

HELLENIC REPUBLIC MINISTRY OF INFRASTRUCTURE AND TRANSPORT

AIR ACCIDENT INVESTIGATION AND AVIATION SAFETY BOARD (AAIASB)



ACCIDENT INVESTIGATION REPORT AIRCRAFT BEECHCRAFT HAWKER 850XP TC-MAN AT MYKONOS STATE AIRPORT ON JULY 26, 2017

ACCIDENT INVESTIGATION REPORT 02 / 2021

TC-MAN Aircraft Accident at Mykonos State Airport on July 26, 2017

This accident investigation was carried out by the Air Accident Investigation and Aviation Safety Board according to:

- Annex 13 of the Chicago Convention
- EU regulation (EU) 996/2010
- Law 2912/2001

"According to Annex 13 of the Chicago Convention of the International Civil Aviation,
EU Regulation 996/2010 and Law 2912/2001 Accidents and Incidents Investigation is
not intended to attribute blame or liability. The sole purpose of this investigation and the
findings is to prevent accidents and incidents.

Therefore, the use of this report for any purpose other than to prevent future accidents and incidents could lead to misinterpretations."

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ABREVIATIONS

A/C : Aircraft

AFM : Aircraft Flight Manual

AGL: Above Ground Level

AIP : Aeronautical Information Publication

ACCREP : Accredited Representative

ALM : Actual Landing Mass

AOA : Angle of Attack

ATC : Air Traffic Control

ATPL: Air Transport Pilot License

CAA : Civil Aviation Authority

CG: Center of Gravity

CVR : Cockpit Voice Recorder

FCL: Flight Crew License

FDR : Flight Data Recorder

IAS : Indicated Air Speed

IR : Instrument Rating

JAR : Joint Aviation Requirement

LM : Landing Mass

METAR : Meteorological Terminal Air Report

MLM : Maximum Landing Mass

MSN : Manufacturer Serial Number

MTOM : Maximum Take-Off Mass

PAPI : Precision Approach Path Indicator

PF : Pilot Flying

PM : Pilot Monitoring

R/W : Runway

U/S : Unserviceable

TITLE

OPERATOR	:	GENEL HAVACILIK A. S.
OWNER	:	STE DENIZCILIK A. S.
MANUFACTURER	:	BEECHCRAFT CORPORATION
A/C TYPE	:	HAWKER 850 XP
COUNTRY OF MANUFACTURE	:	USA
NATIONALITY	:	TURKISH
A/C REGISTRATION	:	TC-MAN
LOCATION OF ACCIDENT	:	MYKONOS STATE AIRPORT
DATE & TIME	:	Wednesday 26/07/2017 at 10:27
Note	:	All times Local ($LT = UTC + 3h$)

SYNOPSIS

On 26/07/2017, the aircraft with registration mark TC-MAN operated by the company "GENEL HAVACILIK A. S.", its left wing came in contact with the runway during its landing at Mykonos State Airport (LGMK).

The Air Accident Investigation and Aviation Safety Board was informed on the same day and with the document AAIASB/ 2393 / 27-07-2017 appointed an investigation team. On 02/08/2017 a notification was sent to the International Aviation Authorities (Notification to International Authorities) and ACCREPS were appointed.

1 Factual Information

1.1 History of Flight

The aircraft with registration mark TC-MAN, departed on 26/07/2017 from the Istanbul International Airport "ATATURK" (LTBA) for Mykonos State Airport (LGMK). On board the A/C were the two Flight Crew members and one passenger.

