

FINAL
KNKT.12.02.02.04

NATIONAL TRANSPORTATION SAFETY COMMITTEE

Aircraft Serious Incident Investigation Report

**ERSA Eastern Aviation
PAC 750 XL ; PK-BSA
Bilai Airstrip, Papua
Republic of Indonesia**

04 February 2012



NATIONAL TRANSPORTATION SAFETY COMMITTEE
MINISTRY OF TRANSPORTATION
REPUBLIC OF INDONESIA
2013

This Final report was produced by the National Transportation Safety Committee (NTSC), 3rd Floor Ministry of Transportation, Jalan Medan Merdeka Timur No. 5 Jakarta 10110, Indonesia.

The report is based upon the investigation carried out by the NTSC in accordance with Annex 13 to the Convention on International Civil Aviation Organization, the Indonesian Aviation Act (UU No. 1/2009) and Government Regulation (PP No. 3/2001).

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ABBREVIATIONS AND DEFINITIONS

AFM	Airplane Flight Manual
AOC	Air Operator Certificate
ATPL	Air Transport Pilot License
ATS	Air Traffic Service
BMKG	<i>Badan Meteorologi Klimatologi dan Geofisika</i> / Indonesia Meteorological Climatologically Geophysical Agency
CASR	Civil Aviation Safety Regulation
CPL	Commercial Pilot License
COM	Company Operation Manual
CSN	Cycles Since New
DGCA	Directorate General of Civil Aviation
ICAO	International Civil Aviation Organization
IIC	Investigator in Charge
Kg	Kilogram(s)
Kts	Knots (NM/hour)
MTOW	Maximum Take-off Weight
NM	Nautical mile(s)
KNKT / NTSC	<i>Komite Nasional Keselamatan Transportasi</i> / National Transportation Safety Committee
°C	Degrees Celsius
PIC	Pilot in Command
QFE	Height above aerodrome elevation (or runway threshold elevation) based on local station pressure
QNH	Altitude above mean sea level based on local station pressure
S/N	Serial Number
TSN	Time Since New
TT/TD	Ambient Temperature/Dew Point
UTC	Coordinated Universal Time
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
WIT	Waktu Indonesia Timur /Local Time (Indonesian time region)

INTRODUCTION

SYNOPSIS

On 04 February 2012 a PAC 750 XL aircraft was being operated by Ersu Eastern Aviation registered PK-BSA route Nabire to Bilai as un-schedule cargo flight.

The aircraft performed Pre-flight check at 0540 WIT (2040 UTC) and release signed at 2100 UTC. It was second flight of the day.

The aircraft was departed from Nabire at 0006 UTC. The weather on that day was good, wind calm, visibility more than 10 km, clear of cloud.

There were two people on board, one Pilot and one Engineer. During flight, the aircraft reported was normal with the altitude 10.000 feet, the weather was clear. While descend was normal, and the weather reported was wind calm and visibility more than 10 km, clear of cloud.

The aircraft approach Bilai airstrip using runway 11 at 0042 UTC During approach the aircraft was maintaining an altitude of 5,757 feet for about 48 second and then increasing engine power about five second to increase the altitude up to 5,764 feet following by a slight air speed increased as recorded on the engine trend monitoring data.

The aircraft the touchdown and landing roll at the altitude of 5,764 feet the engine parameter was varied as on the time of recording up to 13.45.13.9 Compressor RPM 92.1% - 74.2%, The propeller RPM 1990 - 1418 RPM., torque 34.1- 11.0 PSI., Turbine Temperature 639 - 516 C, Indicated Air Speed 51 Knots, Pressure altitude 5,764 Feet

The aircraft landed and experienced bouncing twice during touchdown, the aircraft veered to the left until the aircraft hit the hill side even the pilot tried to keep centerline using brake and power reverse. The Propeller has twisted and nose gear into the mud.

The aircraft stopped at zero knot, then the propeller stuck to the ground indicated by the propeller RPM zero RPM and the engine Torque increased fro18.6 - 35.2 PSI. It took about nine seconds prior the engine shut down.

There was no one injury in this accident.

The left flap was broken and the left main landing gear moved around 90°, the left upper wing skin ripped.

