



Accident
on 17 January 2001
at Quetigny (21)
to the Beechcraft 95-C 55 “Baron”
registered F-BUTZ
operated by Air Bor

REPORT TRANSLATION
f-tz010117a

F O R E W O R D

This report presents the technical conclusions reached by the BEA on the circumstances and causes of this accident.

In accordance with Annex 13 of the Convention on International Civil Aviation, European Directive 94/56/CE and French Law No 99-243 of 29 March 1999, the conclusions contained in this report are intended neither to apportion blame, nor to assess individual or collective responsibility. The sole objective is to draw lessons from this occurrence which may help to prevent future accidents or incidents.

Consequently, the use of this report for any purpose other than for the prevention of future accidents could lead to erroneous interpretations.

SPECIAL FOREWORD TO ENGLISH EDITION

This report has been translated and published by the BEA to make its reading easier for English-speaking people. As accurate as the translation may be, the original text in French should be considered as the work of reference.

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Glossary

ATC	Air Traffic Control
CRNA	Regional ATC center (Centre régional de la navigation aérienne)
CTR	Control Zone
DGAC	Civil aviation directorate (Direction Générale de l'Aviation civile)
DME	Distance Measuring Equipment
FL	Flight Level
GPS	Global Positioning System
IAF	Initial Approach Fix
IFR	Instrument Flight Rules
ILS	Instrument Landing System
kt	Knot
MDH	Minimum Descent Height
MHz	Megahertz
QNH	Altimeter setting to obtain aerodrome elevation when on the ground
S/CTR	Special control zone
SARL	Limited company (Société Anonyme à Responsabilité Limitée)
TACAN	Tactical air traffic control system
ULM	Ultralight motorized
UTC	Universal Time Coordinated
VFR	Visual Flight Rules
VOR	VHF Omnidirectionnel Radio range
VORTAC	VHF Omnidirectional Range station/tactical air navigation

SYNOPSIS

Date and time

Wednesday 17 January 2001 at 19 h 15 ⁽¹⁾

Aircraft

Beechcraft BE 95-C 55 "Baron"
registered F-BUTZ

Site of accident

Quetigny (21)

Owner

Clovis SARL

Type of flight

Private

Operator

Air Bor

Persons on board

1 pilot + 3 passengers

Summary

On a VORTAC approach to runway 18 at Dijon Longvic, at night, the aircraft struck the ground on a carwash area located three nautical miles from the threshold of runway 18. The aircraft crashed into a lamppost, came to a halt and caught fire immediately.

Consequences

	Persons			Equipment	Third Parties
	Killed	Injured	Unhurt		
Crew	1	-	-	Destroyed	Lamppost and cleaning equipment damaged
Passengers	3	-	-		

⁽¹⁾ Except where otherwise noted, the times shown in this report are expressed in Universal Time Coordinated (UTC). One hour should be added to obtain the legal time applicable on the day of the accident.

1 - FACTUAL INFORMATION

1.1 History of Flight

On Wednesday 17 January 2001 at 17 h 30 min, the Beechcraft 95-C 55 Baron registered F-BUTZ took off from Essen Mülheim airport (Germany) for a return flight bound for Dijon-Longvic aerodrome, with a pilot and three passengers on board, under a Z flight plan (flight starting in VFR then continuing in IFR).

At 18 h 41 min 37 s, in IFR, the pilot contacted Dijon aerodrome for the first time on the Tower frequency. The controller told him that runway 36 was in service, the visibility was one thousand five hundred meters and the ceiling at six hundred feet.

At 19 h 05 min 46 s, the pilot contacted Dijon again after having left the en-route ATC frequency, then indicated that he was descending through 6,500 feet and announced his intention to perform an ILS approach to runway 36. After receiving the meteorological conditions from the controller, the pilot said that he was going to “come in direct onto 18”.

At 19 h 13 min 59 s, that is to say after seven minutes without any radio exchanges, the controller asked : *“F-TZ established on long final?”*. The pilot read back : *“Affirm TZ”* then the controller said : *“Roger you are cleared for runway 18 wind calm”*. There was no read back from the pilot to this last statement.

At 19 h 15 min 44 s, the emergency locator beacon was set off.

This flight was undertaken by the pilot in the right seat, the only pilot rated to fly the plane in IFR conditions.

1.2 Examination of Site and Wreckage

1.2.1 Examination of site

The accident site was the parking lot of a shopping mall where there was a carwash, located about three kilometers from the threshold of runway 18, at an angle of 015° in relation to the latter. The altitude of the site is 236 meters, or 774 feet.

Impact marks were found on a vacuum cleaner stand in the carwash, while a second stand had been completely ripped out. Skid marks were visible on the ground following a north-south orientation for about thirty meters and a lamppost was lying on the ground.

