

Annexes

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Organisation of the investigation

1 Alarm

At approximately 0930 hrs the Search and Rescue Service of the Federal Aviation Office and the Federal Aircraft Accidents Investigation Bureau were informed by Basel airport that a British aircraft was thought to have crashed in the area south of Basel.

The team for the preliminary investigation of large scale aircraft accidents was immediately put on stand-by and after the aircraft had been located (approximately 1130 hrs) was called to action in the Hochwald area.

Shortly after the accident the authorities in the country of registration, the United Kingdom, were informed by telex and invited to send a delegation to Switzerland.

2 Rescue and evacuation

The search and rescue work proved difficult because of the bad weather and the interruptions in communications. A very early report of a possible crash near Hochwald was not followed up at first because of an unfortunate combination of circumstances. A great deal of time was also lost because the access roads were only passable in places with cross-country vehicles. It was not possible to use the military helicopters which were made available because of the low cloud.

Approximately 45 minutes after the wreckage had been traced, all the rescued persons were under medical care, the first seriously injured were admitted to local hospitals 30 minutes later. Examinations by experts in forensic medicine to determine the causes of death showed that adverse conditions – above all the extremely difficult meteorological conditions which caused delays in the alarm and rescue – did not have any effect on the saving of further lives. Recovery of the dead meant moving many of the pieces of wreckage, which made subsequent examination of it more difficult.

3 Barricades

The accident area was effectively cordoned off by the Solothurn Cantonal Police into two rings, the outer ring to keep the access roads open, the inner ring to protect the pieces of wreckage. In view of the poor visibility conditions and the large army of helpers there were difficulties at first, after the occupants of the aircraft had been evacuated, in keeping access to the accident site free only for those involved in the investigation of the accident.

4 Investigation team

The team, which began the preliminary investigation of the accident the same afternoon, was made up as follows:

Investigator-in-charge: K Lier, Head of the Federal Aircraft Accidents Investigation Bureau

The Advisers :

Scientific Service of the Zurich City Police Dr M Hubmann

Evacuation Dipl Ing W Nussbaumer

Inquiry into the Search and Rescue Operations P Häberli

Press Dr K Biland

Secretariat E Keller

Representative of the Police and Local Authorities Dr J Huggenberger

Accredited representative of the United Kingdom J S Owen

Accredited representative of France L Gueritot

Working Groups :

Flight operations Leaders and Recorders

Weather H Maeder

Air Traffic Control H P Müller

Witness Statements M Lüthi

Structures Dr H Widmer

Power Plants Dipl Ing B Hegglin
H R Ruetschi, Leader until 27 April 1973
E Oertle, Leader from 27 April 1973 and Recorder

Systems Dipl Ing H Kobelt

Flight recorder A Zweifel

Human factors Dr U Baumann

5 Cantonal authorities assisting

The operations of the Cantonal and local authorities in the disaster were under the control of the Solothurn Cantonal Police and initially were made more difficult by the uncertainty of the location of the accident site, since in view of the difficulty in distinguishing the canton boundaries, it could have been in the territory of Basel-Stadt, Basel-Land, Bern or Solothurn.

The Aargau, Basel-Land, Basel-Stadt, Bern and Zurich (Canton and Stadt) police forces assisted the Solothurn police headquarters, by the provision of personnel and equipment,

with their many functions involving guard duty, organisation, evacuation, identification and measurement.

A great many other local organisations such as fire services, traffic cadets, civil defence and legal authorities etc helped with the evacuation and investigation work until all the pieces of wreckage had been removed.

6 Co-operation with the British Authorities

The British delegation had arrived in Hochwald by the evening of the day of the accident and from the beginning actively assisted the Swiss authorities. The delegation was made up as follows:

J S Owen, Leader of the Delegation and Accredited Representative of the United Kingdom

Advisers to the Leader of the Delegation:

W B Cairns	Accidents Investigation Branch
G S Jameson	Accidents Investigation Branch
E J Trimble	Accidents Investigation Branch
P R Coombes	Accidents Investigation Branch
R Ashford	UK Civil Aviation Authority, Airworthiness Division
Professor J K Mason	Pathologist, RAF Institute of Pathology
S A Cullen	Pathologist, RAF Institute of Pathology
T W Negus	Odontologist, RAF Institute of Pathology
R Bishop	BAC (British Aircraft Corporation)
R H Quinton	Rolls Royce
F Emery	Hawker Siddeley Dynamics
Captain M Bennett	Invicta International Airlines

Co-operation was smooth and proved very useful. The British authorities made all necessary enquiries in Great Britain and provided the necessary documents and information. Valuable contributions were made in the form of the meticulous analysis of the flight data recordings and special enquiries. Altogether 17 joint working sessions took place in Switzerland and Great Britain. At the public hearing held in Solothurn on 7-8 November 1974 the Federal Commission of Inquiry into Aircraft Accidents was also able to question 11 persons working for the British Civil Aviation Authority (CAA), the airline concerned and the maintenance organisation.

7 Co-operation with the French Authorities

As Basel-Mulhouse airport is operated jointly by France and Switzerland, direct contacts with the French meteorological and ATC services were necessary.

The French authorities appointed M Gueritot as the Accredited Representative of France with the Swiss investigation team.

On the day of the accident itself, Swiss accident experts were able to listen to the ATC tape recordings.

On 11-12 April 1973 a flight was made with a Swiss expert on board to test the navigation aids in the Basel area.

The investigating team were able to interview, at Basel-Mulhouse airport, the various French individuals involved in air traffic control, but permission was given only for the Director of the Airport, M A Roques, to be questioned by the Federal Commission of Inquiry into Aircraft Accidents at the public hearing.

In November 1973 the Federal Aviation Office was allowed to make further test flights.

8 Recovery work

Nearly all the dead were recovered on the day of the accident. The bodies of two more passengers were only discovered after the removal of large pieces of wreckage.

It proved very difficult to salvage the wreckage because of the weather conditions and the too narrow access paths. Larger pieces of wreckage had to be partly dismantled before they could be transported. Recovery was completed 15 days after the accident and all important pieces stored in a hangar at Othmarsingen/AG.

9 Federal Commission of Inquiry into Aircraft Accidents

On the day of the accident members of the Commission carried out an inspection at the site of the crash and attended team meetings as observers.

The preliminary inquiry was completed with the submission of the investigation report of 31 May 1974 to the Chairman of the Commission on 21 June 1974.

At the public hearing in Solothurn on 7-8 November 1974, 7 informants, 11 witnesses and 2 experts in the field were questioned. The leaders of the various working groups and the accredited representatives of the United Kingdom and France reported on their findings.

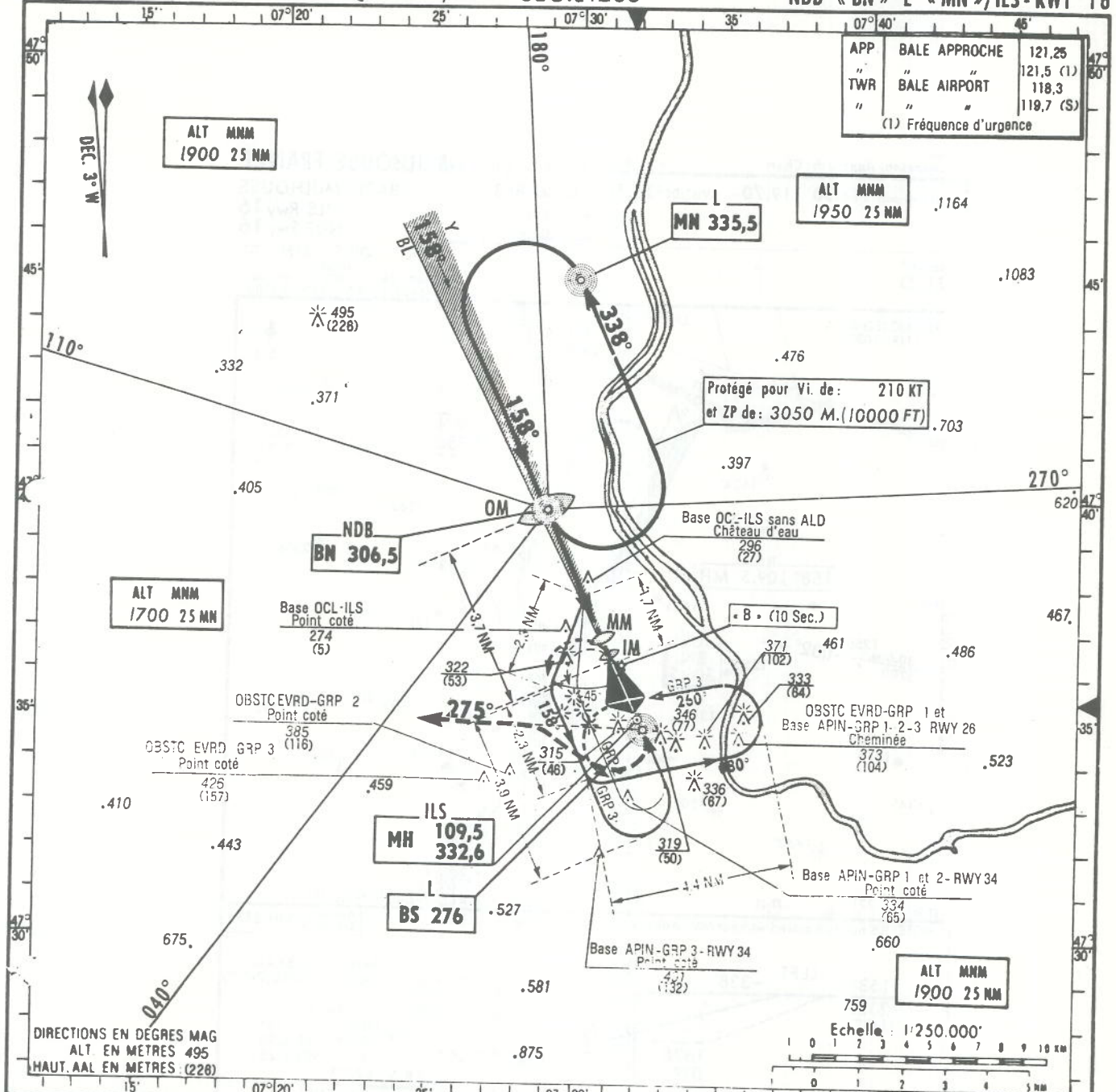
During a charter flight from Luton to Dusseldorf on 23 May 1975 with a Vanguard belonging to Invicta which was equipped very like the crashed aircraft, two members of the Federal Commission of Inquiry into Aircraft Accidents and a member of the UK investigating authority were able to get to know the cockpit procedures of the Invicta crew in detail and to study the use of the IFS system in the various phases of flight.

