Technical report

A-062/1999

Accident involving Piper PA-24-250 aircraft, registration SE-EOU, near Lugo on 23 Oct 1999

MINISTERIO DE FOMENTO
SUBSECRETARÍA
COMISIÓN DE INVESTIGACIÓN DE ACCIDENTES E INCIDENTES DE AVIACIÓN CIVIL

Edita: Centro de Publicaciones
Secretaría General Técnica
Ministerio de Fomento ©

NIPO: 161-03-011-0
Depósito legal: M. 23.129-2003
Imprime: Centro de Publicaciones

Diseño cubierta: Carmen G. Ayala

COMISIÓN DE INVESTIGACIÓN DE ACCIDENTES E INCIDENTES DE AVIACIÓN CIVIL

Tel.: +34 91 597 89 60
Fax: +34 91 463 55 35

E-mail: ciaiac@mfom.es
http://www.mfom.es/ciaiac

C/ Fruela, 6
28011 Madrid (España)

Foreword

This report is a technical document that reflects the point of view of the Civil Aviation Accident and Incident Investigation Commission (CIAIAC) regarding the circumstances in which happened the event being investigated, with its causes and its consequences.

In accordance with the provisions of Law 21/2003 and Annex 13 to the Convention on International Civil Aviation, the investigation has exclusively a technical nature, without having been targeted at the declaration or assignment of blame or liability. The investigation has been carried out without having necessarily used legal evidence procedures and with no other basic aim than preventing future accidents.

Consequently, any use of this report for purposes other than that of preventing future accidents may lead to erroneous conclusions or interpretations.

This report has originally been issued in Spanish language. The English translation is provided for information purposes only.

Table of contents

Abbreviations

00 °C	Degrees Celsius
00° 00' 00"	Degrees, minutes and seconds
Ac	Altocumulus
ACC	Area Control Centre
ADF	Automatic Direction Finder
AIP	Aeronautical Information Publication
APP	Approach Control
ATC	Air Traffic Control
CAT I	Category I ICAO
Ci	Cirrus
CRM	Crew Resource Management
CTE	Commander
CTR	Control Zone
Cu	Cumulus
CVFR	Controlled Visual Flight Rules
CVR	Cockpit Voice Recorder
DH	Decision Height
DME	Distance Measuring Equipment
E	East
EPR	Engine Pressure Ratio
EM	Emitter
ETA	Estimated Time of Arrival
FAP	Final Approach Point
FDR	Flight Data Recorder
ft	Feet
g	Acceleration due to gravity
GPWS	Ground Proximity Warning System
h. min: seg	Hours, minutes and seconds
HP	Horsepower
hPa	Hecto-pascal
IAS	Indicated Air Speed
IFR	Instrumental Flight Rules
ILS	Instrumental Landing System
IMC	Instrumental Meteorological Conditions
INTA	National Institute of Aerospace Technology
Kms	Kilometres
Kts	Knots
Kw	Kilowatts
lbs	Pounds
m	Metres
MAC	Mean Aerodynamic Chord
mb	Milibars
MDA	Minimum Descent Altitude
MDH	Minimum Descent Height
METAR	Meteorological Actual Report
MHz	Megahertz
MM	Middle Marker
N	North
N/A	Not Applicable
NDB	Non Directional Beacon
MN	Nautical mile
OM	Outer Marker
P/N	Part Number
PF	Pilot Flying
PNF	Pilot Not Flying

Abbreviations

QNH	Air pressure adjustment to make the altimeter mark the altitude of the airport above sea level during landing and take off
RVR	Runway Visual Range
S/N	Serial Number
S	South
Sc	Stratocumulus
Shp	Shaft Horsepower
SVFR	Special Visual Flight Rules
TWR	Control Tower
U T C	Universal Coordinated Time
VIP	Very Important Passenger
VMC	Visual Meteorological Conditions
VOR	VHF Omnidirectional Radio-Range
W	West

1. FACTUAL INFORMATION

1.1. History of the Flight

At approximately 09:00 UTC, the aircraft took off from the Portimao airport in the south of Portugal, with destination to Alderney (United Kingdom) and with the pilot and a female passenger on board.

The last communication recorded was at 10:56 UTC when the control tower in Santiago authorised the aircraft to continue its route directly to the ASTUR point. At 11:30 the control tower tries to make contact with the aircraft without getting any response.

A witness stated that at approximately the same time, he saw how the aircraft, initially at a high altitude, suddenly fell, turning upon itself and with the engine running, impacting with terrain and immediately catching on fire. The aircraft was completely destroyed and the two occupants died as a result of the impact and subsequent fire.

1.2. Injuries to Persons

Injuries	Fatal	Serious	Minor/None
Crew	1		
Passengers	1		
Others			

1.3. Damage to Aircraft

The aircraft was completely destroyed as a result of the impact and the subsequent fire.