According to the transcript recorded, at 10:14:47 h the crew of the A/C said: "Mykonos approach TC-MAN kalimera descend flight level 80 LETSO.", while ATC at 10:15:05 h replied: "Roger TC-MAN for the time being number 2 next report over LETSO for further descend and instructions.". This is followed by a dialogue between the crew of the aircraft and the ATC, according to which it is decided to land on R/W 16, after the preceding aircraft. At 10:17:31 h the ATC reported: "TC-MAN descend to 5000 ft on QNH 1004." and at 10:18:23 h the crew of the Aircraft replied: "TC-MAN proceeding LETSO going to MKN VOR descending 5000 ft.". Then, there is a conversation between the aforementioned regarding the leading aircraft and at 10:21:16 h the ATC reported: "TC-MAN descended to 3000 ft QNH 1004.", while the Crew at 10:21:21 h confirmed: "Down to 3000 QNH 1004 turning right and the Airbus is in sight.". At 10:22:50 h the Crew asks for the wind on R/W 16 and ATC replied "1700/05kts". Finally, at 10:24:51 h ATC confirmed: "TC-MAN copy wind 180⁰/05kts R/W 16 clear to land.". According to the CVR recording, after the Landing Check List was completed and immediately after at 400 ft from the runway, the voice of the PM was heard, referring to the vertical speed of the aircraft: "Speed, speed vert.". While the aircraft was descending from 200 to 100 ft AGL, the characteristic sound of the "Stick Shaker Motor" is heard with simultaneous activation of the "Stick Pusher System". Then, while the aircraft was at a height of 30 ft from the runway the Captain was heard twice (2) telling the First Officer, who was the PF, to perform a Go Around. After landing, the First Officer is heard saying with a laugh, "What have I done my friend?", while at the end of the conversation between them, he added: "Well something happened. A sudden drift came from the right.". According to the Captain's report, during the landing on R/W 16, due to the existence of windshear, the aircraft deviated to the left. The aircraft after taxiing, was parked in the appropriate area of the Airport (Appendix: Photo 5).

1.2 Injuries to Persons

Injuries	CREW	Passengers	Others
Deaths			
Serious			
Minor / None	/ 2	/ 1	/

1.3 Aircraft Damages

The left wing tip and parts of the left wing of the aircraft during their contact with the runway, showed extensive damage (Appendix: Photos 1 to 3), also wear was observed on the left outer tire of the left main Landing Gear System (Appendix: Photo 4).

1.4 Other Damages

Not applicable.

1.5 Personnel Information

1.5.1 Flight Crew

The Captain: Male aged 51 years old.

A/C License	:	Valid JAR-FCL/ATPL(A), until 22/01/2022 issued on 22/03/2001.
Endorsements	:	Instrument Rating (IR) valid up to 31/01/2018.
Medical Certificate	:	Class 1 and Class 2 valid up to 04/08/2017.
Flight Experience	:	Captain until 26/07/2017, had accumulated 9.066 h Flight hrs. from which 3.770 hrs. on A/C type.

The First Officer: Male aged 36 years old.

A/C License	:	Valid JAR-FCL/ATPL(A), until 24/01/2022 issued on 25/01/2017.
Endorsements	:	Instrument Rating (IR) valid up to 31/01/2018.
Medical Certificate	:	Class 1 valid up to 12/05/2018 and Class 2 valid up to 12/05/2022.
Flight Experience	:	First Officer until 26/07/2017 had accumulated 2.763 h flight hrs. from which 1.767 hrs. on A/C type.

The Flight hours of the Captain and First Officer were respectively:

• The previous Day: 1 h and 30 min.

• The previous Week: 16 hours and 35 min.

• The previous Month: 46 hours and 25 min.

1.5.2 ATC Personnel

Not applicable.

1.5.3 Maintenance Personnel

Not applicable.

1.6 Aircraft Information

1.6.1 General

The Hawker Beechcraft 850XP Aircraft comes from the Hawker 800 type which is a medium-sized twinengine aircraft. Developed by British Aerospace as a BAe 125 model and assembled by Hawker Beechcraft. The Hawker 850XP was certified in March 2006 and is equipped with winglets that extend its operational range by 100 nautical miles (190 Km), has lower fuel consumption, has advanced electronic systems, and has a brand new interior cabin from that of the Hawker 800 model, with the ability to carry from 8 to 15 passengers.