The last aircraft heading was 038°, at the coordinate S 03°44'080" E 136°51'386", on the elevation about 5764 feet.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 04 February 2012 a PAC 750 XL aircraft was being operated by Ersa Eastern Aviation registered PK-BSA route Nabire to Bilai as un-schedule cargo flight.

The aircraft performed Pre-flight check at 05.40 WIT (20.40 UTC) and release signed at 21.00 UTC.

The weather reported that day was good, wind calm, visibility more than 10 km, and clear of cloud.

The first flight was destination to Bilai. The aircraft take-off at 21.39 UTC. Block fuel required 450 liter, and has refuelled one day before flight with load cargo 1.100 kgs.

During flight the engine parameter was normal, the aircraft flight to Bilai and landed at 22.16 UTC and off-load cargo at Bilai. The aircraft prepared back to Nabire and take-off from Bilai at 22.52 UTC. The aircraft normal landed on Nabire at 23.29 UTC.

The second flight preparation, the Engineer walked around and checked all condition of the aircraft. The aircraft was good and released for flight.

The second flight destination to Bilai, The aircraft take-off at 00.06 UTC. The pilot request block fuel 450 litres and remaining fuel was 195 liters. The Engineer up lift fuel was 255 liters. The aircraft up load cargo 1.100 kg were contained 6 drums diesel fuel.

The weather reported at Nabire was good, wind calm, visibility more than 10 km, clear of cloud.

There were two people on board, one Pilot and one Engineer. During flight the aircraft was reported normal with the altitude 10.000 feet, the weather was clear. While the aircraft descend normal, Bilai weather reported wind calm and visibility more than 10 km clear of cloud.

Once aircraft levelled off the prop speed was set at NP 85 %. I believe the aircraft was poorly setup. Setting the engine in this configuration causes the engine power and propeller to become less response to attitude changes especially in the descent. Refer attachment " BSA Approach.pdf " during the distance phase the aircraft was set at approx. 1100 ft/minutes descent, with the possibility of an overweight loading configuration, the aircraft is very hard to slow down during descent with engine torque set at 4 Psi. A descent rate of 500 ft/ minutes is considered normal during approach for a 750 XL. Refer attachment " BSA just before touchdown" it is clearly seen the propeller speed is increased back to 100%Np. With NG set a 81 % and tq set a 13 psi the aircraft is configured to land hard. The propeller governor, Nf governor and Beta valve and F.C.U. normally flight idle is the set 68- 70% Ng with primary

blade set at 18-24 psi Tq at 1820 Np. Once again this reinforces the potential for heavy landing.

The aircraft approach in Bilai airstrip using runway 11. At 00.42 UTC the aircraft landed and experienced bouncing twice during touchdown, and veered to the left until hit the hill side even the pilot tried to keep centerline using brake and power reverse and nose gear was sank into the mud

The left flap and aileron was broken, the left main landing gear sited 90°, and the left upper wing skin tear.

The last aircraft heading was 038°, at the coordinate S 03°44'080" E 136°51'386", on the elevation about 6,000 feet.



Figure 1: Last position of the PK-BSA aircraft

1.2 Injuries to Persons

Injuries	Flight crew	Passengers	Total in Aircraft
Fatal	-	-	-
Serious	-	-	-
Minor	-	-	-
Nil Injury	2	-	2
TOTAL	2	-	2

1.3 Damage to Aircraft

The aircraft was damaged on left wing section and left main landing gear. The aircraft propeller was twisted.

1.4 Other Damage

There was no other damage to property and/or the environment.

1.5 Personnel Information

1.5.1 Pilot in Command

Gender : Male
Age : 41 years old
Nationality : Indonesia
Marital status : Married
License : ATPL
Date of issue : 22 July 2009
Aircraft type rating : PAC-750 XL
Instrument rating : 09 October 2010
Medical certificate : First Class
Last of medical : 10 October 2011
Validity : 10 April 2012
Medical limitation : Holder shall wear corrective lenses
Last proficiency check : 25 October 2012
Flying experience
Total hours : 3402 Hours 01 minutes
Total on type : 114 Hours 37 minutes
Last 90 days : 100 Hours 58 minutes

Last 60 days	:	86 Hours 52 minutes
Last 24 hours	:	02 Hours 05 minutes
This flight	:	36 minutes