1.4. Other Damage

There were no other damages reported.

1.5. Personnel Information

1.5.1. *Pilot in Command*

Age/Sex: 78 years old/Male

Nationality: Swedish

Licence:	Private Pilot Type A
Number:	211005-1675
Licence Issue Date:	18-01-1961
Validity of Licence:	
— Renewal Date:	29-09-1999
— Expiration Date:	30-09-2000
Ratings:	Instrument. Single engine
Total Flight Hours:	2.113 hours.

1.5.2. *Passenger*

Despite the fact that only one pilot is needed for this type and model of aircraft, the following information is included, pertaining to the passenger on board when the accident occurred, because she had a pilot certificate and licence.

Age:	56 years old
Nationality:	Swedish
Licence:	Private Pilot Type A
Number:	430321-9408
Issue date:	14-09-1976
Validity of Licence:	
— Renewal Date:	13-04-1999
— Expiration Date:	30-04-2000
Ratings:	Night flying. Single engine.
Total Flight Hours:	324 hours.

1.6. Aircraft Information

1.6.1. *Airframe*

Make:	Piper
Model:	24-250
Registration:	SE-EOU

M.T.O.W.:	1315 kg
Owner:	BRAVO FOX AB

1.6.2. *Airworthiness Certificate*

Not known.

1.6.3. *Maintenance Record*

Not known.

1.6.4. *Engine*

Make:	Lycoming
Model:	O-540 A1A5
Power:	250 hp

Other data is not known.

1.7. Meteorological Information

There were low clouds in the area where the accident occurred.

1.8. Aids to Navigation

They are not applicable.

1.9. Communications

The pilot made several contacts by radio during the flight, the last one being at 10:56 with the Santiago Airport Control Tower. The control tower tried to make contact with him again at 11:30 but did not get a response.

1.10. Aerodrome Information

Not applicable.

1.11. Flight Recorders

The aircraft did not have any flight recorders nor was it mandatory.

1.12. Wreckage and Impact Information

The impact took place just outside of Lugo by highway N-540, on a small hill a few meters from its right edge, amongst thick autochthonous vegetation, with an angle of impact of approximately 85 degrees.

The engine and the propeller were buried, leaving the cockpit levelled with the ground and completely burnt as a consequence of the fire subsequent to the impact. Farther behind, there were remains of the fin, the rear fuselage, and the left wing, all of it grouped together without any scattering.

It was impossible to determine the fuel valve position due wreckage state.

1.13. Medical and Pathological Information

Both occupants of the aircraft died as a result of the impact against terrain that produced the destruction of vital organs.

1.14. Fire

According to a witness testimony, when the aircraft impacted with the ground, three explosions were heard and a violent fire broke out that destroyed most of the aircraft. The fire was put out by a team of fire-fighters who had been alerted by a witness.

1.15. Survival Aspects

As a consequence of the impact, both occupants of the aircraft died. Because a violent fire broke out immediately afterward, there was no possibility of rescue.

1.16. Test and Research

1.16.1. *Aircraft Trajectory*

From the time the flight began until the echo is lost on the radar at 11:29:43, there is no knowledge of any abnormality occurring on board. The last communication with the

control tower in Santiago was at 10:56:30, authorising the aircraft to go directly to the ASTUR point.

According to the RADAR data record, the displayed trajectory was normal, in accordance with the foreseen route, at FL[1]93 and with a NE direction, until it began to turn NW descending to FL 88 without communicating the change to the control tower. Afterwards, the bearing was adjusted to NE going down to FL 50, again without communicating the change. Thirty seconds later it disappears from the RADAR screens after having travelled around 0.8 NM.

1.16.2. *Witness Testimonies*

The only testimony obtained was from a witness who said «*he had seen how at around 13.30 (local time) a light aircraft coming from Santiago towards Lugo at high altitude suddenly turned over, spinning and diving down, while the engine noise could be heard until he listened three explosions and he could see a big cloud of smoke in the area*».

1.16.3. *Other Investigations*

A pilot who, a friend and colleague of the accident victims, stated that both were IFR flight qualified and that he found it difficult to believe that none of them would be able to manage the aircraft. The aircraft had a new system with ILS, GPS and VOR, integrated in one screen, that could have produced some problems.

In the departure eve the tanks were filled with 125.8 litres of fuel, to their maximum capacity. The following day, before departure, the fuel tanks had to be refilled with an extra 34 litres that had been lost due to a leak in the right wing tank. The fuel that leaked out could be seen on the pavement where the aircraft had been parked. When the pilot was asked about this, he replied that he was aware of it, but no maintenance was carried out to decrease or stop the leakage.