1.2.2 Examination of wreckage

The burnt out main wreckage was resting against a lamppost, with a 240° heading. Only the aft part of the fuselage, the tail, the left wing and a part of the left engine had not burnt. Examination of the wreckage showed that the airplane's right engine had struck the lamppost. The propeller had separated from the right engine and was found about twenty meters away. Deformations on the propeller showed that the right engine was delivering power at the time of the impact.

The left engine's propeller was still attached. The blades had been partially melted by the fire that followed the impact and bore the same deformations as the right propeller. This indicates that the left engine was also delivering power. The forward part of the airplane, the cabin and the right wing were destroyed by the fire. The main instrument panel and all of the instruments had been destroyed and were unusable, the instruments having melted during the fire. The left and right fuel selectors were found in the open position.

Examination of the control systems located in the tail section and in the rear part of the fuselage did not reveal any anomalies. The landing gear was extended at the time of impact.

Visual examination of the left wing:

- The leading edge was partially melted and deformed.
- The wingtip was ripped off.
- The aileron was in place and the flap was extended in the landing position.

Visual examination of the right wing:

- The leading edge was destroyed by the fire, from the wing root to the wingtip.
- The wingtip was intact.
- The aileron and the flap were partially destroyed.

A portable GPS receiver, a Garmin 295 model, was found a few meters from the wreckage.

1.3 Personnel Information

1.3.1 Experience of the pilot in the right seat

The pilot in the right seat, aged thirty-six, held a Private Pilot's License issued by France on 28 July 1997 and valid until 30 June 2001, as well as a ULM pilot's license.

He also held a professional pilot's license issued by Canada on 7 April 1999 with, in addition:

- a "Single and Multi-Engine, Land and Sea Airplanes" license expiring on 1 July 2001,
- an instructor's rating issued on 6 April 2000 expiring on 1 May 2001,
- a multi-engine instrument rating issued on 1 February 1999 expiring on 1 March 2001.

The non-professional privileges of this license are recognized by France, with the exception of those privileges associated with his qualification as an instructor.

The pilot's logbook was destroyed during the accident, which made it difficult to know what experience the pilot had on this type of aircraft.

A fixed-term contract between Air Bor and the pilot specified that the latter worked for the company as an aircraft mechanic between 25 May and 30 September 2000.

1.3.2 Experience of the passenger in the left seat

The passenger in the left seat, aged forty-eight, held a valid Private Pilot's License issued by France on 21 December 1971, with class SEP and MEP ratings, subject to restrictions relating to wearing corrective glasses. On 31 August 2000, his total number of flying hours was estimated to be 1,700.

1.4 Aircraft Information

1.4.1 Airframe

- manufacturer: Beechcraft
- type: 95-C 55 "Baron"
- serial number: TE 105
- Airworthiness Certificate No 31616 issued 30 October 1973, valid until 9 September 2001
- Total flying hours to 17 January: 4,134 hours

1.4.2 Engines

- manufacturer: Teledyne Continental Motors
- type: IO-520C
- operating hours to 3 December 2000:
 - left: 53 hours
 - right: 1 746 hours

1.5 Testimony

Many witnesses saw the airplane perform turns close to the ground a short time before the accident, then line up parallel to an avenue lined with lampposts, at a height of about thirty meters, as if "the airplane was going to land".

Testimony relating to the pilot of the airplane indicated that he was not used to using the VORTAC 18 approach procedure at Dijon Longvic. According to his family and friends, he had been employed as a pilot by Air Bor since June 2000.

1.6 Meteorological Conditions

- General situation

At altitude, upper level troughs centered on Brittany extended along a trough line oriented west-east from Brittany towards Germany. On the ground, an occluded front extending from Abbeville-Reims-Zürich was associated with a 1000 hPa depression centered off the French Atlantic coast. This depression directed a southwest flow towards Dijon at 10 to 15 kt at around 1,500 meters, light from the south to southeast sector on the ground. Over the Dijon region, the sky was overcast with low cloud and low visibility with light icing in the cloud layer.

- Observations at the Dijon-Longvic station at 19 h 00

Wind: 170° / 02 kt, visibility 1,500 meters, mist, stratus cover at 600 feet, temperature 0 °C, dew-point temperature - 01 °C, QNH 1020 hPa.

- Observations at the Dijon-Longvic station at 20 h 00

Wind: 160° / 02 kt, visibility 1,800 meters, mist, covered by stratus at 700 feet, temperature 1 °C, dew-point temperature 0 °C, QNH 1020 hPa.

At Dijon Longvic station, the cloud height meter (a device that automatically measures the height of the cloud base) is located about one kilometer south of the threshold of runway 36. It indicated the height of the cloud base as about 180 meters with a relative improvement from 19 h 00 onwards over the south of the area. There was no equipment enabling an evaluation to be made of the height of the cloud base to the north of the aerodrome.

1.7 Aerodrome Information

1.7.1 General

Dijon Longvic Aerodrome is a military aerodrome open to public air traffic. It has two hard runways: runway 02/20 1,800 meters long and 36 meters wide, and runway 18/36 2 400 meters and 45 meters wide. It is located six kilometers southeast of the city of Dijon, under a class D special control region (S/CTR), eight kilometers southwest of the LF-R 8A restricted area that extends from 3,000 feet to FL 195.