Annex 2a

APPROCHE AUX INSTRUMENTS O.A.C.I.
« PISTON-RÉACTION » (VP FINALE < 180 KT)

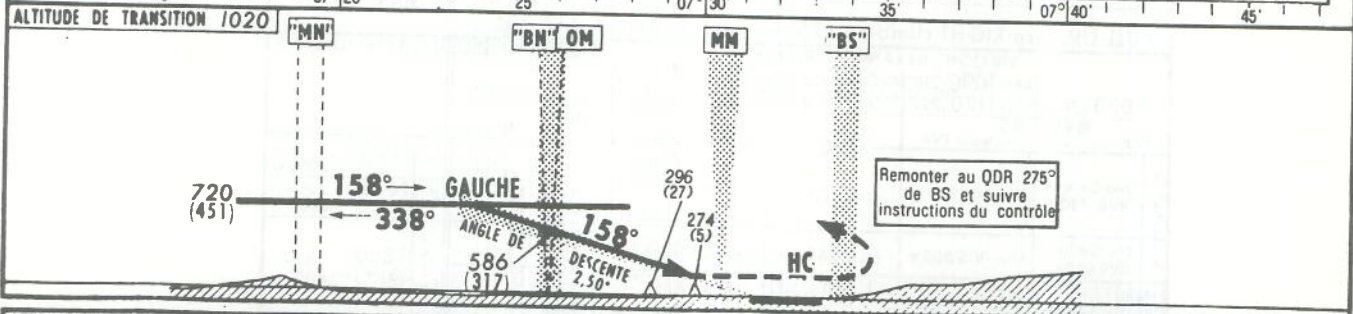
ALT : 269
SEUIL : 266

BALE - Mulhouse (LFSB)
NDB « BN » - L « MN » / ILS - RWY 16



DIRECTIONS EN DEGRES MAG
ALT EN METRES 495
HAUT. AAL EN METRES (228)

Echelle : 1/250.000



Remonter au QDR 275°
de BS et suivre
instructions du contrôle

ATTENTION : Minimums classiques ci-dessous à multiplier au moins par 1,6 pour exploitants non titulaires autorisation délivrée par autorités compétentes

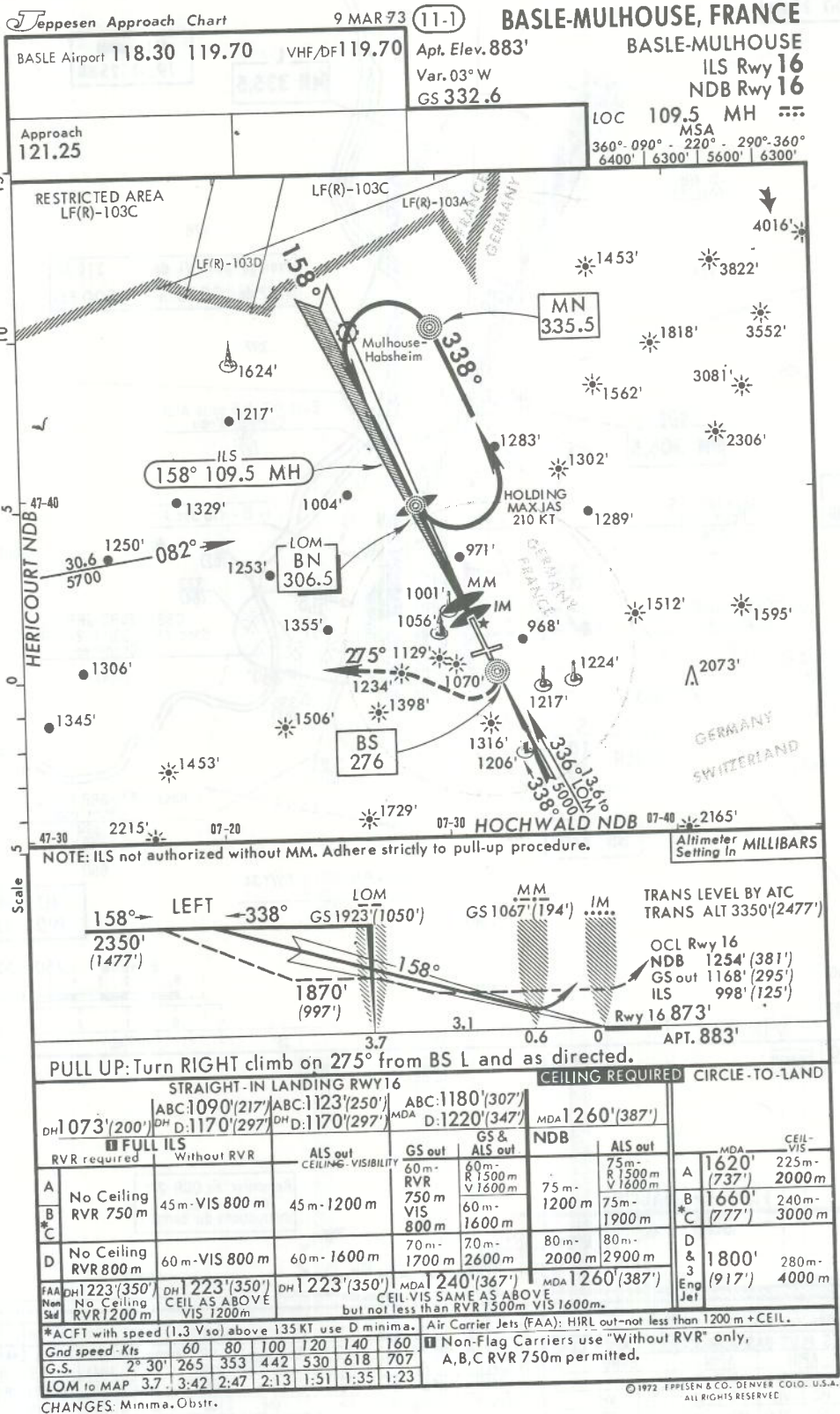
CORRECTIONS	OCL	ILS		ILS sans ALD		APIN		APIN		APCH CLASSIQUE ET APPR (1)		DECO (CLASSIQUE)		VP en KT	Temps OM/Seuil		Observations
		QCL	35	OCL	87	RWY 26	RWY 34	EVRO	APPR CAT. 1	VV	Balisage lumineux axial	avec	sans		(3,7 NM)	(3,2 NM)	
1	85	400	90	600	225	2000	185	2000	225	2300	60	400	VH	130	2 MIN 28 SEC	2 MIN 08 SEC	
2	85	600	90	750	225	2800	185	2800	240	3000	60	600	VH	150	1 MIN 43 SEC	1 MIN 28 SEC	
3	90	800	105	1800	225	3200	255	3200	280	4000	60	800	VH	170	1 MIN 29 SEC	1 MIN 16 SEC	
														180	1 MIN 18 SEC	1 MIN 07 SEC	
														180	1 MIN 14 SEC	1 MIN 04 SEC	(1) PPR