1.5.2 Maintenance Engineer

Gender	:	Male
Age	:	41 years old
Nationality	:	Indonesia
Marital status	:	Married
License	:	AMEL
Date of issue	:	11 May 2011
Aircraft type rating	:	PAC-750 XL ENG PT6A

1.6 Aircraft Information

1.6.1 General

Registration Mark	:	PK-BSA
Manufacturer	:	Pacific Aerospace Limited
Country of Manufacturer	:	New Zealand
Type/ Model	:	PAC-750 XL
Serial Number	:	168
Year of manufacture	:	2010
Certificate of Airworthiness		
Issued	:	10 August 2011
Validity	:	11 February 2012
Category	:	Normal
Limitations	:	Day VFR operation only
Certificate of Registration		
Number	:	2938
Issued	:	11 August 2011
Validity	:	10 February 2012
Time Since New	:	239 Hours 32 minutes
Cycles Since New	:	345 Cycles
Last 150 Check	:	147 Hours 43 minutes
Next 300 Check	:	297 Hours 43 minutes

1.6.2 Engines

Manufacturer : Pratt & Whitney Canada
Type/Model : Turbo Propeller Engine/ PT6A-34
Serial Number : PCE-RB 0479

- Time Since New : 239 Hours 32 minutes
- Cycles Since New : 306 Cycles
- Time Since Overhaul : 239 hours 32 minutes

1.6.3 Weight and Balance

The pilot did not make a weight and balance calculation prior the accident.

The aircraft has modification PAC/XL/0151 installed which is the instalation of the cargo. With reference to Pilot Operating Handbook supplement 79 the MTOW has been reduced from 7500 lbs to 7400 lbs. The log book has a production weight and balance report stating 3805.38 lbs empty with the pod fitted. When completing a basic weight calculation of aircraft, freight, crew, fuel and the passengers seat stowed in the pod place PK-BSA over the certified landing load of 7125 lbs. This increases the probability that damage or a safety event will occur during landings.

1.7 Meteorological Information

Surface wind : Calm
Visibility : More than 10 km
Weather : Nil
Cloud base : Sky clear
TT / TD : 32°
QNH : 1010 mb
Remark : Nil

1.8 Aids to Navigation

Not relevant to this serious incident.

1.9 Communications

Communication between the aircraft and Bilai Ground Station were using radio HF freq 5995 kHz

1.10 Aerodrome Information

Airport Name	: Bilai
Airport Identification	: BII / WAKF
Airport Operator	: Local Government
Coordinate	: 136° 51' 33,73" BT, 3° 44' 28,95" LS
Elevation	: 1.729,61 mdpl (5.674,49 ft dpl)
Runway Direction	: 15- 33
Runway Length	: 500 m
Runway Width	: 20 m
Surface	: Gravel

1.11 Flight Recorders

The aircraft was not fitted with a flight data recorder or cockpit voice recorder. Neither recorder was required by current Indonesian aviation regulations.

Although neither a CVR nor FDR accident recorder was required to be fitted, the aeroplane was equipped with a Perkins Data Acquisition Alarm Monitoring System (DAAMS) as described in section 1.18.1.

1.12 Wreckage and Impact Information

The left wing hit the ground and nose landing gear into the mud, propeller hit the hill side, the aircraft position was heading 038°, at the altitude about 6000 feet

The main aircraft wreckage was in the left side middle of runway. The main left landing gear and left wing flap were broken.

1.13 Medical and Pathological Information

No medical or pathological investigations were conducted on the flight crew.

1.14 Fire

There was no evidence of fire in-flight or after the aircraft impacted terrain.

1.15 Survival Aspects

Not relevant to this serious incident.

1.16 Tests and Research

No test and research was performed during this investigation.