1.7.2 Approach procedures

The aerodrome has four instrument approach procedures: an ILS 36 approach, a VOR 36 approach, a VORTAC 36 approach and a VORTAC 18 approach, used by the pilot. This procedure is based on two radio-electric fixes: the "DIJ" VOR, on the 113.5 MHz frequency and the TACAN used in the DME function, both located near the runways.

The initial approach fix (IAF) is DIJ, which must be over-flown at an altitude of 2,900 feet. The outbound leg is oriented at 004° (for aircraft classed as category B, including F-BUTZ) and the inbound track is oriented at 172°. The descent for final approach begins at seven nautical miles DME. The Minimum Descent Height (MDH) is 1,140 feet, the altitude below which the pilot ends his approach and performs the landing with the aid of visual references. The Minimum Safety Altitude (MSA) in the sector is 3,300 feet.

The operational minima for this procedure require a visibility of 1,500 meters.

The missed approach is based on a Missed Approach Point (MAP) consisting of the VOR DIJ with a climb on the 172° radial to 4.5 NM followed by turn to the left to intercept the 126° radial in climb at 2,900 feet in order to enter the holding pattern (see chart in appendix 2).

1.7.3 Airspace management

A protocol exists between Dijon 102 Air Base and the CRNA-EST (Reims). Its aim is to define the approach, departure and transit procedures for aircraft flying in IFR within the airspace managed by Dijon approach, during and outside the opening hours. The area of responsibility of Dijon approach consists of the S/CTR and the LF-R8 restricted area. For arrivals in IFR, when the Dijon Approach organization is closed and Dijon Tower is open, the protocol requires control of flights to be transferred by the CRNA-EST to the Dijon Tower frequency at the Airway base level. In such cases, the aircraft receives aerodrome control services provided by Dijon Tower as well as the alerting service and flight information service supplied by CRNA-EST.

1.7.4 Overall lighting environment

At night, the airport is in an extensive dark area, on the edge of the lighted areas of Dijon and Quetigny. The shopping mall area in which the accident occurred is a significant source of light. (see paragraph 1.9.3)

1.8 Survival Aspects

The violence of the impact with the ground and obstacles and the subsequent fire left no hope of survival. The autopsies indicated that the injuries observed on the passenger in the front left seat would be consistent with the positioning of the hands on the control column at the moment of the impact. These indications were not found on the pilot in the right seat.

1.9 Tests and Research

Radar track data concerning the aircraft was collected from the CRNA-EST and from the military control and detection centre at Drachenbronn. The radio communications between the aircraft and the control centers were recorded by the CRNA-EST and Dijon Tower (see appendix 1).

1.9.1 Trajectography

The airplane's track and the approach procedure were overlaid on a map. The correlation between the airplane's altitude and its position is shown.

