	**SWR2591 descend flight level niner zero turn right heading one seven zero**	
APW	**2591**	**:53**	**Right heading one seven zero descend level niner zero SWR2591**	
89	APW	:02:47	SWR89 descend to flight level niner zero	

Signature of person
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TRANSCRIPT SHEET

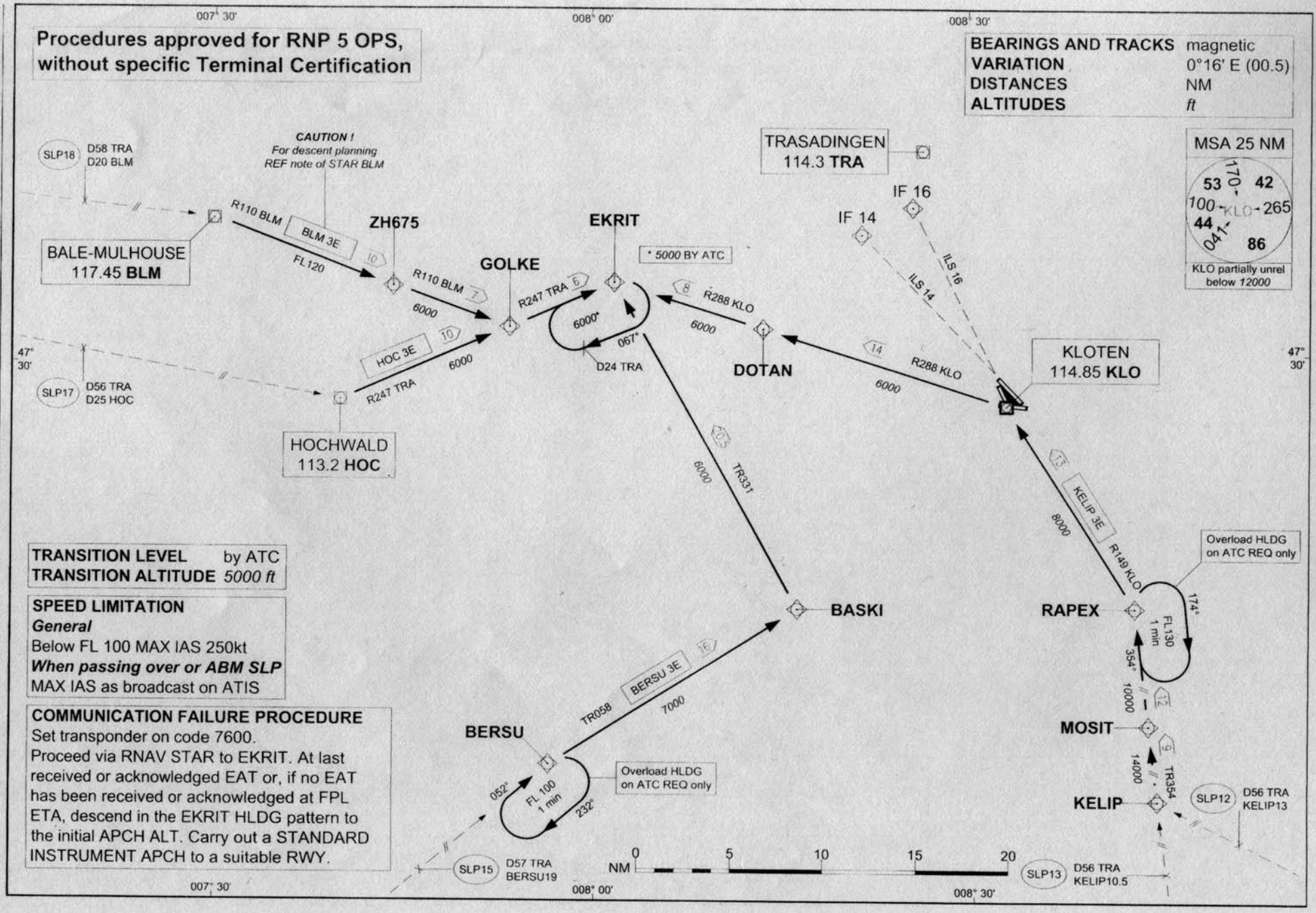
Occurence: PAC529 / SWR289 / SWR2591 of 17.11.2003