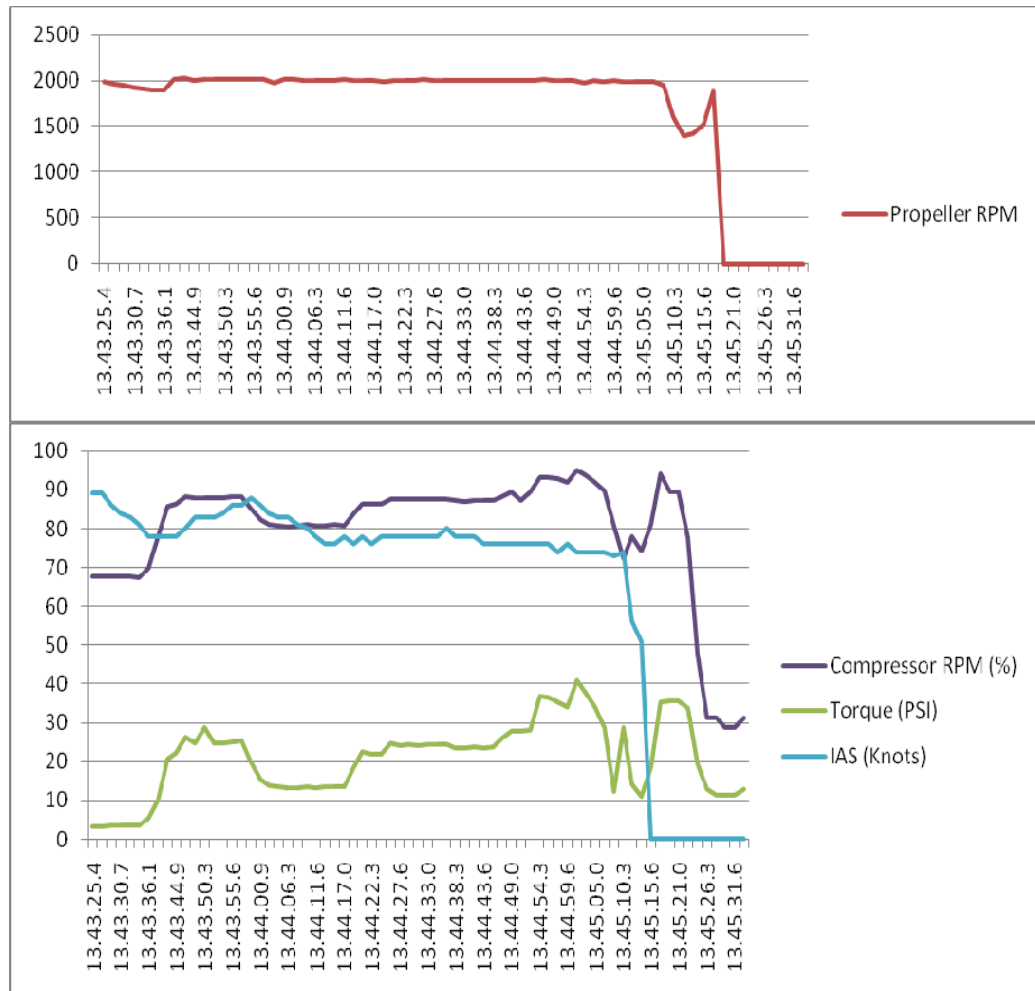
1.17 Organizational and Management Information

Aircraft owner : Pasific Aerospace Limited
Aircraft operator : PT. Ersa Eastern Aviation
Air operator certificate : AOC / 135 -047

1.18 Additional Information

1.18.1 Engine Trend Monitoring Data / Data Acquisition Alarm Monitoring System (Daams)

Referred the engine & performance trend monitor trend data that during short final the following data was recorded:



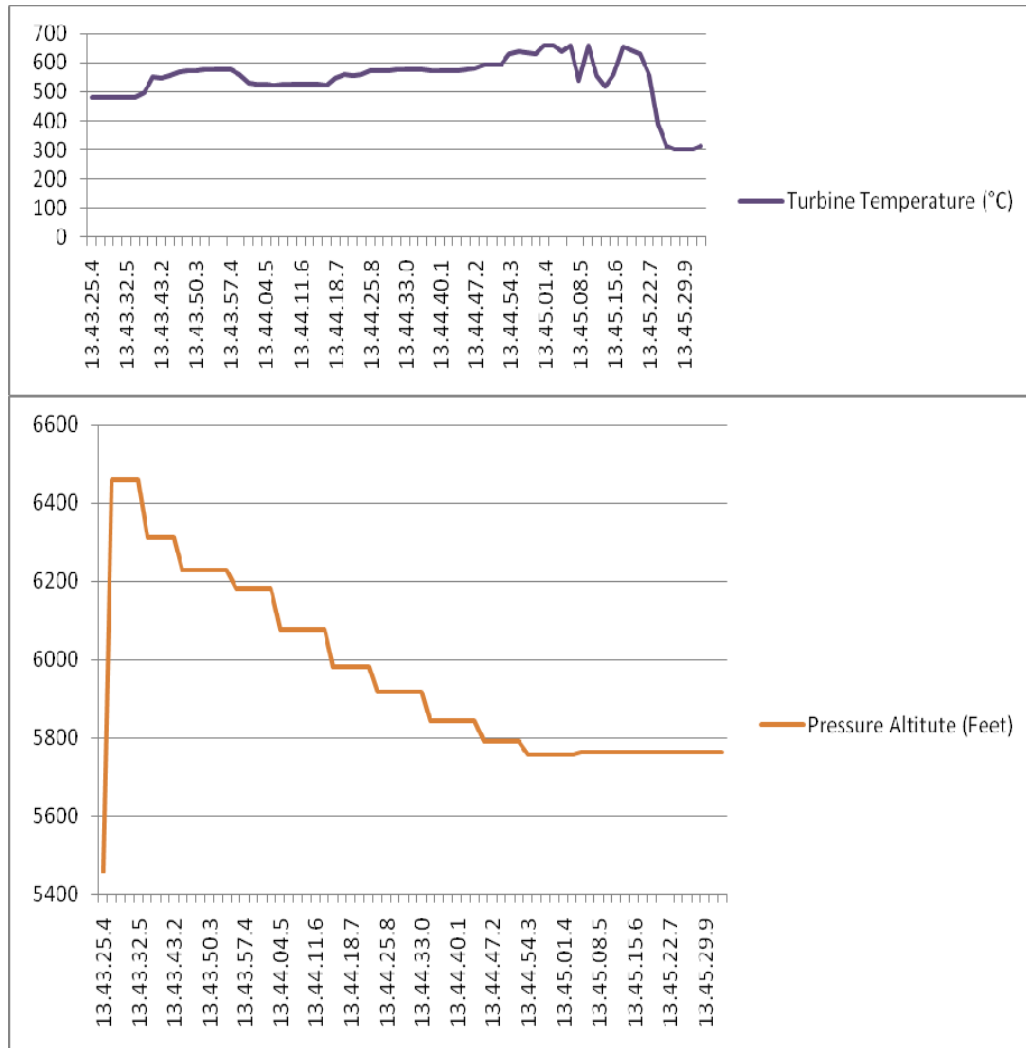


Figure 2: Engine trend monitoring data graphic

1.18.2 Witness Information

The aircraft maintenance engineer who onboard the aircraft informed that on the first flight the aircraft was normal approached and landed normally, on the second flight the aircraft approached in a level to the runway and climbing before touching down, while touching down the aircraft bounced two time and veer to the left.

1.19 Useful or Effective Investigation Techniques

The investigation was conducted in accordance with the NTSC approved policies and procedures, and in accordance with the standards and recommended practices of Annex 13 to the Chicago Convention.

2 ANALYSIS

During approach the aircraft was maintaining an altitude of 5757 Feet for about 48 second and then increasing engine power about five second to increase the altitude up to 5764 Feet following by a slight air speed increased as recorded on the engine trend monitoring data,

It was correlated to the witness information that the aircraft approached in the same elevation of the runway and climbing before touchdown, also reported had a twice bouncing before full stop.

The engine tend parameter data time increment frequencies was to wide to detect the changes of Aircraft vertical G and also the other parameter (it was about 1.8 second each record)

While about the touchdown and landing roll at the altitude of 5764 Feet the engine parameter was varied as on the time of recording up to 13.45.13.9 Compressor RPM 92.1% - 74.2%, Propeller RPM. 1990 - 1418 RPM, torque 34.1- 11.0 PSI, Turbine Temperature 639 - 516 C, Indicated Air Speed 51 Kts., Pressure altitude. 5764 Feet

The following data was indicated the aircraft stop and possibly start to hit the ground as the recorded parameter was varied at the time of 13.45.15.6 - 13.45.31.6 Compressor RPM 81.2% - 94.1%, Propeller RPM. 1521- 1885 RPM, torque 18.6 - 35.2 PSI, Turbine Temperature 559 - 654 C, Indicated Air Speed 00 Kts, Pressure altitude. 5764 Feet (see Figure 2 and Appendix A)

After Since the aircraft propeller stuck to the ground indicated by the propeller RPM zero RPM it took about nine seconds prior the engine shut down.