1.6.2 Aircraft

Manufacturer	:	BEECHCRAFT CORPORATION
A/C Type	:	HAWKER 850 XP
MSN	:	258836
Year of Construction	:	2007
MTOM	:	12.701 Kgs (28.000 lbs)
MLM	:	10.591 Kgs (23.350 lbs)
ALM	:	9.462 Kgs (20.860 lbs)
CG Limit (FWD and AFT)	:	25,2% (15,4% and 26,9%)
A/C Total Flight Hours	:	3.825:30 hrs
A/C Total Landings	:	2.266

The aircraft had the following certificates and licenses:

- Registration Certificate: Serial Number 2655, issued on 23/01/2017.
- Certificate of Airworthiness: Serial Number 2655, Category "STANDARD", issued on 01/11/2013.
- Airworthiness Review Certificate: Number 2655, issued on 23/01/2017, with expiration date 11/01/2018.

The A/C was insured from 24/12/2016 until 23/12/2017.

1.6.3 Engines

Manufacturer		HONEYWELL AEROSPACE			
Туре	:	TFE731-5BR-1H			
MSN	:	(LH) P129323, (RH) P129317			
Maximum Thrust	:	4.660 lbf (20,7 KN)			
Total Hours	:	3.825:30 Hrs			

1.7 Meteorological Information

The meteorological conditions of the Airport, according to the Meteorological Data Sheet of the area for the specific day and time of the accident, were the following:

2017 07 26 0720 METAR LGMK 26 0720Z 180^o 05KT CAVOK 28/21 Q1004

1.8 Aids to Navigation

The Airport is equipped with a VOR / DME system as well as PAPI on both runways 16/34, which was U/S on R/W 16.

1.9 Communications

Communications of the aircraft with the ATC were conducted without any problem.

1.10 Airport Information

The coordinates of the Airport are 37°26′14′′N and 25°20′50′′E. Runway 16/34 (PCN 34 / F / B / X / U), measuring 1.902 m X 30 m and Fire Fighting category 7.

In the general information provided in the AIP, published by the CAA air navigation, windshear has often been reported during approach and landing on runway 16/34.

The approach to runway 16 is allowed only during the daytime due to the presence of high unlighted terrain, as well as the descent tracking device PAPI which was U/S.

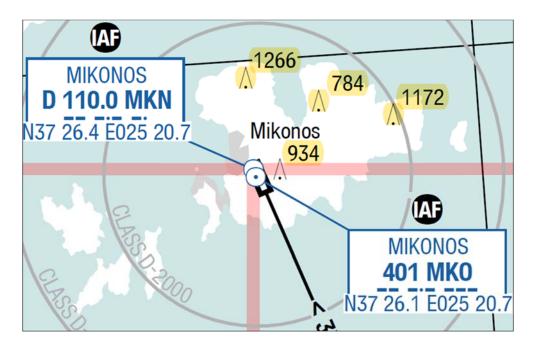


Fig. 1: Mykonos Airport

1.11 Flight Recorders

The aircraft was equipped with a CVR (Manufacturer: Universal Avionics Systems Corp., Model: CVR-120, Part No.: 1603-02-12, Serial No.: 1753), which was sent to a specialized center abroad for reproduction. The aircraft also had an FDR (Manufacturer: Honeywell International Inc., Part No.: 980-4710-003, Serial No.: ARFDR-00865), which was sent to a specialized overseas center for analysis, characteristic data of which are presented in the Annex here to.

According to the analysis of FDR data, the following information is obtained:

When landing the aircraft, the Autopilot was disengaged, and the flaps extended to 43°. Also, a left bank of 13,7° was recorded. Additional instantaneous acceleration (G-Load) 2.67g and a significant deviation of the rudder to the right at 31,1° were recorded.

1.12 Wreckage and Impact information

Not Applicable.

1.13 Medical Information

Both Pilots were tested for alcohol consumption (alcohol test), without findings.

1.14 Fire

Not applicable.

1.15 Survival Aspects

After previously parking in an appropriate position at the Airport (Appendix: Photo 5), both Pilots and the passenger disembarked the aircraft without being injured.

1.16 Tests and Research

Not applicable.

1.17 Organizational and Management Information

1.17.1 Airline

Not applicable.

1.17.2 Airport

Not Applicable.

1.18 Additional Information

1.18.1 Windshear

Windshear is defined as a sudden change of wind velocity and/or direction.