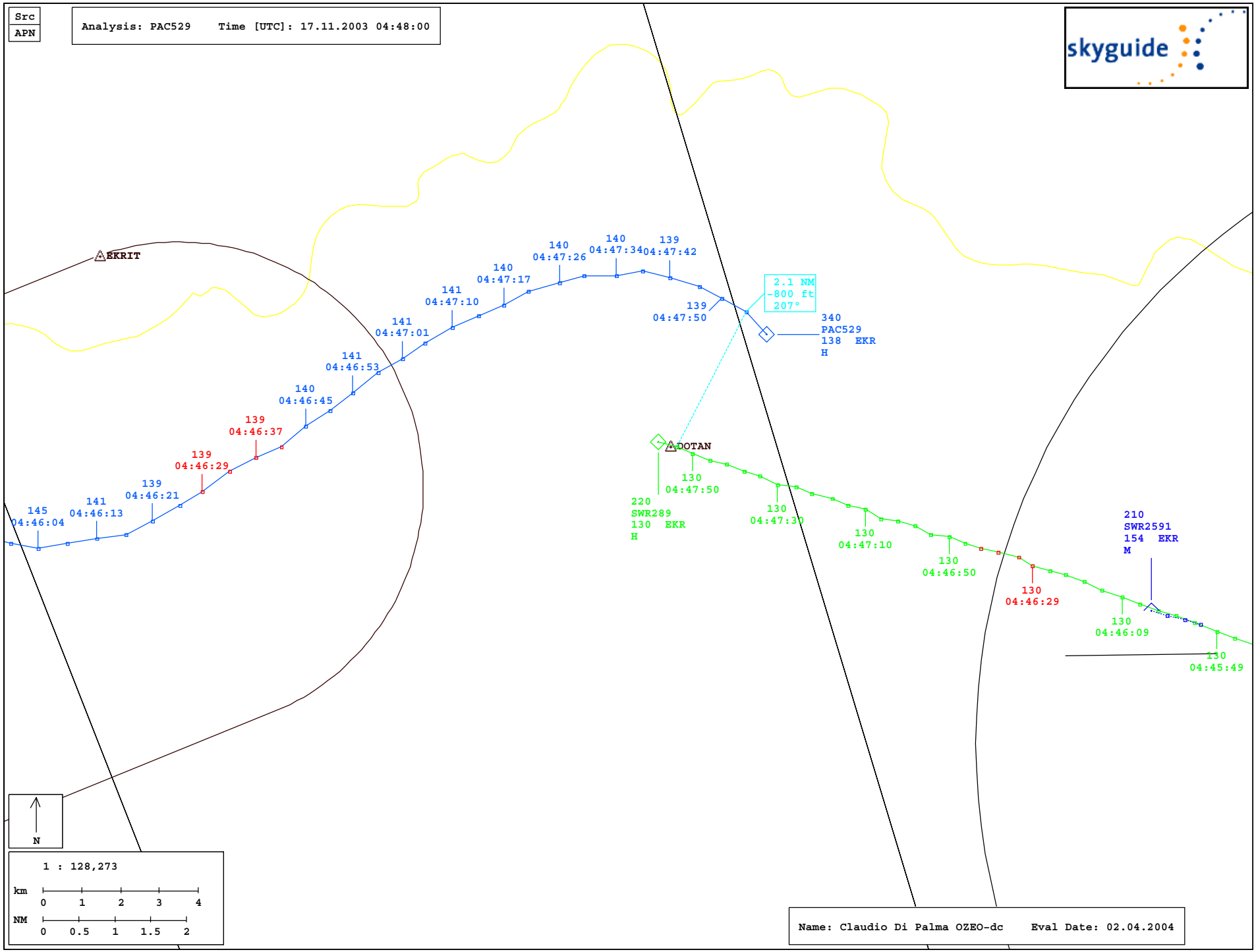
To Col.1	From Col.2	Time Col.3	Communications Col.4	Observations Col.5
APW	89	05:02:51	Down level niner zero SWR89	
2591	**APW**	**:03:02**	**SWR2591 contact Final one two five decimal three two**	
APW	**2591**	**:06**	**One two five three two "schöne Tag" SWR2591**	

- end -

Signature of person
in charge of transcription :