3 CONCLUSIONS

3.1 FINDINGS

- The aircraft was airworthy prior the departure
- The approach path was at the same level to the runway
- The increasing slightly engine power for climbing caused the increasing of air speed.
- The aircraft had a twice bounce.
- The left main landing gear was detached from the aircraft.
- The propeller hit the ground
- The shut down engine action about nine seconds since the impact.

3.2 Factors¹

- The aircraft was un stabilized approach and got experience of twice bouncing and veer to the left followed by the propeller hit the ground when the aircraft nose wheel run to the banked.

¹ “Factors” is defined as events that might cause the occurrence. In the case that the event did not occur then the accident might not happen or result in a less severe occurrence.

4 SAFETY ACTION

At the time of issuing this Final Report, the National Transportation Safety Committee had not been informed of any safety actions resulting from this accident.

5 SAFETY RECOMMENDATIONS

As a result of this serious incident investigation, the National Transportation Safety Committee issued recommendation to address safety issues identified in this final report, as follow:

5.1 PT. Ersa Eastern Aviation

The National Transportation Safety Committee recommends that PT. Ersa Eastern Aviation should review as follows:

- CFIT/ ALAR procedure;
- Pilot training program and criteria related to the mountainous area especially for Papua flying Pilots;
- The shut down engine emergency procedure on the ground on the serious incident or accident;
- The recruitment and training for the single pilot in-command.

5.2 Directorate General Civil Aviation

The National Transportation Safety Committee recommends that the Directorate General of Civil Aviation should to review pilot qualification especially for the mountainous and marginal air strip operation.

6 APPENDICES

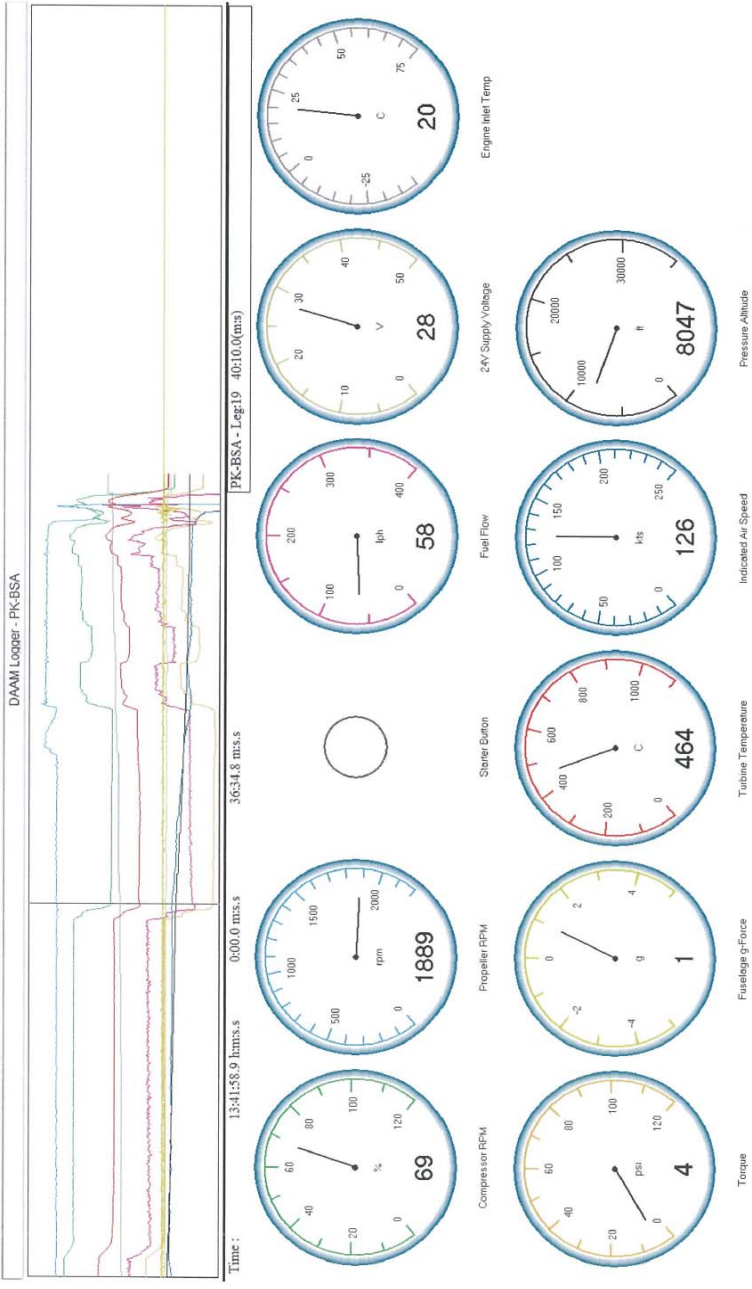
6.1 Appendix A: Engine Trend Monitoring Data PAC 750 XL aircraft Reg. PK-BSA