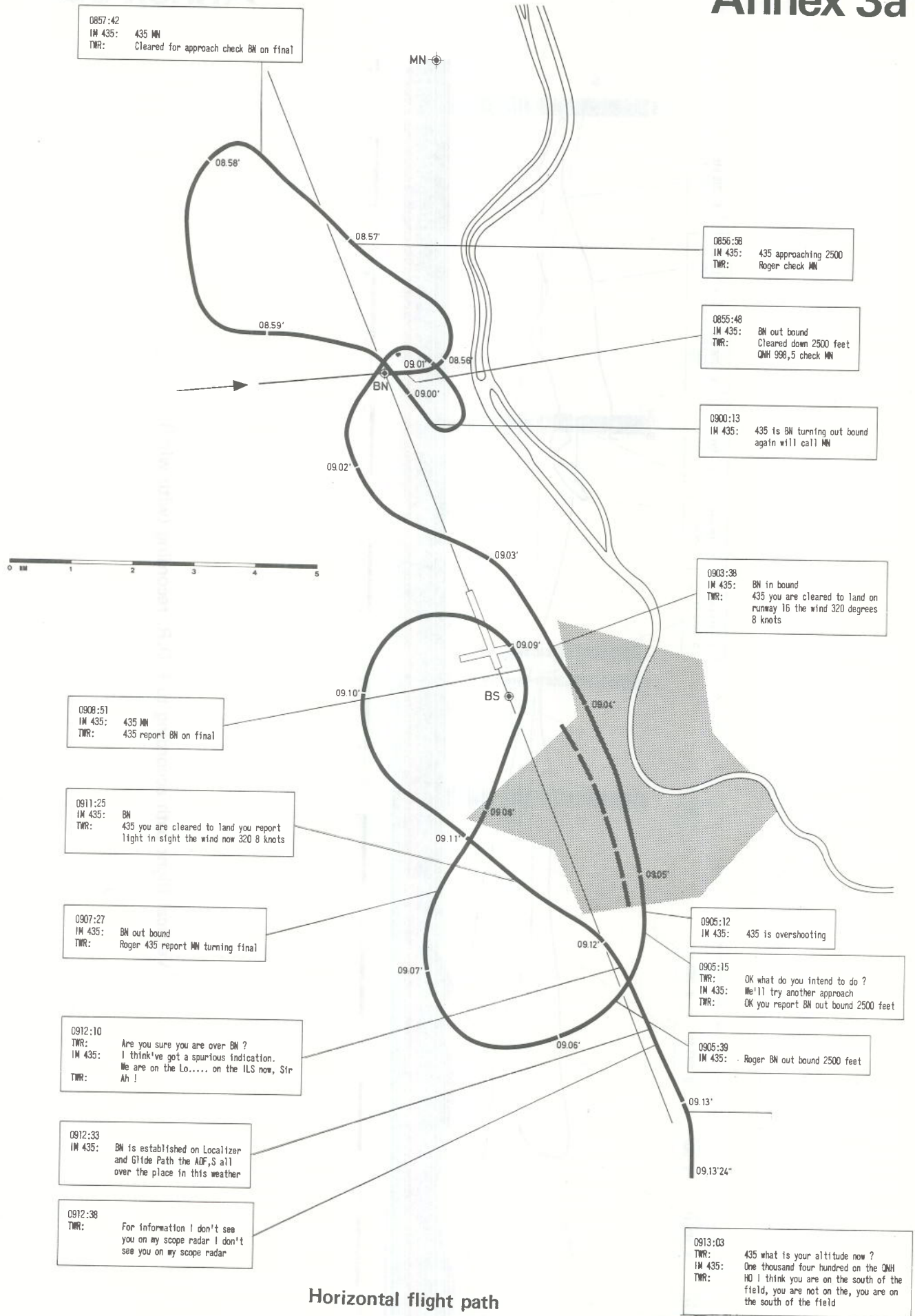
20 JUILLET 1972

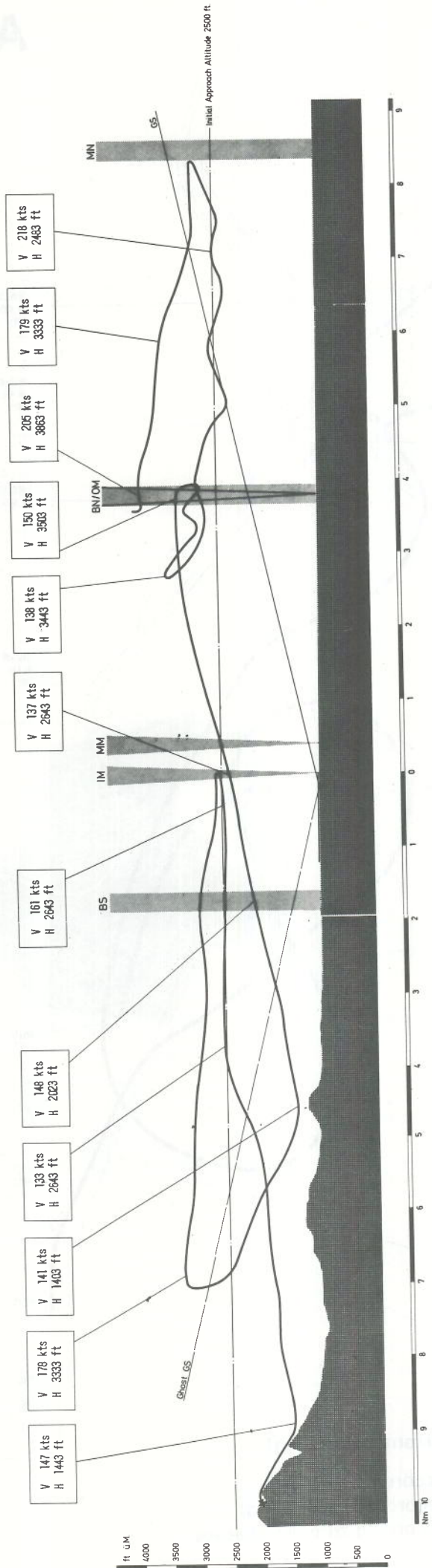
SERVICE DE L'INFORMATION AERONAUTIQUE FRANCE