2. ANALYSIS

2.1. History of the Flight

According to the RADAR data records, once the aircraft took off from Portimao at 9 o'clock, it maintained a flight altitude at FL 95 until 11:28:48. At this time it descended to FL 88 in 5 seconds, and then 20 seconds later to FL 50, remaining there for 30 seconds. The RADAR echo was lost at this last position.

In the same records and related to the trajectory followed by the aircraft, it can be observed that from time to time, without any regularity, the aircraft veered to port in a rather wide curve, immediately corrected, returning to the right bearing. Just when it was recuperating the bearing toward the ASTUR (NE) point, during one of the widest turns toward the NW, the loss of altitude and the RADAR echo fading occurred, as described in the previous paragraph.

The fuel leak in the right wing, especially if it increased during the flight, could have lead to the deviations to port due to the unbalanced wings, making the left wing descend and producing a yaw toward that side, corrected now and then in order to take the aircraft back to its route. If the right fuel tank was almost empty when the last manoeuvre was made, turning to the right to get a NE direction again it could have resulted in a loss of control, getting into a stall, and falling to 5000 ft. where the pilot seems to control the aircraft momentarily for about 30 seconds, but losing the control finally and falling in a spin to the ground.

Since the engine was completely buried and the aircraft wreckage fully burnt, it could not be determined whether or not some part of the frame or the flight controls became detached, leading to a loss of control and making the aircraft to fall in a spin, as reported by a witness.

On the other hand, it does not seem, either, that an engine failure had occurred, because in this case, given the pilot experience, a glide would have been carried out with a small angle of impact, resulting in the scattering of aircraft wreckage.

2.2. Remarks about Incapacitation During Flight

Despite the fact that the autopsy provided no information to confirm a pilot incapacitation (due to the impact against terrain and subsequent fire), faced with an aircraft that is out of control for no apparent reason, one could be lead to assume that the pilot suffered some incapacitation as a consequence of the specific flight characteristics. In this case, altitude, exposure time to the altitude and the age of the pilot are factors that contribute to setting off a series of hypoxic events that can definitely lead to his gradual or sudden incapacitation.

On the other hand, the potential actions taken by the other passenger (she was competent to assume the functions of a flight crew) in order to control the aircraft, could have been limited by the cockpit confined space and by her lack of strength to move the incapacitated pilot away.

3. CONCLUSIONS

3.1. Findings

— The pilot and the passenger had valid licences and were qualified for the flight.
— The aircraft had a fuel leak in the right wing that was known by the pilot.
— The flight took place without incidents until the outskirts of the city of Lugo, where it crashed to the ground.

3.2. Causes

The most probable cause of the accident seems to be the loss of control of the aircraft for reasons that could not be determined.

4. SAFETY RECOMMENDATIONS

None.