Time	Compressor RPM (%)	Propeller RPM	Torque (PSI)	Turbine Temperature (°C)	IAS (Knots)	Pressure Altitude (Feet)
13.43.25.4	67,8	1991	3,1	480	89	5458
13.43.27.2	67,8	1963	3,3	479	89	6458
13.43.28.9	67,7	1946	3,4	479	86	6458
13.43.30.7	67,6	1926	3,5	479	84	6458
13.43.32.5	67,6	1908	3,6	480	83	6458
13.43.34.3	67,5	1898	3,6	479	81	6310
13.43.36.1	69,8	1893	5,4	498	78	6310
13.43.37.8	77,8	2017	10,2	550	78	6310
13.43.43.2	85,6	2023	20,8	547	78	6310
13.43.44.9	86,5	2001	22,2	555	78	6229
13.43.46.7	88,1	2007	26,3	568	80	6229
13.43.48.5	87,9	2009	24,6	570	83	6229
13.43.50.3	87,9	2009	28,8	571	83	6229
13.43.52.1	87,9	2009	24,8	574	83	6229
13.43.53.8	87,9	2009	24,8	576	84	6229
13.43.55.6	88,1	2007	24,9	577	86	6183
13.43.57.4	88,1	2007	25,2	577	86	6183
13.43.55.6	85,2	1974	19,6	561	88	6183
13.44.00.9	82,3	2007	15,4	530	86	6183
13.44.02.7	81,1	2008	13,7	528	84	6183
13.44.04.5	80,8	1998	13,4	526	83	6076
13.44.06.3	80,5	1998	13,2	524	83	6076
13.44.08.1	80,7	2001	13,3	525	81	6076
13.44.09.9	80,9	1996	13,6	526	80	6076
13.44.11.6	80,8	2007	13,3	525	78	6076