35 C-2

Annex 2b

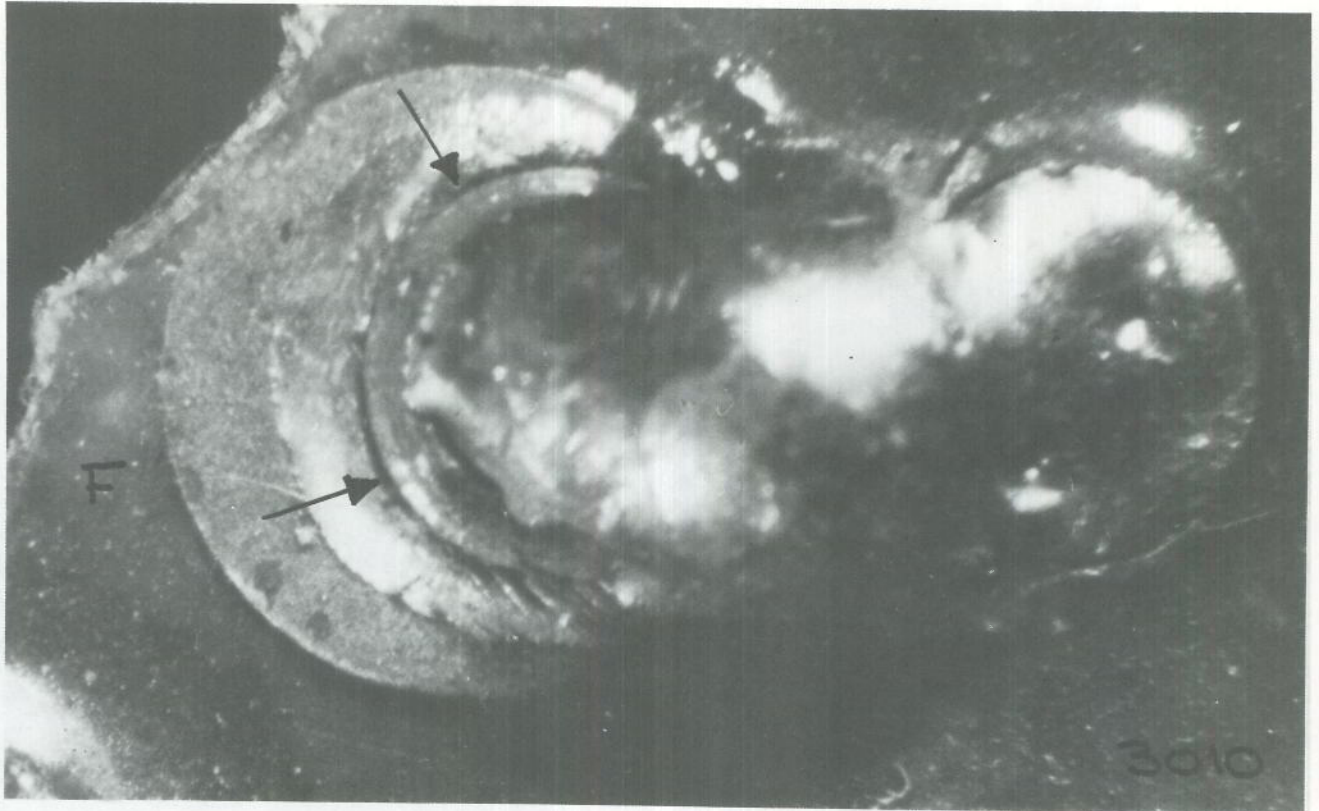




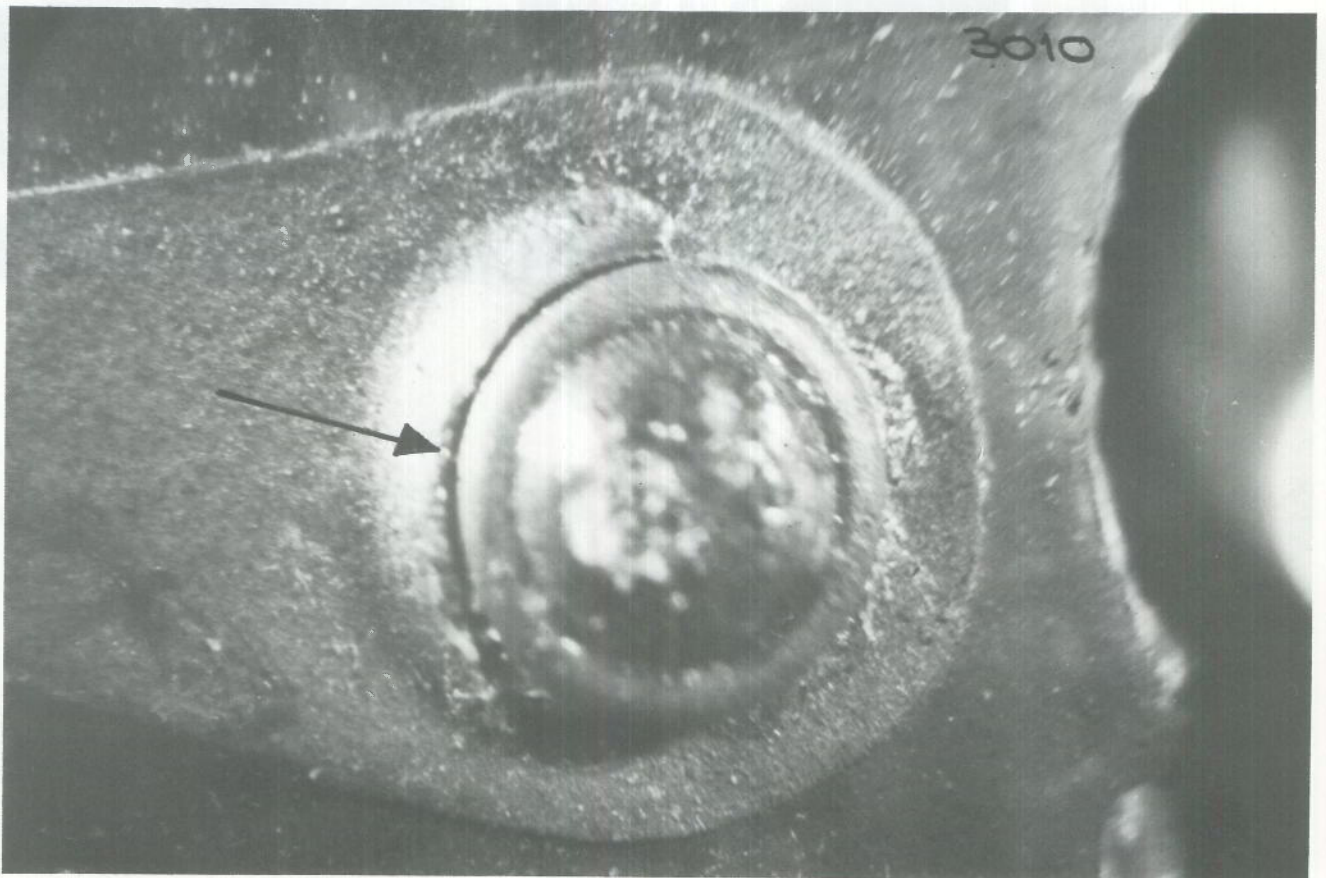


Vertical flight path according to F.D.R. recording (with wind)

No1 Loop Servo Amplifier



Clearly visible interruption (see arrows)

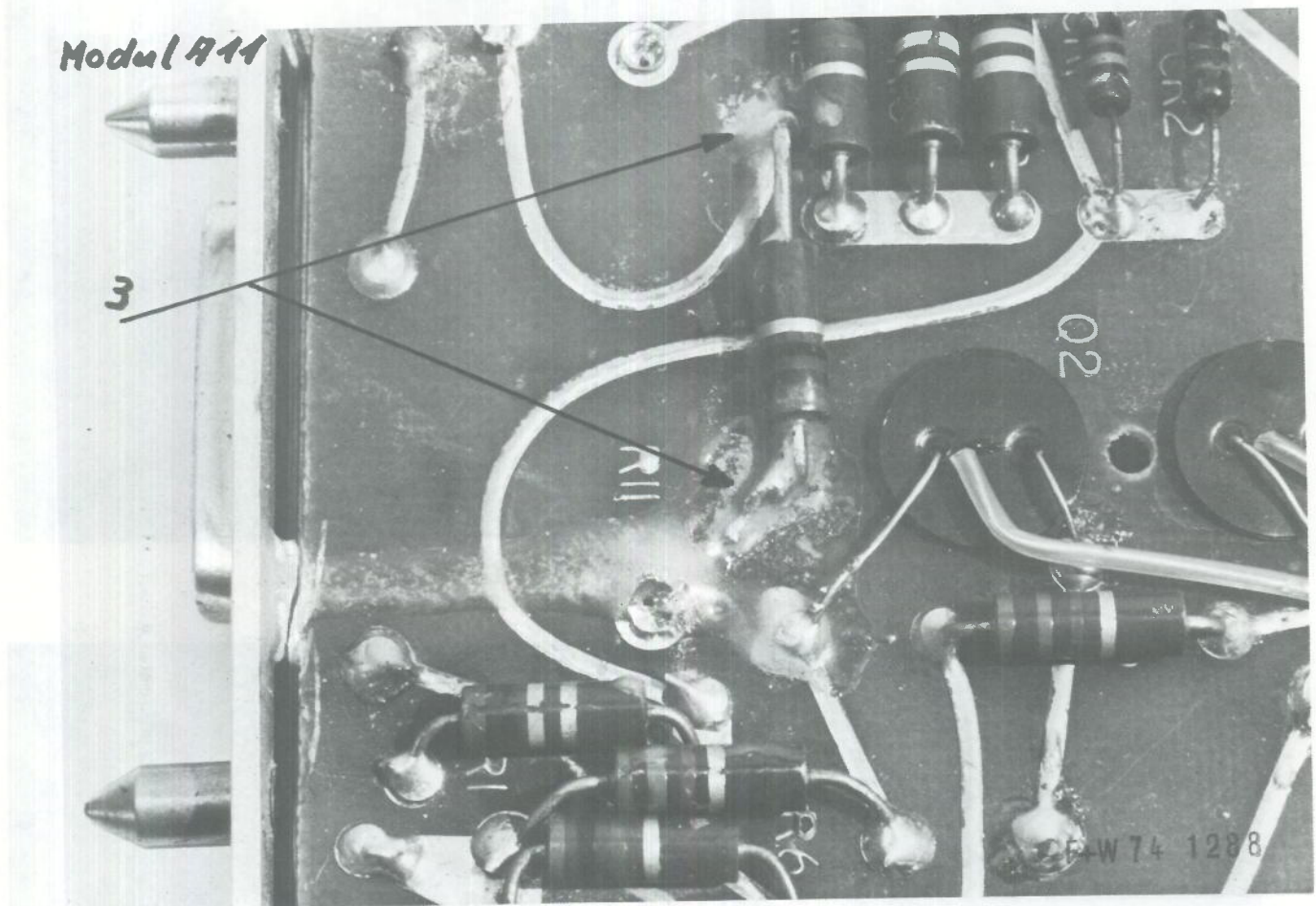


Very clear gap with interruption

Example of an unskilled repair

Module A11 RMI Servo

A resistor glued with Araldite
Very bad conductor tracks and soldered joints



Record of the R/T communications with voice identification

Accident to G-AXOP on 10. 4. 1973

Record of radio telephonic conversation exchanged between
the Basle-Mulhouse approach controller and the VC 9 G-AXOP
on frequencies 121.25 and 118.3 MHz

(Second edition)

GMT	VOICE	FROM	TO	CONVERSATION
Frequency 121.25 MHz				
08 49 00	Terry	435	TWR	Basle Approach Invicta 435 good morning
		TWR	435	435 good morning
	Terry	435	TWR	435 was Hericourt 49 flight level 70 estimating BN at 55
		TWR	435	Invicta 435 wind 360 degrees 9 kts visibility RVR Alpha 700 meters Bravo 1300 meters snow, ceiling 8 octas 120 meters QFE 967.5 QNH 998,5 temperature zero degrees runway in use 34 please contact on 118.3
	Terry	435	TWR	Roger 998, 967 runway 34 and wildo 118,3
Frequency 118.3 MHz				
08 50 20	Terry	435	TWR	Basle Invicta 435 good morning
		TWR	435	Good morning Invicta 435
	Terry	435	TWR	435 is at flight level 70 estimating BN 55
		TWR	435	Roger maintain 70 check BN out bound
	Terry	435	TWR	Roger I understand runway 34
		TWR	435	Negative runway in use 16
08 50 40	Terry	435	TWR	Thank you runway 16
08 52		TWR	435	Invicta 435 cleared down flight level 50 check leaving 70
	Dorman	435	TWR	435 leaving 7 for 5
08 52 20		TWR	435	Roger check approaching 50
	Dorman	435	TWR	Roger
08 53 40	Terry	435	TWR	435 coming to 50
		TWR	435	You are recleared transition level 40 and check BN out bound
08 54 45	Terry	435	TWR	Roger down 40 will call BN out bound
	Terry	435	TWR	Flight level 40
		TWR	435	Roger check BN out bound
08 55 40	Terry	435	TWR	BN out bound
		TWR	435	Cleared down 2500 feet QNH 998.5 check MN