Windshear may be vertical or horizontal, or a mixture of both types. ICAO Doc 9817 AN/449 defines the vertical and horizontal components of windshear as follows:

- Vertical windshear is defined as change of vertical wind direction and/or speed with height, as
 would be determined by means of two or more anemometers mounted at different heights on a single
 mast.
- Horizontal windshear is defined as change of horizontal wind direction and/or speed with horizontal distance, as would be determined by two or more anemometers mounted at the same height along a runway.

Windshear on the Approach and Landing

Horizontal and/or vertical windshear during the approach can result in sudden loss of airspeed and apparent loss of power, with potentially disastrous consequences. A sudden change of wind component or drift prior to landing can make the approach unstable at a point where go-around is not possible or would be extremely hazardous. It is vital that such conditions should be quickly recognised if they are encountered, and that pilot response should be immediate and correct.

1.18.2 Windshear Warning

Red WINDSHEAR MESSAGE ON PDF and or WINDSHEAR, WINDSHEAR, WINDSHEAR AURAL ALERT.

- DURING TAKE OFF: Verify take-off thrust is set and maintain take-off path attitude.
- DURING APPROACH: Consider a go-around. If approach is continued, closely monitor airspeed and glidepath and avoid prolonged thrust reduction.

1.18.3 Stick Shaker / Pusher

The aircraft was equipped with the above mentioned systems, according to which, the flight controls is shaking and move forward in order for the aircraft to regain control, from the loss of lift, by reducing pitch attitude.

This safety system operates behind the scenes in to prevent the onset of an aerodynamic stall.

A stick shaker acts as a stall-warning device, while the stick pusher's job is one of stall avoidance.