Federal Office for Civil Aviation, 3003 Berne
AIRAC 10/05 OCT 2000

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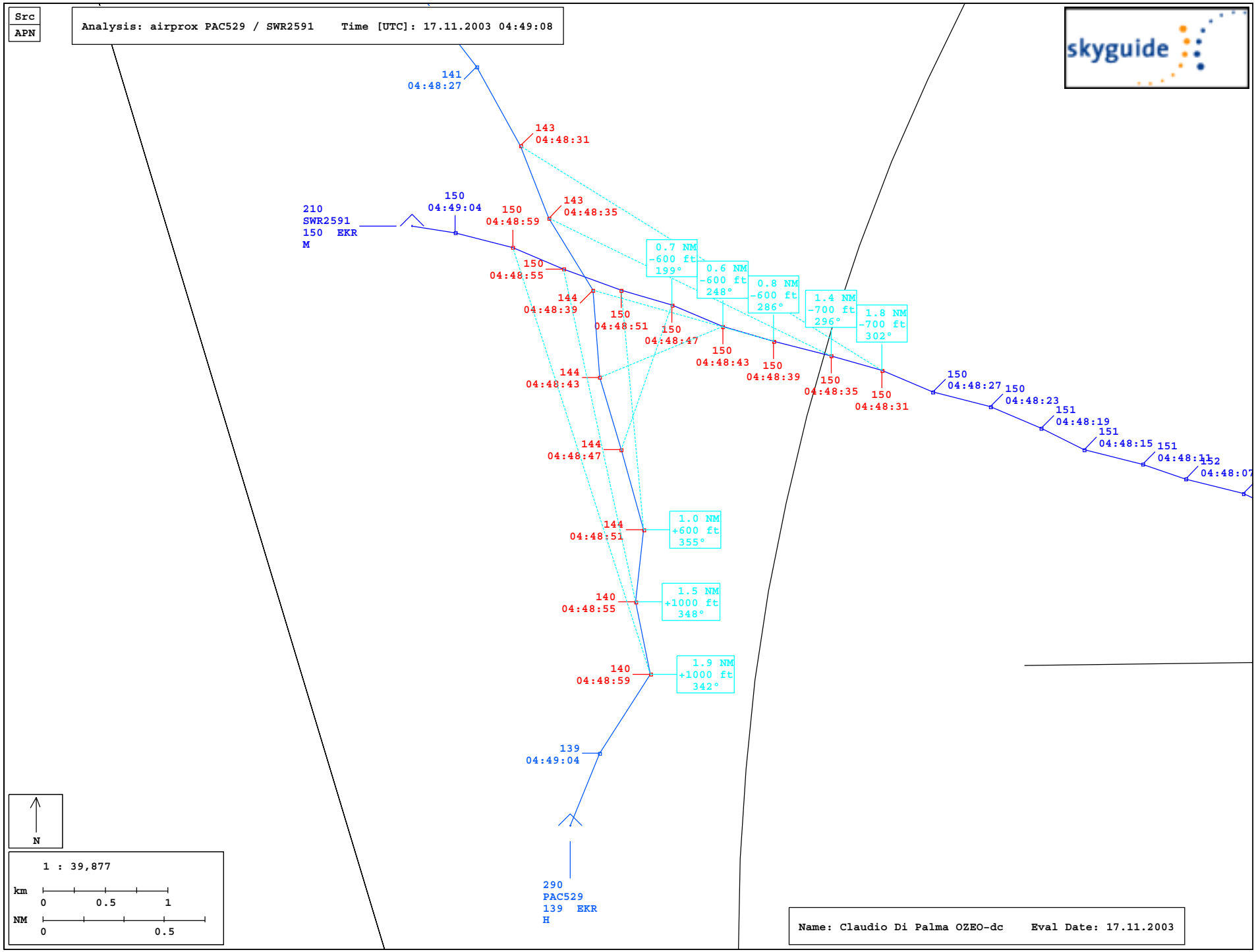
EKRIT
145
04:46:04
141
04:46:13
139
04:46:21
139
04:46:29
139
04:46:37
140
04:46:45
141
04:46:53
141
04:47:01
141
04:47:10
140
04:47:17
140
04:47:26
140
04:47:34
139
04:47:42
139
04:47:50
2.1 NM
-800 ft
207°
340
PAC529
138 EKR
H
DOTAN
220
SWR289
130 EKR
H
130
04:47:50
130
04:47:30
130
04:47:10
130
04:46:50
130
04:46:29
130
04:46:09
130
04:45:49
210
SWR2591
154 EKR
M
N
1 : 128,273
km
0 1 2 3 4
NM
0 0.5 1 1.5 2
Name: Claudio Di Palma OZEO-dc Eval Date: 02.04.2004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APN
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skyguide
141
04:48:27
143
04:48:31
210
SWR2591
150 EKR
M
150
04:49:04
150
04:48:59
143
04:48:35
150
04:48:55
144
04:48:39
150
04:48:51
150
04:48:47
150
04:48:43
150
04:48:39
150
04:48:35
150
04:48:31
150
04:48:27
150
04:48:23
151
04:48:19
151
04:48:15
151
04:48:11
152
04:48:07
0.7 NM
-600 ft
199°
0.6 NM
-600 ft
248°
0.8 NM
-600 ft
286°
1.4 NM
-700 ft
296°
1.8 NM
-700 ft
302°
144
04:48:43
144
04:48:47
144
04:48:51
1.0 NM
+600 ft
355°
140
04:48:55
1.5 NM
+1000 ft
348°
140
04:48:59
1.9 NM
+1000 ft
342°
139
04:49:04
290
PAC529
139 EKR
H
N
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km
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NM
0 0.5
Name: Claudio Di Palma OZEO-dc Eval Date: 17.11.2003