GMT	VOICE	FROM	TO	CONVERSATION
	Terry	435	TWR	Roger 998.5 will call MN
08 56 50	Terry	435	TWR	435 approaching 2500
		TWR	435	Roger check MN
	Terry	435	TWR	Wildo
08 57 45	Terry	435	TWR	435 MN
		TWR	435	Cleared for approach check BN on final
	Terry	435	TWR	Thank you
09 00 20	Terry	435	TWR	435 is BN turning out bound again will call MN
		TWR	435	Roger
09 01 20				... contact avec IT 141 ...
09 03 30	Terry	435	TWR	BN in bound
		TWR	435	435 you are cleared to land on runway 16 the wind 320 degrees 8 knots
	Not sure	435	TWR	435
09 05 10	Dorman	435	TWR	435 is overshooting
09 05 15		TWR	435	You are overshooting 435?
	Dorman	435	TWR	435 is overshooting
		TWR	435	OK what do you intend to do?
	Dorman	435	TWR	We'll try another approach
		TWR	435	OK you report BN out bound 2500 feet two five zero zero ft
09 05 35	Dorman	435	TWR	Roger BN out bound 2500 feet
			 contact avec IT 141 ...
09 07 25	Terry	435	TWR	BN out bound
		TWR	435	Roger 435 report MN turning final
	Dorman	435	TWR	Roger
09 08 40	Dorman	435	TWR	435 MN
		TWR	435	435 report BN on final
	Dorman	435	TWR	Roger
09 11 25	Terry	435	TWR	BN
		TWR	435	435 you are cleared to land you report light in sight the wind now 320 8 knots
	Terry	435	TWR	Thank you
09 12 10		TWR	435	Invicta 435 Basle
	Dorman	435	TWR	435
		TWR	435	Are you sure you are over BN?
	Dorman	435	TWR	I think've got a spurious indication. We are on the Lo ... on the ILS now, Sir

GMT	VOICE	FROM	TO	CONVERSATION
		TWR	435	Ah!
09 12 35	Terry	435	TWR	BN is established on Localizer and Glide Path the ADF,S all over the place in this weather
09 12 50		TWR	435	For information I don't see you on may scope radar I don't see you on my scope radar
09 13 00		TWR	435	435 what is your altitude now?
*	**	435	TWR	One thousand four hundred on the QNH
		TWR	435	HO I think you are on the south of the field, you are not on the you are on the south of the field
09 13 40		TWR	435	435 Basle
		TWR	435	Invicta 435 Basle
		TWR	435	Invicta 435 Basle
		TWR	435	Invicta 435 Basle
		TWR	435	Invicta 435 Basle
09 14 00		TWR	435	Invicta 435 Basle
		TWR	435	Invicta 435 Basle
		TWR	435	Invicta 435 Basle
09 14 30		TWR	435	Invicta 435 Basle
		TWR	435	Invicta 435 Basle
		TWR	435	Invicta 435 Basle
09 15 00		TWR	435	Invicta 435 Basle
		TWR	435	Invicta 435 Basle
09 15 30		TWR	435	Invicta 435 Basle
		TWR	435	Invicta 435 Basle Invicta 435
		TWR	435	Invicta 435 Basle Invicta 435 Basle
09 16 15		TWR	435	Invicta 435 Basle
		TWR	435	Invicta 435 Basle Invicta 435 Basle
		TWR	435	Invicta 435 If you received me you contact Zurich on 133.4 contact Zurich on 133.4
09 16 50		TWR	435	Invicta 435 Basle
		TWR	435	Invicta 435 Basle
		TWR	435	Invicta 435 Basle
09 17 50		TWR	435	Invicta 435 Basle
		TWR	435	Invicta 435 Basle Invicta 435
		TWR	435	Invicta 435 Invicta 435 Basle
		TWR	435	Invicta 435 Invicta 435 Basle
09 19 10		TWR	435	Invicta 435 Invicta 435 Basle

GMT	VOICE	FROM	TO	CONVERSATION
09 19 15		TWR	435	Invicta 435
		TWR	435	Invicta 435 Invicta 435 Basle is calling do you read over

Ceased calling INVICTA 435 on 118.3 MHz at 0920 hrs

I certify that I recognise the relevant transmissions as being made by Capt. Terry or Capt. Dorman as annotated.

Signed: Allan Scorey
VANGUARD TRAINING CAPTAIN
INVICTA INTERNATIONAL AIRLINES LTD

19TH APRIL 1974

Time GMT	Radio communications between IM435 and Basel ATC	Coordination messages Basel and Zurich ATC (external telephone)	Statements by Basel and Zurich ATC	Logbook of Zurich ATC (none kept at Basel)
08.49.12	<p>Frequency 121.25 MHz</p> <p>435 TWR Basle Approach Invicta 435 good morning</p> <p>TWR 435 435 good morning</p> <p>435 TWR 435 was Hericourt 49 flight level 70 estimating BN at 55</p> <p>TWR 435 Invicta 435 wind 360 degrees 9 kts visibility RVR Alpha 700meters Bravo 1300 meters snow, ceiling 8 octas</p> <p>120 meters QFE 967.5 QNH</p> <p>998.5 temperature zero degrees runway in use 34 please contact on 118.3</p> <p>435 TWR Roger 998, 967, 34 and over to 118.3</p>		<p>Identification of IM435 over NDB HR with Basel VHF direction finder</p> <p>Basel (lady) aerodrome Controller observes IM435 on radar from NDB HR to NDB BN</p>	
08.50.19	<p>Frequency 118.3 MHz</p> <p>435 TWR Basle Invicta 435 good morning</p> <p>TWR 435 Good morning Invicta 435</p> <p>435 TWR 435 is at flight level 70 estimating BN 55</p> <p>TWR 435 Roger maintain 70 check BN out bound</p> <p>435 TWR Roger 1 understand runway 34</p> <p>TWR 435 Negative runway in use 16</p> <p>435 TWR Thank you runway 16</p>			
08.52.05	<p>TWR 435 Invicta 435 cleared down flight level 50 check leaving 70</p>			
08.52.20	<p>435 TWR 435 leaving 7 for 5</p> <p>TWR 435 Roger check approach 50</p> <p>435 TWR Roger</p>			

Time GMT	Radio communications between IM 435 and Basel ATC	Coordination messages Basel and Zurich ATC (external telephone)	Statements by Basel and Zurich ATC	Logbook of Zurich ATC (none kept at Basel)
08.53.53	435 TWR 435 coming to 50 TWR 435 You are cleared transition level 40 and check BN out bound 435 TWR Roger down 40 will call BN out bound			
08.54.45	435 TWR Flight level 40 TWR 435 Roger check BN outbound			
08.55.48	435 TWR BN out bound TWR 435 Cleared down 2500 ft QNH 998.5 check MN 435 TWR Roger 998.5 will call MN			
08.56.58	435 TWR 435 approaching 2500 TWR 435 Roger check MN 435 TWR Wildo			
08.57.42	435 TWR 435 MN TWR 435 Cleared for approach check BN on final 435 TWR Thank you		Basel Aerodrome Controller identifies IM435 over NDB MN. Loss of radar contact shortly afterwards owing to clutter.	
09.00.13	435 TWR 435 is BN turning out bound again will call MN TWR 435 Roger		Observes IM435 again from NDB BN heading for MN, the turn 1/2 nm beyond MN, for 2 nm on the localiser, echo vanishes again.	
09.01.55/ 09.02.40contact avec IT 141.....			
09.03.38	435 TWR BN in bound TWR 435 435 you are cleared to land on runway 16 the wind 320 degrees 8 knots 435 TWR 435			

Time GMT	Radio communications between IM435 and Basel ATC	Coordination messages Basel and Zurich ATC (external telephone)	Statements by Basel and Zurich ATC	Logbook of Zurich ATC (none kept at Basel)
09.05.12	435 TWR 435 is overshooting			
09.05.17	TWR 435 you are overshooting 435? 435 TWR 435 is overshooting TWR 435 OK what do you intend to do? 435 TWR We'll try another approach TWR 435 OK you report BN out bound 2500 feet two five zero zero ft 435 TWR Roger BN out bound 2500 feet		After the overshoot briefly observes a weak radar echo moving towards NDB BN	
09.05.39				
09.05.43/ 09.06.35Contact avec IT 141			
09.07.27	435 TWR BN out bound TWR 435 Roger 435 report MN turning final 435 TWR Roger			
09.08.10		TWR Hallo Beck Hallo the Tower TWR Yes good morning Beck Yes good morning Monsieur this is Beck at the Basel-Binningen Observatory TWR Yes Beck There is an aircraft which has just passed 2 minutes ago heading south TWR Yes Beck Ah probably ah a four-engined turbo-prop TWR Yes Beck Probably and it is flying at barely 50 metres and then it is snowing very heavily and I have the impression if it remains like this it will crash in the mountains	Basel control tower receives a telephone call from R Beck, Basel-Binningen Observatory, regarding the sighting of a 4-engined turbo-prop aircraft over the Observatory at a very low altitude and flying south.	