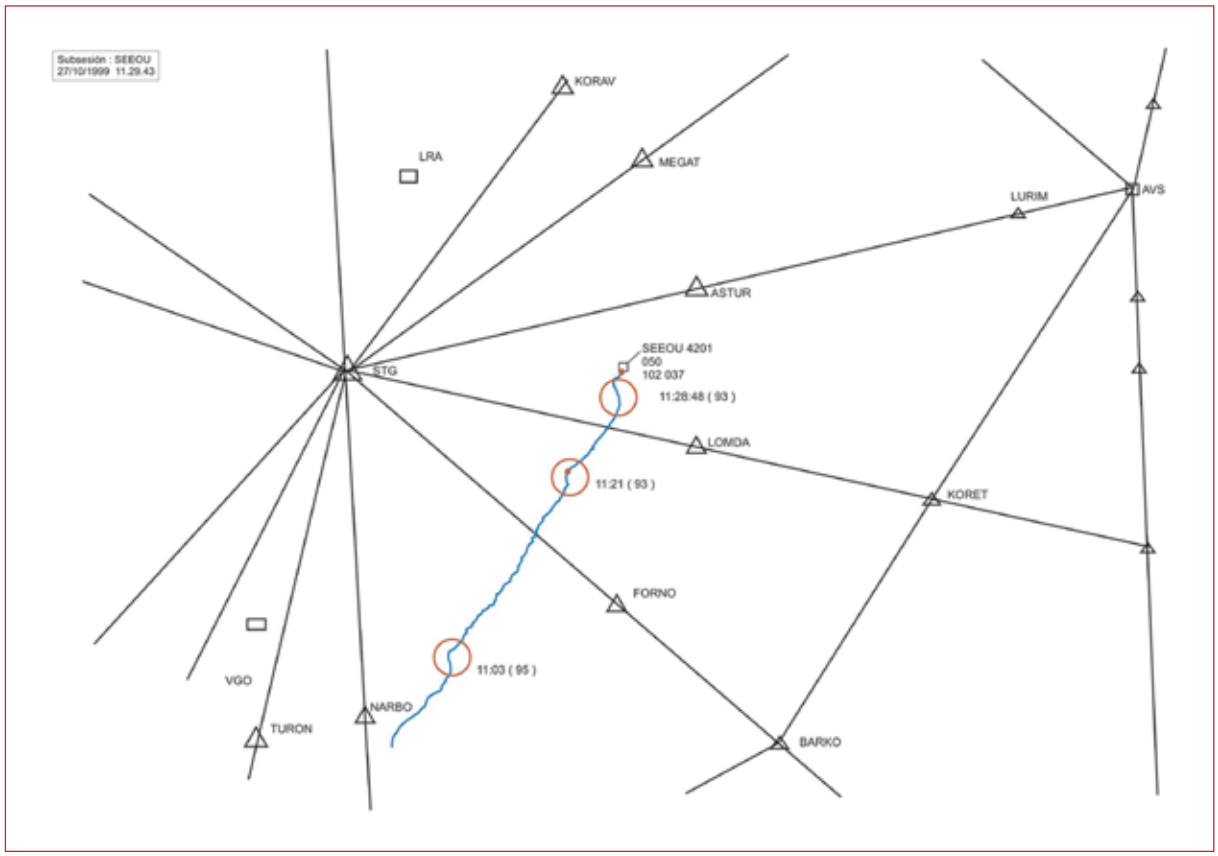
APPENDICES

APPENDIX A
Aircraft Trajectory


TRAYECTORIA
TRAYECTORIA
Ferrol
A Coruña
Gijón
Oviedo
Lugo
Santiago de Compostela
León
Ponferrada
Pontevedra
Orense (Ourense)
Vigo
Viana do Castelo
Braga
Chaves
Verín
Bragança
Benavente
Zamora
Póvoa de Varzim
Matosinhos
Porto (Oporto)
Vila Nova de Gaia
Vila Real
Aveiro
Viseu
Celorico da Beira
Guarda
Salamanca
Coimbra
Covilhã
Plasencia
Castelo Branco
Leiria
Tomar
Alpalhão
Cáceres
Trujillo
Santarém
Portalegre
Vila Franca de Xira
Estremoz
Mérida
Badajoz
Almada
Évora
Setúbal
Grândola
Beja
Córdoba
Écija
SEVILLA
Huelva
Faro
Lagos
Vila Real de Santo António
Olhão
Golfo de Cádiz
Río Duero
Río Tajo
Río Guadiana
Río Guadalquivir
PORTUGAL
ESPAÑA
OCEANO ATLÁNTICO

APPENDIX B

Radar Data Records from the Last Part of the Trajectory


Subsesión : SEEOU
27/10/1999 11.29.43
KORAV
LRA
MEGAT
LURIM
AVS
ASTUR
SEEOU 4201
050
102 037
STG
11:28:48 (93)
LOMDA
11:21 (93)
KORET
FORNO
VGO
11:03 (95)
NARBO
TURON
BARKO

APPENDIX C
Location of Point of Impact


LUGO
IMPACTO
Rábade
Otero de Rey
Penelas
Bagueixos
Ramil
Muja de Abajo
Barbaín
Conturiz
Nadela
Estación
Corgo
Argonde
Belesar
Carretera
Folgueira
Sobrada
Vilela
Matela
Aguiar
Bonge
Caboy
Aspay
Martul
Robra
Silvarrey
Mosteiro
Guillar
Parada
Camoira
Hombreiro
Bocamaos
Meilan
Outeiro
Aday
Albeiros
Orbazay
Saamasas
Veral
Alto
Muja
Cerballido
Boveda
Castro
Angeles
Recimil
Coeo
Cuiña
Piugos
Soñar
Esperante
Calde
Lamas
Bazar
Fijós
Saá
Coeses
Pena
Santa Comba
Lajosa
Cabreiros
Manán
Paradela
Constante
Monte de Meda
Pradeda
Castelo
Lousada
San Román
Campo
Piñeiro
Ribas de Miño
Fernadeiros
Quinte
Ferroy
Grolos
Zolle
Sabarey
Lapío
Maceda
Abragán
Marey
Ansean
Chamoso
Bergazo
Piedrafita
Argemil
Segovia
Vilachá
Aday
Romean
Bascuas
Gondar
Barredo
Labio
Pedreda
Rubias
Benade
Teijeiro
Paz
Arcos
Duarría
Dumpín
Mondriz
Duancos
Frayalde
Carazo
Orizón
Ludrio
Tirimol
Pías
Mazoy
Uriz
Gayoso
Senande
Progalo
Burgo
Poutomillos
Vilachá de Mera
Alta
MIÑO
630
640
546
VI
454
441
783
725