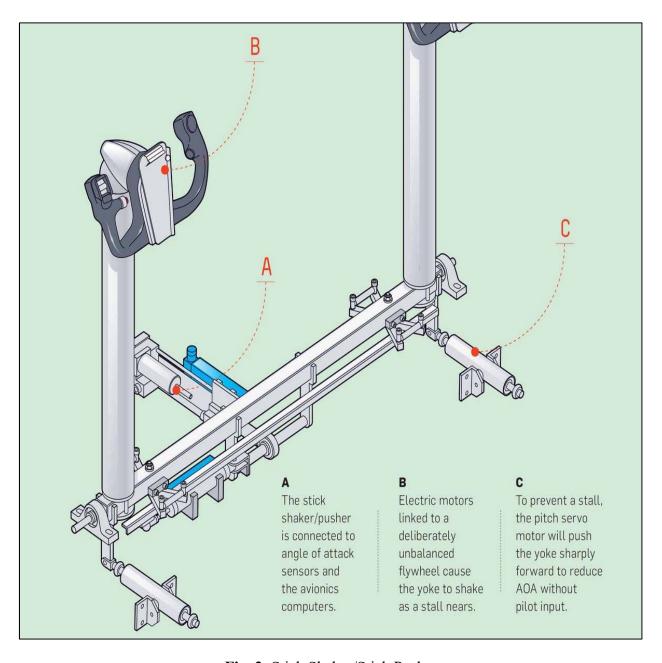


Fig. 2: Stick Shaker/Stick Pusher

1.18.4 Stalling Speeds

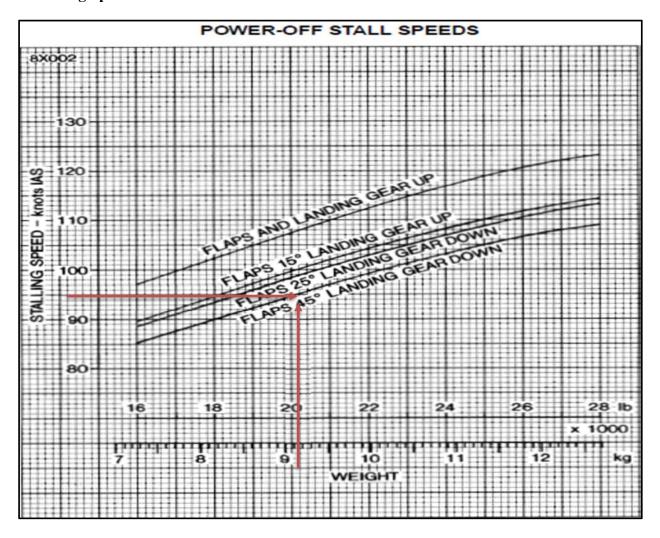


Fig. 3: Stalling Speed Graf

1.18.5 Landing Reference Speed Vref

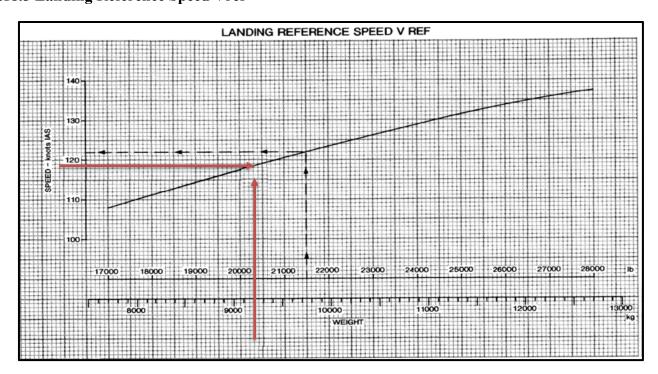


Fig. 4: Vref Graf

Vref: The Landing reference speed is the speed at which the Pilot should aim to cross the R/W threshold at landing flaps. The Approach speed is (Vref+10 kts). At the ALM of 9.462 kg, Vref equals to 121kts. Thus, Approach speed equals to 131kts.

1.19 Useful or Effective Investigation Techniques

Not applicable.

2 ANALYSIS

The aircraft with registration mark TC-MAN, departed on 26/07/2017 from Istanbul "ATATURK" (LTBA) destination Mykonos State Airport (LGMK), having two Pilots as Flight Crew and one passenger. By the time the plane approached Mykonos Airport, no problems had been reported by the Flight Crew and the flight was operating normally.

The conversation of the Flight Crew with Mykonos ATC was also conducted without any problem. From the data of par. 1.6.2, it appears that the actual landing weight of the aircraft was less than the maximum allowed limit, while the center of gravity of the aircraft was within the prescribed limits. According to the METAR of the airport, the wind speed was $180^{0}/5$ knots, a fact which was also confirmed by ATC three minutes before the landing of the A/C on R/W 16.

According to the general information provided by the CAA (AIP-Greece), on the approach and landing on R/W 16/34, special attention must be given due to the reports of windshear. However, the existence of a windshear during approach and landing is not confirmed, by the CVR, FDR, neither by the meteorological instruments that the airport had, or by the aircraft's instruments.

Otherwise the visual and audible warning in the cockpit of the aircraft (Windshear Caution / Aural Warning) would have been activated, which did not happen. In the event of a windshear, the pilot following the AFM, would either have to perform a "Go Around" or, if the approach continued, carefully monitor the airspeed, as well as to avoid early thrust reduction. The above, according to the information available to the investigation team, did not take place.

According to the analysis of the FDR, it appears that the autopilot was disengaged, and the flaps were extended to 43°.

While the aircraft was descending on final approach (CVR 12:56:00 h-13: 06: 00 h), the characteristic sound of Stick Shaker is perceived which warns the Flight Crew through the control for upcoming stall, while the Stick Pusher System was activated at the same time. The first activation of stick Shaker took place at 07:26:49 at 704 ft PR ALT and the second started at 07:26:53, 4 sec before landing, at 640 ft PR ALT. Also, a few seconds before landing, the PM (Captain) warns of the vertical speed and at the same time commands "Go Around".

The A/C had an indicated Air speed of 100 knots at touchdown, an IAS lower than the recommended Vref of 121 knots, Approach speed of 131 knots and close to the Stalling speed of 97 knots at actual landing weight with landing configuration.

At that very moment and according to the FDR (Appendix 5), a left inclination angle of 13,7° was recorded and instantaneous G-Load acceleration of 2,67g, while immediately after, the rudder showed a significant deviation to the right of 31,1°.