Time GMT	Radio communications between IM435 and Basel ATC	Coordination messages Basel and Zurich ATC (external telephone)	Statements by Basel and Zurich ATC	Logbook of Zurich ATC (none kept at Basel)
09.08.51	<p>435 TWR 435 MN</p> <p>TWR 435 435 report BN on final</p> <p>435 TWR Roger</p>	<p>TWR Ah. hold on you are really sure that is flying at 50 metres</p> <p>Beck Yes certainly listen, I was a pilot with Swissair I have just, I have now retired ba</p> <p>TWR Ah. Agreed (two simultaneous conversations)</p> <p>Beck I work here at (two simultaneous conversations)... I am telephoning you it was here at a maximum of 50 metres south of the Observatory here (an aside from M Mao can be heard 'an aircraft which was flying at 50 metres above the Observatory, everything was blotted out, it is a former Swissair pilot who is on the telephone').</p> <p>TWR Right thank you</p> <p>Beck It had a red tail unit, I could not, I did not have time to see the markings</p> <p>TWR Yes but because you are being....., there is an aircraft which has just overshoot there which is going to return over (two conversations)</p> <p>Beck It must be made to climb</p> <p>TWR Yes agreed thank you</p> <p>Beck It must be made to climb, it is going to crash in the mountains like this</p> <p>TWR Agreed thank you</p> <p>Beck Well then many thanks goodbye</p> <p>TWR Goodbye</p> <p>Beck Goodbye</p>		
09.09.10				

Time GMT	Radio communications between IM435 and Basel ATC	Coordination messages Basel and Zurich ATC (external telephone)	Statements by Basel and Zurich ATC	Logbook of Zurich ATC (none kept at Basel)
09.11.10		<p>Runway No 22</p> <p>B/M ZH Yes Hello</p> <p>ZH B/M Tell me you have someone who has taken off who is now crawling towards Hochwald?</p> <p>B/M ZH Ah! who is on the Hochwald side? We have an aircraft which has overshoot yes but it is going to return to BN</p>	Radar operator in Zurich ACC, west sector, observes an unidentified echo (unknown traffic) approximately 3-5 nm south-west of Basel heading towards HOC.	
09.11.20				
09.11.25	<p>435 TWR BN</p> <p>TWR 435 you are cleared to land you report light in sight the wind now 320 8 knots</p> <p>435 TWR Thank you</p>	<p>ZH B/M Ah! it is ...</p> <p>B/M ZH Hold on hold on</p> <p>ZH B/M It has a heading for Hochwald</p> <p>B/M ZH What?</p>		
09.11.30				
09.11.40		<p>ZH B/M It has a heading for Hochwald</p> <p>B/M ZH Towards Hochwald, hold on</p> <p>ZH B/M What is its flight level?</p> <p>B/M ZH Ah! yes I see one in that direction which is heading for Hochwald now you will be told that at once</p> <p>B/M ZH Yes hello, you must check with Paris because the aircraft has supposedly passed BN it has just contacted us ours has passed BN</p>	Basel Aerodrome Controller observes an unidentified radar echo 6 nm south of the aerodrome along the runway centre line	
09.12.00		<p>ZH B/M It is probably a VFR but that's not on now</p> <p>B/M ZH Eh</p> <p>ZH B/M We cannot see it any more now eh right agreed many thanks</p>	Zurich radar operator states that the echo has vanished 3-5 NM North-West of HOC	

Time GMT	Radio communications between IM 435 and Basel ATC	Coordination messages Basel and Zurich ATC (external telephone)	Statements by Basel and Zurich ATC	Logbook of Zurich ATC (none kept at Basel)
09.12.10		B/M ZH Yes right ZH B/M Thank you B/M ZH Cheers		
09.12.10	TWR 435 Invicta 435 Basle 435 TWR 435 TWR 435 Are you sure, you are over BN? 435 TWR I think've got a spurious indication. We are on the Lo... on the ILS now, Sir TWR 435 Ah! 435 TWR BN is established on Localiser and Glide Path the ADFs all over the place in this weather TWR 435 For information I don't see you on my scope radar I don't see you on my scope radar TWR 435 435 what is your altitude now? 435 TWR One thousand four hundred on the QNH TWR 435 HO I think you are on the south of the field, you are not on the you are on the south of the field		Basel aerodrome Controller asks IM435 if he is sure he is over BN. He observes the echo (see time 09.11.40) during another 5 rotations of the antenna exactly along the runway centre line (heading south).	
09.12.33				
09.12.38				
09.13.03				
09.13.34	TWR 435 Basle TWR 435 Invicta 435 Basle TWR 435 Invicta 435 Basle TWR 435 Invicta 435 Basle TWR 435 Invicta 435 Basle			

Time GMT	Radio communications between IM 435 and Basel ATC	Coordination messages Basel and Zurich ATC (external telephone)	Statements by Basel and Zurich ATC	Logbook of Zurich ATC (none kept at Basel)
09.14.00	<p>TWR 435 Invicta 435 Basle</p> <p>TWR 435 Invicta 435 Basle</p> <p>TWR 435 Invicta 435 Basle</p>			
09.14.30	<p>TWR 435 Invicta 435 Basle</p> <p>TWR 435 Invicta 435 Basle</p> <p>TWR 435 Invicta 435 Basle</p>			
09.14.40		<p>ZH B/M Go ahead</p> <p>B/M ZH Yes Zurich do you have (one word unintelligible) on your scope on Hochwald</p> <p>ZH B/M What's the matter?</p> <p>B/M ZH Yes do you see an aircraft over Hochwald</p> <p>ZH B/M No one moment, I am giving you the controller eh</p>		
09.15.00	<p>TWR 435 Invicta 435 Basle</p>			
09.15.30	<p>TWR 435 Invicta 435 Basle</p> <p>TWR 435 Invicta 435 Basle</p> <p>TWR 435 Invicta 435 Basle</p> <p>TWR 435 Invicta 435 Basle, Invicta 435</p> <p>TWR 435 Invicta 435</p> <p>TWR 435 Invicta 435 Basle, Invicta 435 Basle</p>	<p>ZH B/M Hello</p> <p>B/M ZH Yes tell me, have you had any contact with an Invicta, how much? An Invicta 435?</p> <p>ZH B/M 435</p> <p>B/M ZH Yes</p> <p>ZH B/M No none at all</p> <p>B/M ZH It has not contacted you and you do not see any echo on the Hochwald side</p> <p>ZH B/M Hold on, check for a moment eh</p> <p>B/M ZH Yes you try and call it</p> <p>B/M ZH Hello</p> <p>ZH B/M Where is it now you say</p>		

Time GMT	Radio communications between IM435 and Basel ATC	Coordination messages Basel and Zurich ATC (external telephone)	Statements by Basel and Zurich ATC	Logbook of Zurich ATC (none kept at Basel)
09.16.00	<p>TWR 435 Invicta 435 Basle</p> <p>TWR 435 Invicta 435 Basle</p> <p>TWR 435 Invicta 435 Basle</p> <p>TWR 435 Invicta 435 If you receive me you contact Zurich on 133.4 contact Zurich 133.4</p>	<p>B/M ZH Hello</p> <p>ZH B/M Hello, where is it now, you say?</p> <p>B/M ZH Well, it said it was on the heading for Hochwald and then we cannot see it any more and it does not answer any more either</p> <p>ZH B/M Yes perhaps it's the one that we saw before but we have no contact, it has disappeared from the screen</p> <p>B/M ZH Can't you try and call it</p> <p>ZH B/Mit has disappeared from the screen</p> <p>B/M ZH As yes, it has disappeared from the screen, yes</p> <p>ZH B/M Yes with us here too therefore I don't know what it is doing</p> <p>B/M ZH To us, to me it said to me that it was established on the ILS we saw an echo to the south we did not know what it was</p> <p>ZH B/M I say, I am hearing you very badly</p> <p>B/M ZH Yes it said to us that it was established on the ILS and we had an echo in the south, that is the echo about which you telephoned us, but we did not know who it was</p> <p>ZH B/M In any event, we cannot see anything any more, eh I do not know what it has done, there is no echo to be seen nothing at all eh</p>		
09.16.15				