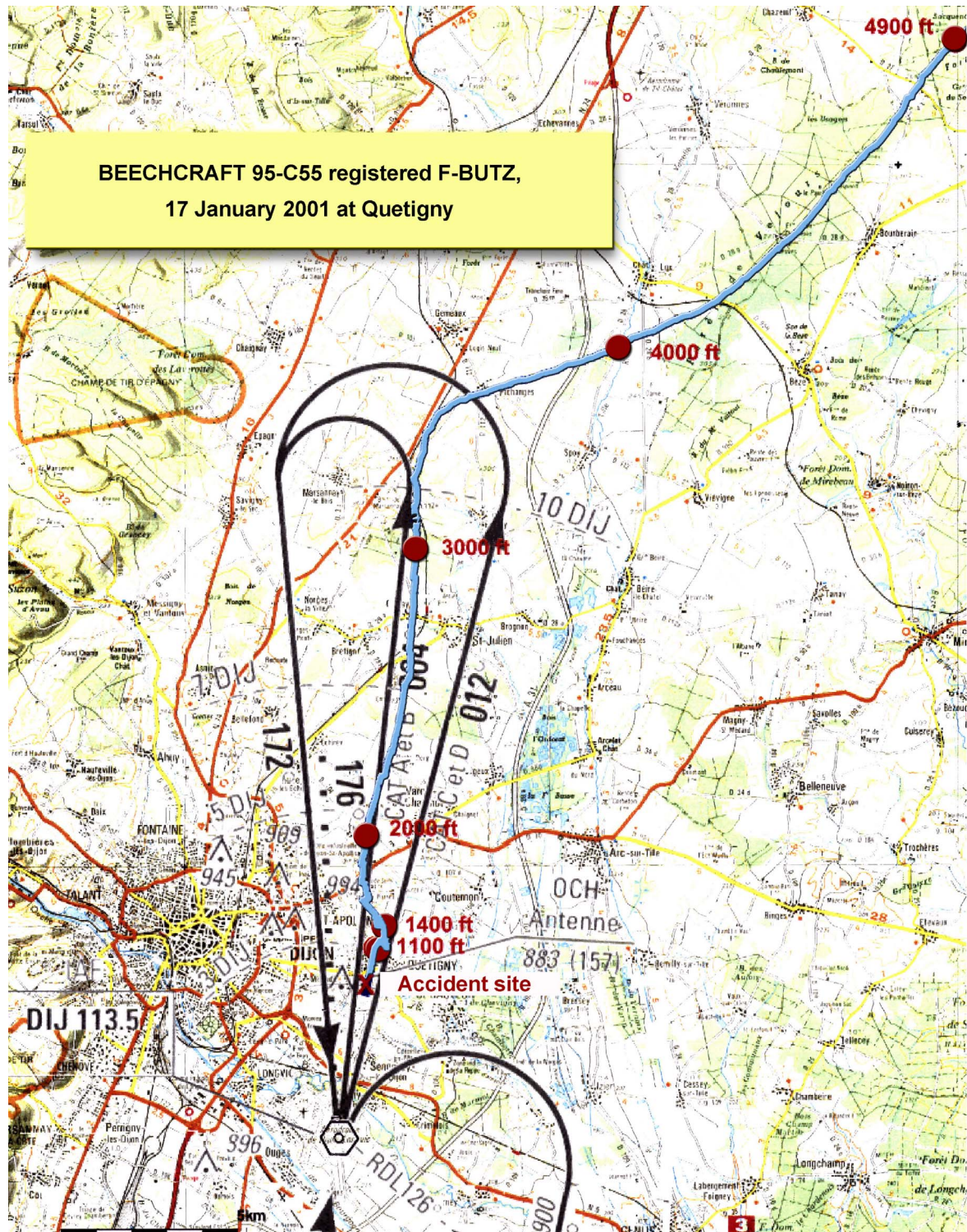


Figure 1: radar track and VORTAC 18 procedure

Distance to TACAN	Aircraft altitude	Nominal altitude (Jeppesen chart)
7 NM	2,600 ft	2,900 ft
5 NM	2,400 ft	2,270 ft
3 NM	1,500 ft	1,640 ft

Seven NM out, the airplane was three hundred feet lower than the nominal slope. Five NM out, the airplane moved to 130 feet above the slope. Three NM out, it again passed under the slope (140 feet) , with a descent rate of 1,000 feet per minute on this segment. Radar data is not usable at less than three NM.

1.9.2 GPS receiver

Examination of the GPS receiver that was found near the wreckage showed that it was not in operation at the time of the impact. In fact, the last point recorded related to the end of a flight segment near Nancy on 17 January 2001 between 19 h 35 min and 19 h 39 min, the time base being that of the GPS. After the data was recovered, a functional test on the receiver, powered by the original batteries, showed that the batteries were charged and in good electrical condition and that the casing was damaged at the time of the accident.

1.9.3 Lighting environment

In order to observe sources of light around the accident site, a film was made on board a helicopter. The footage was shot at night in places approaching the accident area along the track flown by F-BUTZ.

It should be noted that the film was shot in visibility conditions that were better than those on the day of the accident.

The following photograph shows lines of lights corresponding to avenues lined with lampposts, in the vicinity of the accident site.



Figure 2: lighting environment near the accident site

Varying the intensity of the runway lighting shows the position of runway 18 at Dijon-Longvic. The photo above was taken with the runway lighting at maximum intensity.



Figure 3: runway position

1.10 Information on Organizations and Management

The following information is a synthesis of a variety of testimony and documents.

The airplane belongs to S.A.R.L. Clovis, based in Troyes (10). The lessor was Larzac Locations whose headquarters is at Valleray (54). The airplane was maintained and operated by Air Bor, based at Dijon-Longvic. A rental contract was signed between Air Bor and Clovis. The contract mentions that Clovis rented the Beechcraft registered F-BUTZ to Air Bor for one year, renewable.

The passenger in the left front seat, president of a private company with no connection with civil aviation, rented the aircraft privately from Air Bor with the intention of carrying out a two-day professional trip in Germany. The airplane was rented as a dry lease with no crew. This passenger was accompanied by two people from his company and a qualified private pilot rated on the type who possessed an IFR rating issued by France. The flight could be performed, according to preference, as a private flight in either IFR or VFR conditions.

The trip could have been performed as a public transport flight, with a crew supplied.

The French Civil Aviation Code gives the following definitions of public transport, rental and charter activities:

Article L.124. 1

Renting an aircraft is the operation by which a lessor makes an aircraft available without a crew for use by a lessee.

Article L. 330. 1

Public air transport consists of transporting passengers, cargo or mail, in an aircraft, for payment, from one point to another.

Article L. 323. 1

Chartering an aircraft is the operation by which a charterer makes an aircraft with aircrew available to a charter operator. Except where otherwise specified, the aircrew remain under the charterer's management.

Article L. 323. 2

Any company operating an aircraft "for payment" for a transport operation is subject to the applicable laws and regulations relating to public air transport, whatever use the aircraft may be put to by the operator.