3 CONCLUSIONS

3.1 Findings

- → A/C and engine Maintenance according to the kept registers was performed by a certified maintenance organization and to according the approved Maintenance Program and following the Maintenance Manuals of the Manufacturers, without any pending items.
- → The aircraft was airworthy and had all its legal documents valid.
- → Both Pilots met the legislative requirements for their A/C licenses and had valid medical certificates.
- → The actual Landing Mass was lower than the Max Allowed Landing Mass and the Aircraft CG was within normal operating limitations.
- → At the time of landing the IAS of the Aircraft was lower than the appropriate Vref and near to the Stalling speed.
- → At the time of landing, a significant left inclination, an increased G-Load acceleration and a significant deviation of the rudder to the right were recorded.
- → The allegation, of the Captain, for the existence of windshear on short final of R/W16 is not confirmed according to, the instruments that the aircraft was equipped, nor from the reports of ATC and also FDR does not indicate a change in wind direction or velocity during approach and landing.
- → On short final, just before landing, the characteristic sound of stick shaker was recorded that warned the Flight Crew of approaching the 97 kts Stalling speed.
- → Following the above, the Stick Pusher Systems mechanism was activated according to which the control columns move forward in order for the aircraft to regain control from the loss of lift by lowering the A/C pitch attitude.
- → Few seconds before landing the Captain acting as PM was heard saying "GO AROUND"

3.2 Route Cause

The non-stabilized approach, from 2000 ft to touch down, regarding the final approach and landing speed, ranging from -6 to -31 kts lower than the appropriate recommended Approach speed of 131 kts and Vref of 121 kts and very close to the A/C Stalling speed of 97 kts (Appendix 5).

3.3 Contributing Factors

- → CRM during approach and landing between the Captain and Fist Officer was not effective.
- → No standard call outs regarding speed management. Only "GO AROUND" is heard on CVR.
- → Lack of familiarity of the Flight Crew with the peculiarities in terms of approach and landing at MYKONOS airport may have contributed to raised anxiety especially on R/W 16.

4. SAFETY RECOMMENDATIONS

To GENEL HAVACILIK A. S.

2021/04: GENEL HAVACILIK A. S., in order to continue operating commercial flights to Mykonos (LGMK), must consider according to ICAO categorization criteria that Airport, and ascertain that all Flight Crews operating at LGMK, undergo special training taking into account the peculiarities (Airport terrain environment and weather phenomena as stated in AIP-Greece).

2021/05: GENEL HAVACILIK A. S. must enhanced efficiency of CRM training program.

Nea Philadelphia January 14, 2021

THE CHAIRMAN THE MEMBERS

Ioannis Kondylis Akrivos Tsolakis

Grigorios Flessas

Exact Copy Christos Valaris

THE SECRETARY

Charalampos Tzonos-Komilis

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5 APPENDIX



Photo 1: Damage of the left-wing tip (winglet) of the left wing.



Photo 2: Damage of the trailing edge flaps on the left wing.



Photo 3: Damage of the left aileron drive cover on the lower part of the left wing.



Photo 4: Wear to the outer tire of the left main landing gear.



Photo 5: The Aircraft parked at Mykonos State Airport.