Time GMT	Radio communications between IM435 and Basel ATC	Coordination messages Basel and Zurich ATC (external telephone)	Statements by Basel and Zurich ATC	Logbook of Zurich ATC (None kept at Basel)
09.16.50	<p>TWR 435 , Invicta 435 Basle</p> <p>TWR 435 Invicta 435 Basle</p> <p>TWR 435 Invicta 435 Basle</p>	<p>B/M ZH No</p> <p>ZH B/M No</p> <p>B/M ZH Eh a pity thanks</p> <p>ZH B/M OK Jo</p>		
09.17.50	<p>TWR 435 Invicta 435 Basle</p> <p>TWR 435 Invicta 435 Basle</p> <p>Invicta 435</p> <p>TWR 435 Invicta 435 Invicta 435 Basle</p> <p>TWR 435 Invicta 435 Invicta 435 Basle</p>			
09.19.10	<p>TWR 435 Invicta 435 Invicta 435 Basle</p>			
09.19.15	<p>TWR 435 Invicta 435</p> <p>TWR 435 Invicta 435 Invicta 435 Basle is calling do you read over</p> <p>Ceased calling Invicta 435 on 118.3 MHz at 09.20 hrs</p>			
09.20.20		<p>ZH B/M Ya Bale</p> <p>B/M ZH Yes eh, you can give me the, but no,you can, your Air Rescue there must be informed that the Invicta must have crashed near Hochwald</p> <p>ZH B/M Ah. I am giving you the Controller, one moment right</p> <p>B/M ZH Right</p>		

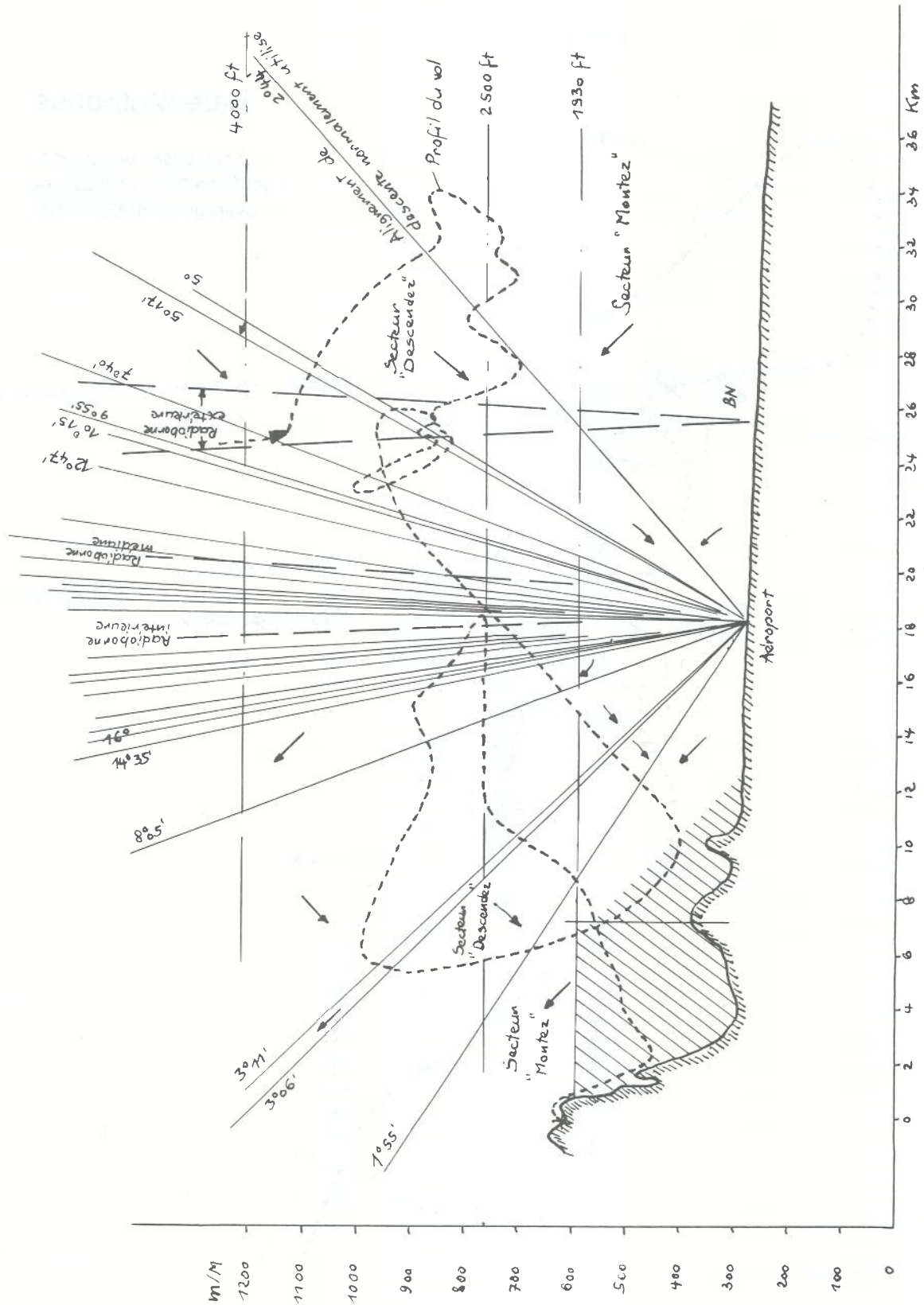
Time GMT	Radio communications between IM435 and Basel ATC	Coordination messages Basel and Zurich ATC (external telephone)	Statements by Basel and Zurich ATC	Logbook of Zurich ATC (none kept at Basel)
09.20.40		<p>ZH B/M Yes hello</p> <p>B/M ZH Yes tell me, can you inform the rescue system your rescue that the Invicta 435 must have crashed near Hochwald</p> <p>ZH B/M Have you heard something?</p> <p>B/M ZH What?</p> <p>ZH B/M Did you hear this?</p> <p>B/M ZH No it was seen going away southwards in fact an echo was seen going away southwards it must have been it</p> <p>ZH B/M Ah! yes and now I must call the rescue</p> <p>B/M ZH Yes because it is no longer answering</p> <p>ZH B/M Yes it is no longer answering I believe</p> <p>B/M ZH Yes the echo disappeared at the same moment</p> <p>ZH B/M Yes therefore I have telephoned to the RCC but eh</p> <p>B/M ZH Yes right you give the report for the rescue eh</p> <p>ZH B/M What was it called Invicta</p> <p>B/M ZH Invicta 435</p> <p>ZH B/M 435 what was it doing, it was coming from England it was coming to Bale, it made an overshoot here</p> <p>ZH B/M To Bale, then it was too far to the south it seems eh, it was going off to the south</p>		
09.21.10				

Time GMT	Radio communications between IM435 and Basel ATC	Coordination messages Basel and Zurich ATC (external telephone)	Statements by Basel and Zurich ATC	Logbook of Zurich ATC (none kept at Basel)
09.21.40		<p>B/M ZH It was going off to the south</p> <p>ZH B/M What flight level when you lost it?</p> <p>B/M ZH Well, the flight level is not known because it replied to us that it was established on the ILS</p> <p>ZH B/M Right</p> <p>B/M ZH Eh, and no echo was seen to the north of the aerodrome on the contrary, there was an echo which was going off to the south</p> <p>ZH B/M Right</p> <p>B/M ZH It disappeared on the Hochwald side shortly before Hochwald</p> <p>ZH B/M Yes, yes, you have already informed the Bale police</p> <p>B/M ZH Yes we are engaged in doing so</p> <p>ZH B/M Ah good, right, I will inform the RCC eh</p> <p>B/M ZH Yes agreed</p> <p>ZH B/M Agreed</p> <p>B/M ZH OK</p> <p>ZH B/M I will call you back about what they say eh</p> <p>B/M ZH Yes agreed thank you</p> <p>ZH B/M OK many thanks</p>		

Time GMT	Radio communications between IM435 and Basel ATC	Coordination messages Basel and Zurich ATC (external telephone)	Statements by Basel and Zurich ATC	Logbook of Zurich ATC (none kept at Basel)
09.23				<p>TWR BA reports by telephone IM435 Vanguard England BA reports 'established on ILS'. The aircraft does not land and does not re-establish radio contact. Zurich radar (west sector) sees a radar echo south of BN heading south east at the relevant time (approximately between 09 10-0915 hrs). The echo vanishes approximately 3nm NW HOC. D-West informs Basel about this observation. Air Ministry RCC informed. BU informed for transmission.</p>
09.24.30		<p>B/M ZH Hello ZH B/M Tell me, what aircraft type was it B/M ZH Hello ZH B/M Yes the Invicta 435 what aircraft type was it B/M ZH The aircraft type was a Vanguard ZH B/M A Vanguard B/M ZH Yes ZH B/M Good right thanks B/M ZH Right ZH B/M Hold on (conversation between Bale-Mulhouse controllers)</p>		
09.29.20		<p>ZH B/M You have heard something about the Invicta B/M ZH No we have heard nothing the police have been informed and then you have asked the RCC in actual fact</p>		

Time GMT	Radio communications between IM435 and Basel ATC	Coordination messages Basel and Zurich ATC (internal telephone)	Statements by Basel and Zurich ATC	Logbook of Zurich ATC (none kept at Basle)
09.34.50		<p>ZH B/M Yes we have telephone now he is in fact the chief he is telephoning now eh</p> <p>B/M ZH Yes right thanks</p> <p>ZH B/M OK</p> <p>B/M ZH Thanks</p> <p>B/M ZH Yes hello</p> <p>ZH B/M Look, the Federal Air Office has been informed and they have said something is to be done the appropriate services informed and then we shall see what results this gives</p> <p>B/M ZH Yes right</p> <p>ZH B/M And then, our Chief has also been informed actually (conversation covered by radio-telephony) the deputy</p> <p>B/M ZH Yes</p> <p>ZH B/M He said to the Head of Air Safety</p> <p>B/M ZH Yes</p> <p>ZH B/M He said we are going to check</p> <p>B/M ZH Yes</p> <p>ZH B/M At the moment.....it is the services of the Federal Air Office which are doing something eh</p> <p>B/M ZH Good right thanks</p> <p>ZH B/M Right then if you have something fresh you will say so eh</p> <p>B/M ZH Yes agreed you will be kept informed thanks Au revoir</p>		