Dry leasing of an aircraft without crew is not subject to the provisions governing public air transport, on condition that it is not accompanied by the supply (direct or indirect) of a flightcrew for the aircraft by the lessor. The operational context of the flight, within private general aviation, did not offer the same safety conditions as for public air transport.

2 - ANALYSIS

2.1 Choice of Approach Procedure

The pilot initially decided to perform an ILS approach to runway 36 at Dijon-Longvic, a procedure that, due to the minima and its precision, offered the best descent under the cloud layer in degraded meteorological conditions.

At 19 h 06 min, about nine minutes before the accident, while descending through flight level 65, the pilot told ATC that he wanted to perform a “direct 18” approach. This change of strategy occurred late in the organization of the arrival and the pilot did not set himself favorable conditions to prepare the VORTAC 18 procedure, which he wasn’t used to undertaking. Time and financial pressures could have played a part in the pilot’s decision to perform only a part of the procedure, which had the advantage of shortening the arrival track from the northern sector.

2.2 Execution of Procedure

Examination of the radar track shows that the pilot performed the procedure using the 184° path directly (corresponding to the outbound 004° path) instead of the published 172° path. Further, the pilot did not over-fly the IAF to descend under the minimum altitude in the sector to the altitude at the beginning of the procedure and he was not under radar vectoring. The order of 17 July 1992 concerning general air traffic procedures for the use of aerodromes by aircraft specifies that “on arrival, if an instrument approach procedure is published and approved, the aircraft must conform to it unless a visual approach is decided on”. Taking into account the meteorological conditions, the pilot could not have the field in view. Following the incorrect path in addition to the descent under the minimum safety altitude indicates some kind of improvisation, apparently resulting from the change of strategy analyzed in paragraph 2.1.

Examination of the airplane’s speeds drawn from the radar track indicates that the approach was fast (around 165 to 170 kt), until the height of the cloud base (600 feet above the ground), then the speed decreased sharply on approach to the ground, during the maneuvers at low height. The flaps, found in the landing position, were extended late, due to the Vie limitation (maximum flaps extended speed: 122 kt). The radar data indicates that the descent path was maintained until a distance of three NM. The imprecision of radar data below this distance makes it unusable.

These elements indicate that the approach was undertaken precipitously and conducted in an unstabilized manner.

2.3 Transition from Instrument to Visual Flight

The transition represents the part of the flight during which the pilot passes from instrument flying, following the flight parameters on the instrument panel, to visual flight with search for and detection of external visual references.

Above the MDH, the pilot's attention is concentrated on following the flight parameters. On approaching the MDH, his attention moves to the outside, looking for the runway lighting. This phase is particularly delicate when the visibility conditions are degraded and close to the operational minima.

During the last minute of the flight, the pilot had the ground in sight and performed turns at a low height. This indicates that following the instruments had been abandoned. It is not, however, possible to establish precisely the moment when visual flight began and external visual references were looked for.

Many witnesses saw the airplane perform controlled turns at a low height in the last moments of its flight, then line up parallel to an avenue lined with lampposts, at a height of about thirty meters, as if "the airplane was going to land".

During the initial impact with the ground, the main landing gear, along with the nose gear, separated from the fuselage. The flaps were also found extended in the landing position. Impact marks indicate that the airplane slope angle was zero. The pilot very likely tried to land outside of the aerodrome after having confused the lamplights with the runway lighting. It cannot, however, be excluded that the pilot had, very late, started a missed approach procedure.

2.4 Pilot Flying

The investigation could not determine with certainty whether the pilot or the passenger in the front left seat was in fact in control at the end of the flight. The pilot was sitting in the right seat, which is unusual when it is not an instruction flight. Flying in the right seat causes difficulties in reading certain navigation instruments located on the left side of the instrument panel. Since the passenger in the front left seat possessed a private pilot's license with MEP and night flying ratings, it is likely that there was some co-operation between the two pilots and that they shared some of the actions taken on board the airplane as well as some decisions taken during the flight. The latter would, in particular, apply to the choice of the arrival procedure. They did not notice the error in the inbound track that they followed.

3 - CONCLUSIONS

3.1 Findings

- The aircraft registered F-BUTZ was rented for two days to perform a general aviation flight for a professional trip to Germany.
- The pilot possessed the qualifications and licenses required to perform the flight, applying non-professional privileges from his Canadian license.
- The aircraft was certificated and maintained in accordance with the applicable regulations.
- The pilot was sitting in the right seat.
- The pilot did not follow all of the instructions imposed by the VORTAC 18 approach procedure at the Dijon-Longvic aerodrome.
- The engines were supplying power at the time of the impact.
- The aircraft struck the ground in landing configuration without loss of control.
- The type of flight performed corresponded to the needs of a flight for the public transport of passengers.