Flight Data Recorder

GMT	IAS	PR ALT	PITCH	ROLL	W/D	W/S	ELEVATOR	RUDDER	AILERON	N1	G ACCEL
07:24:17	134	2304	12,1	-26,4	179	6	7,5	-2,0	0,8	80,20	1,04
07:24:21	132	2304	10,9	-21,8	176	7	7,5	-2,1	-1,4	69,60	1,04
07:24:25	129	2368	9,3	-19,0	172	7	7,9	-2,8	0,1	71,00	0,97
07:24:29	127	2368	6,9	-15,1	171	7	7,3	-3,0	0,2	55,45	0,90
07:2433	126	2368	6,5	-10,2	170	7	8,2	-0,6	-5,7	56,20	0,94
07:24:37	127	2368	5,3	-4,9	168	7	9,1	-2,7	3,1	56,85	0,96
07::24:41	127	2304	6,7	-19,7	165	7	8,8	-2,9	0,0	57,15	1,02
07:24:45	128	2304	5,3	-15,1	166	7	9,4	-2,9	0,1	57,10	0,99
07:24:49	129	2240	5,6	6,7	162	7	7,6	-2,8	3,8	57,10	0,94
07:24:53	128	2176	6,9	-3,9	160	7	8,1	-3,3	1,0	57,35	0,99
07:24:57	128	2176	6,7	-3,5	159	7	8,8	-3,2	-0,6	61,00	0,98
07:25:01	128	2176	6,2	-5,3	158	7	7,8	-3,0	0,4	61,30	0,94
07:25:05	125	2112	4,7	2,5	155	7	8,4	-2,7	-1,3	49,50	0,99
07:25:09	120	2048	2,6	0,4	154	7	8,9	-2,8	2,3	49,95	0,94
07:25:13	118	2048	3,5	-10,2	151	7	9,7	-2,8	3,0	50,15	1,04
07:25:17	117	1984	1,9	-3,5	151	7	12,1	-2,8	-2,6	50,20	0,95
07:25:21	119	1920	5,8	4,6	148	7	11,8	-1,7	-2,0	69,15	1,10
07:25:25	119	1920	5,1	7,0	147	7	10,9	-1,6	-0,6	71,70	0,99
07:25:29	119	1856	3,5	1,1	146	7	8,4	-1,6	3,3	98,85	0,86

GMT	IAS	PR ALT	PITCH	ROLL	W/D	W/S	ELEVATOR	RUDDER	AILERON	N1	G ACCEL
07:25:33	119	1856	2,3	-1,8	146	7	8,6	-1,7	2,2	61,60	0,90
07:25:37	117	1792	1,1	-2,1	144	7	10,4	-2,7	-2,3	52,05	0,88
07:25:41	116	1728	3,3	-1,8	143	7	10,7	-2,5	1,3	47,80	0,98
07:25:45	115	1664	5,3	-2,1	143	7	10,5	-2,5	-0,1	53,80	1,03
07:25:49	115	1600	2,6	4,2	141	7	11,0	2,2	-0,4	60,70	0,96
07:25:53	116	1536	2,6	1,1	141	7	11,6	-0,6	4,6	60,95	0,99
07:25:57	117	1472	3,9	-3,9	141	7	11,6	-0,6	-2,1	59,35	1,03
07:26:01	117	1408	2,8	-2,8	141	7	11,9	-0,5	1,1	57,15	0,96
07:26:05	116	1344	2,5	-1,4	140	6	11,0	-0,5	-3,3	57,45	0,94
07:26:09	117	1280	3,3	-0,4	139	6	10,1	-0,6	3,0	57,50	0,98
07:26:13	117	1216	2,6	-1,8	139	6	11,2	-1,0	1,0	59,15	0,99
07:26:17	119	1152	3,3	-1,1	139	6	10,9	-0,6	-3,9	57,85	1,04
07:26:21	119	1088	4,0	1,4	139	6	10,1	-1,1	1,3	56,90	1,03
07:26:25	121	1024	1,1	-0,4	141	6	9,4	-1,1	-0,6	49,05	1,02
07:26:29	119	1024	1,8	-2,1	141	6	11,5	-0,9	-2,2	48,35	1,05
07:26:33	117	896	0,9	0,0	144	6	10,1	-0,9	1,0	42,05	0,89
07:26:37	115	832	3,2	1,4	146	6	10,7	1,5	3,9	42,05	0,96
07:26:41	115	832	2,8	-4,2	146	6	11,3	-3,6	1,1	41,95	0,94
07:26:45	113	768	5,3	-0,7	149	6	12,2	-0,6	-1,6	48,85	0,98
07:26:49	110	704	5,3	1,1	150	6	13,7	-0,7	-1,0	41,80	0,90
07:26:53	106	640	8,3	2,8	152	6	15,4	-1,8	3,4	47,10	1,05
07:26:57	106	640	8,1	8,8	152	6	19,9	-5,4	-0,7	67,50	0,93
07:26:57	100	<mark>628</mark>	14,4	-13,7	152	<mark>6</mark>	21,4	<mark>-11,2</mark>	0,2	68,15	2,67
07:27:01	101	0	-0,7	-2,5	152	6	15,4	-31,1	8,4	44,65	0,80

Auto Pilot Disconnected
Aircraft on the Ground