Time GMT	Radio communications between IM453 and Basel ATC	Coordination messages Basel and Zurich ATC (external telephone)	Statements by Basel and Zurich ATC	Logbook of Zurich ATC (none kept at Basle)
		ZH B/M OK many thanks B/M ZH Au revoir ZH B/M Au revoir		
11.41				BA: Found near Hochwald
11.47				SRFW: 1.5 km W Hockwald at 1015 L 139 + 7



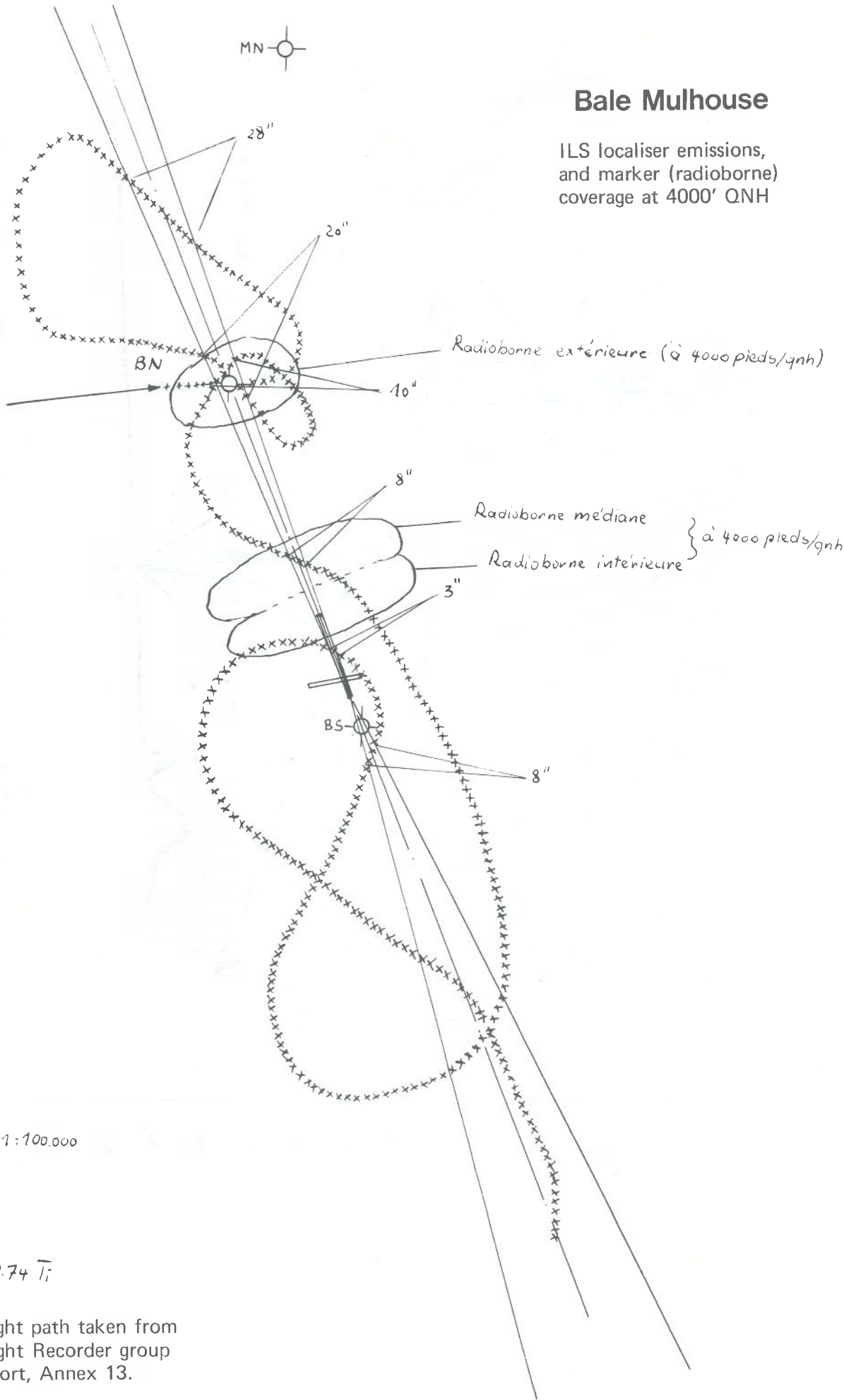
Flight path profile (---) = Sector "Montez"
 taken from Flight Recorder = Sector "Descendez"
 group report, Annex 13. Glideslope emission normally used = 2° 44'

Bale Mulhouse
 ILS Glideslope emissions and markers (Radiobornes)

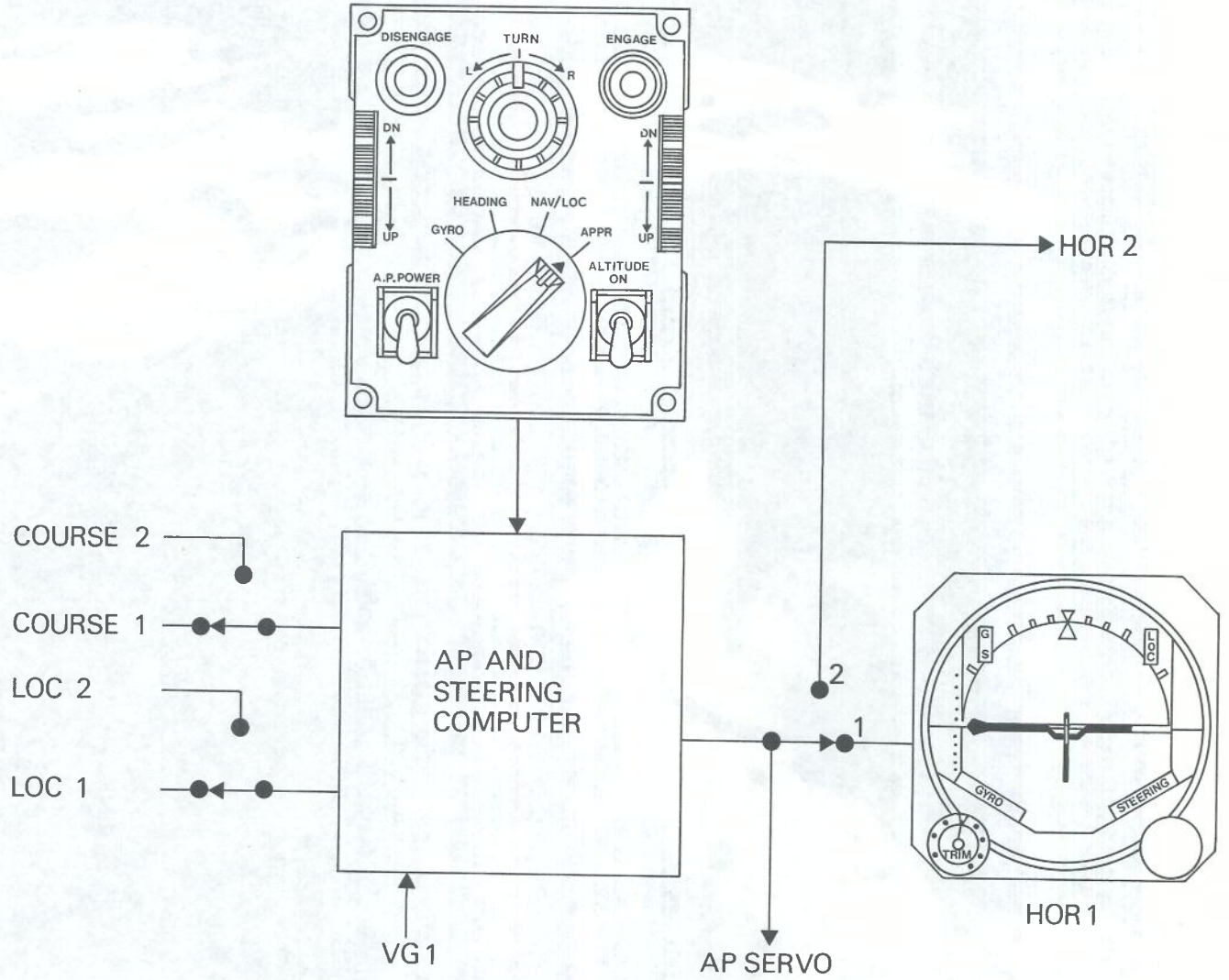
Annex 6b

Bale Mulhouse

ILS localiser emissions,
and marker (radioborne)
coverage at 4000' QNH



Integrated Flight System, APPROACH Mode



Annex 8a



Aerial view of accident site



Close up of accident site