3.2 Probable Causes

The accident was probably caused by:

- performing an approach procedure that was initiated precipitously and incompletely applied,
- the confusion between the luminous references located in an urban area and the runway lighting, at the moment of transition to visual flight.

Time and financial pressures that may have led the pilot to a late change in the choice of procedure and to shorten the arrival path probably contributed to the accident.

List of appendices

APPENDIX 1

Transcript of radio communications

APPENDIX 2

Procedure sheets

APPENDIX 3

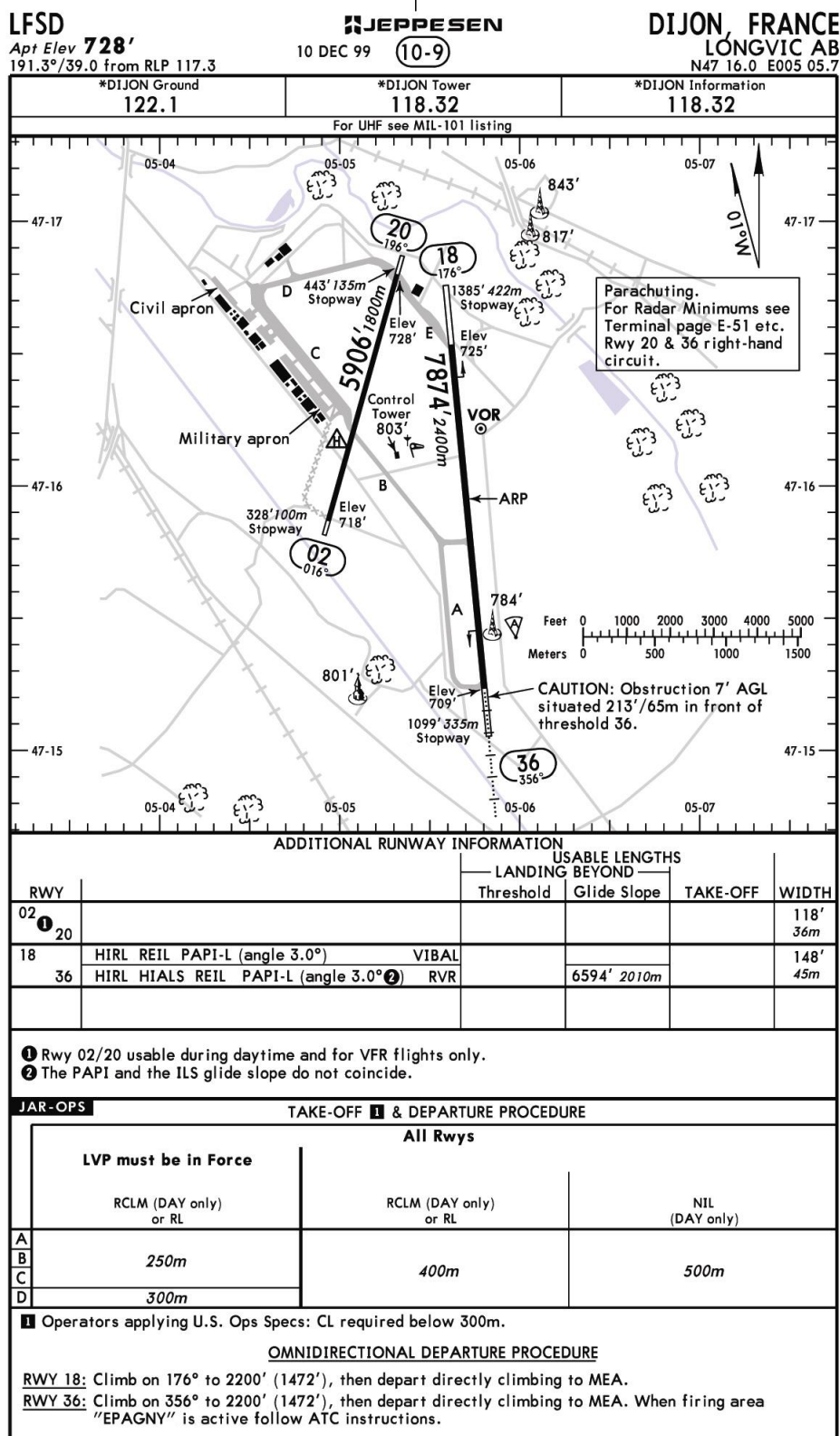
Flight path as re-constituted from witness testimony

Transcript of radio communications
between Dijon-Tower and F-BUTZ
on 17 January 2001

118.32 frequency		
18 h 41 min 37 s	TZ	Dijon from F-BUTZ good evening
18 h 41 min 45 s	CTL	F-TZ Dijon good evening
18 h 42 min 48 s	TZ	Dijon from F-BUTZ good evening
18 h 42 min 51 s	CTL	F-TZ Dijon good evening
18 h 42 min 56 s	TZ	A BE 55 inbound from ESSEN to your installations estimated time 15' for the short final.
18 h 44 min 30 s	CTL	TZ runway 36 wind calm, visibility 1 500 m and mist cover at 600 feet temperature 1° QNH 1019
18 h min s	TZ	1019, runway 36 in service, will talk later
18 h min s	CTL	Will talk later
19 h 05 min 46 s	TZ	Dijon from F-BUTZ good evening again
19 h 05 min 51 s	CTL	F-BUTZ Dijon good evening again
19 h 05 min 55 s	TZ	F-TZ we've just been handed over by regional ATC, we're descending through 6 500 feet
19 h 06 min 03 s	CTL	Roger, wind calm runway 18/36 in service at your convenience, the QNH 1019, what sort of arrival do you want?
19 h 06 min 12 s	TZ	Oh, initially, an ILS 36 but what is the ceiling where you are?
19 h 06 min 19 s	CTL	We have overcast at 600 feet
19 h 06 min 23 s	TZ	Yes we're going to come in direct onto 18
19 h 06 min 27 s	CTL	Roger, call back when established on long final runway 18
19 h 06 min 31 s	TZ	Call back when established on long final runway 18, F-TZ
19 h 06 min 35 s	CTL	Correct, we have visibility at 1 500 m and mist
19 h 13 min 59 s	CTL	F-TZ established on long final ?
19 h 14 min 02 s	TZ	Affirm TZ
19 h 14 min 04 s	CTL	Roger you are cleared for runway 18 wind calm
19 h 16 min 05 s	CTL	TZ Dijon
19 h 16 min 12 s	CTL	F-TZ Dijon
19 h 16 min 22 s	CTL	F-TZ Dijon
19 h 16 min 32 s	CTL	F-TZ Dijon
19 h 16 min 49 s	CTL	F-TZ Dijon Tour
19 h 17 min 27 s	CTL	F-TZ Dijon
19 h 17 min 46 s	SSIS	Yes chalumeau 5 receiving
19 h 19 min	CTL	F-TZ Dijon Tower for a test
	CTL	F-TZ Dijon

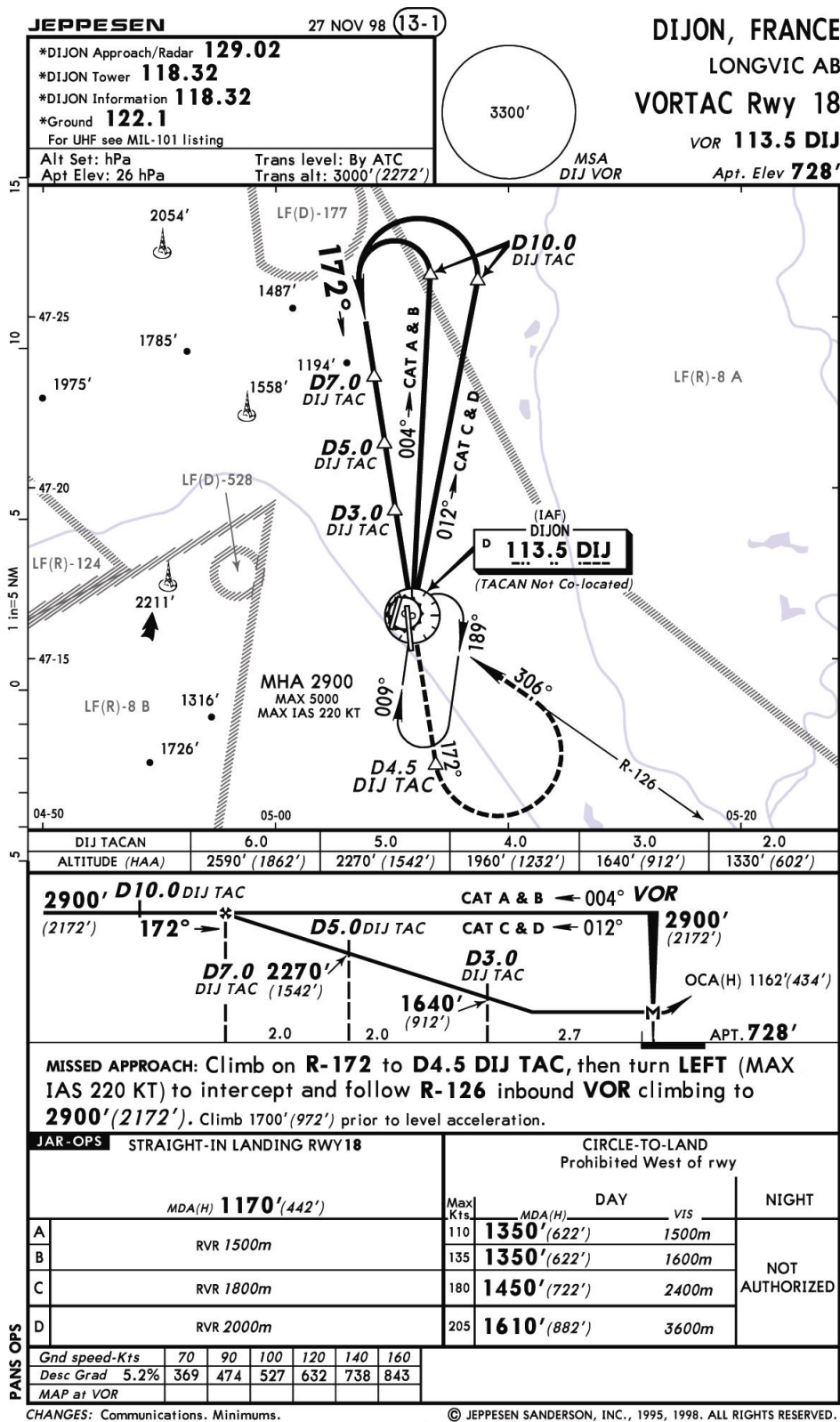
NB: 19 h 15 min 44 s Emergency locator beacon.

Procedure sheets

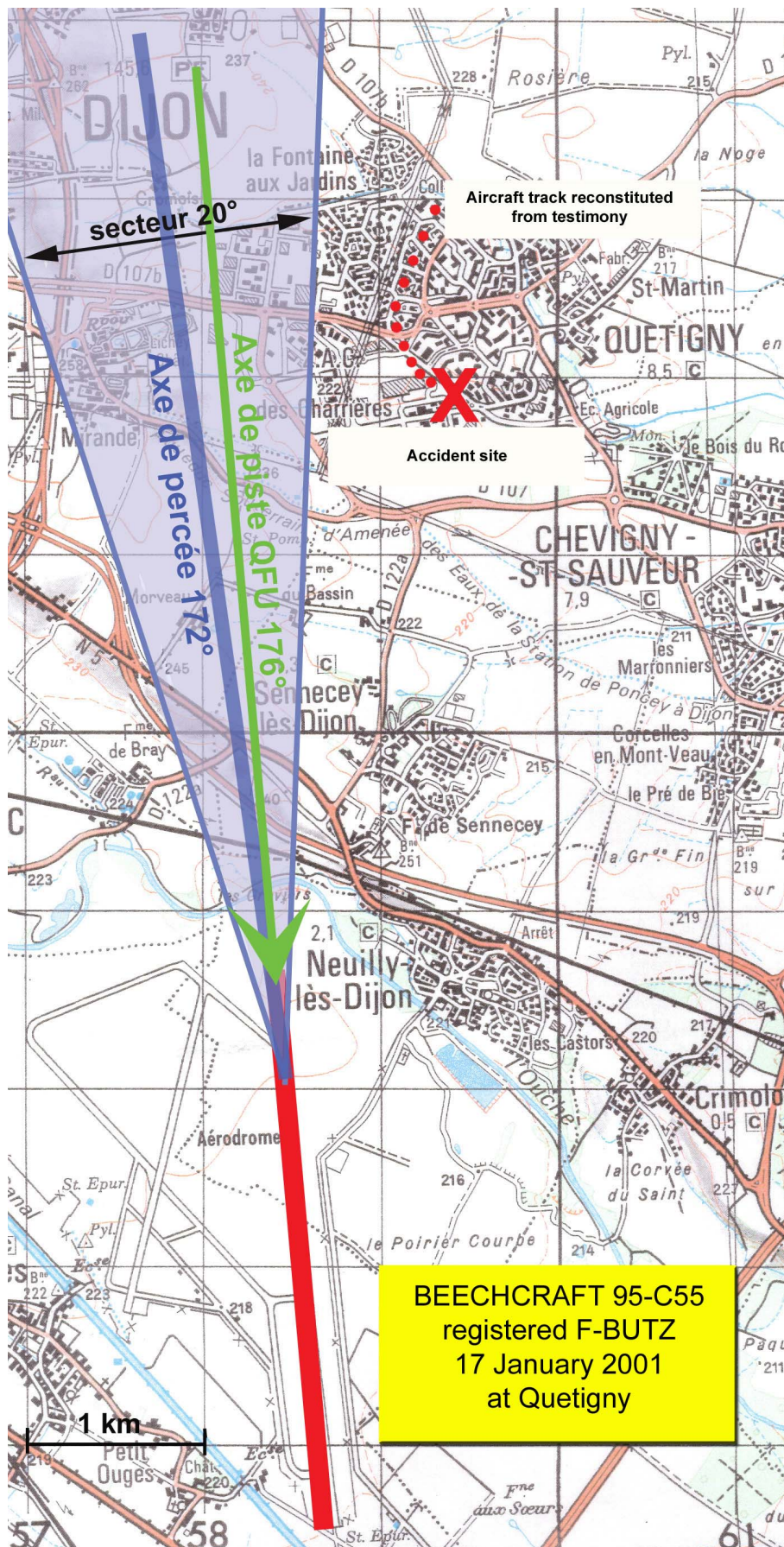


CHANGES: Twy designations. New chart format.

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Flight path as re-constituted from witness testimony



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