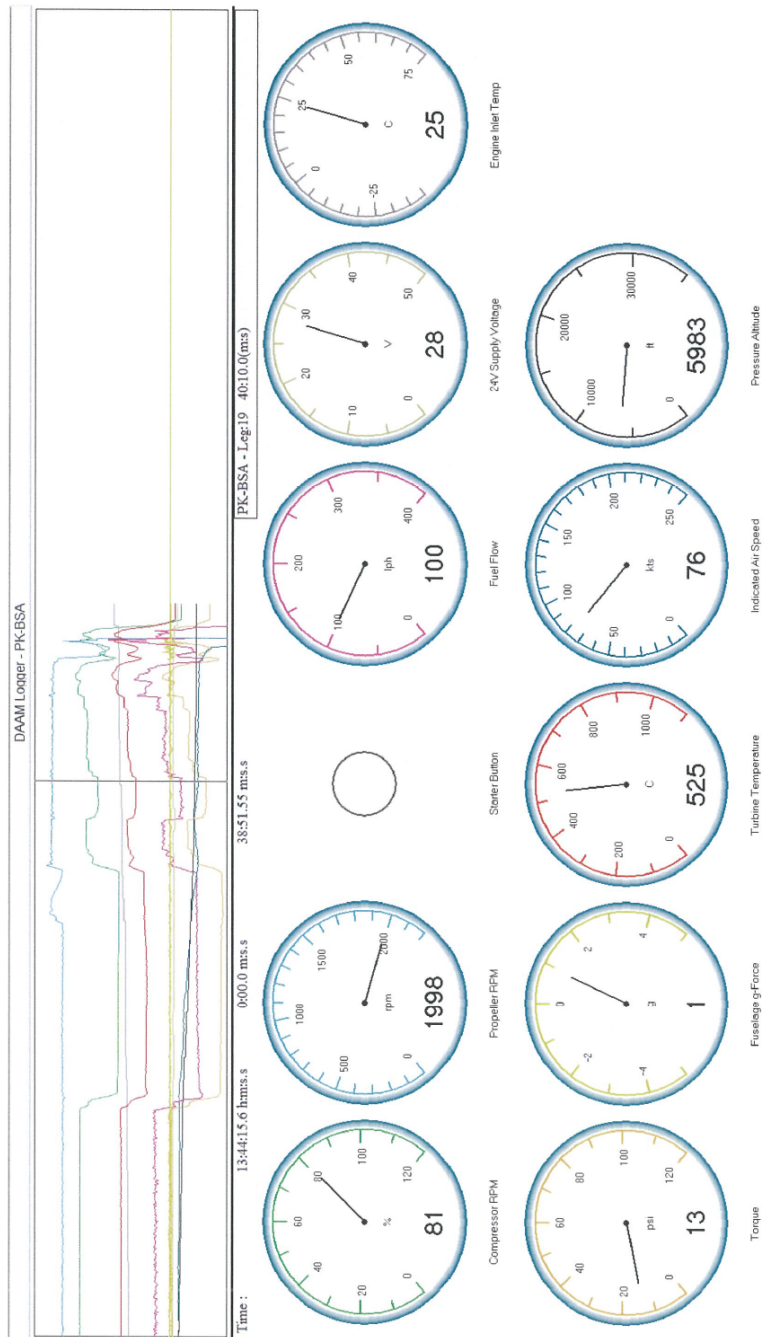
Time	Compressor RPM (%)	Propeller RPM	Torque (PSI)	Turbine Temperature (°C)	IAS (Knots)	Pressure Altitude (Feet)
13.44.13.4	80,8	2000	13,5	525	76	6076
13.44.15.2	80,9	1999	13,5	525	76	5983
13.44.17.0	80,8	2002	13,4	524	78	5983
13.44.18.7	84	1989	18,4	546	76	5983
13.44.20.5	86,2	2006	22,4	559	78	5983
13.44.22.3	86,3	2000	21,9	557	76	5983
13.44.24.1	86,3	1999	21,9	559	78	5916
13.44.25.8	87,7	2010	24,6	570	78	5916
13.44.27.6	87,6	2005	24,1	572	78	5916
13.44.29.4	87,6	1997	24,4	573	78	5916
13.44.31.2	87,6	2003	24,2	574	78	5916
13.44.33.0	87,6	2001	24,4	574	78	5916
13.44.34.7	87,6	2005	24,4	575	78	5843
13.44.36.5	87,5	2001	24,3	575	80	5843
13.44.38.3	87,2	1997	23,6	572	78	5843
13.44.40.1	87,1	2001	23,6	573	78	5843
13.44.40.1	87,2	1997	23,7	572	78	5843
13.44.43.6	87,2	1998	23,47	573	76	5843
13.44.45.4	87,2	1998	23,7	574	76	5790
13.44.47.2	88,3	2014	25,9	579	76	5790
13.44.49.0	89,4	1997	27,8	592	76	5790
13.44.50.7	87,2	1999	27,8	593	76	5790
13.44.52.5	89,4	1998	28	594	76	5790
13.44.54.3	93,3	1978	36,7	632	76	5757
13.44.56.1	93,1	1998	36,4	637	76	5757
13.44.57.8	92,8	1990	35,3	636	74	5757
13.44.59.6	92,1	2002	33,9	628	76	5757
13.45.01.4	95	1989	40,8	659	74	5757
13.45.03.2	93,9	1983	37,9	659	74	5757
13.45.05.0	92,1	1990	34,1	639	74	5764

Time	Compressor RPM (%)	Propeller RPM	Torque (PSI)	Turbine Temperature (°C)	IAS (Knots)	Pressure Altitude (Feet)
13.45.06.7	89,9	1988	28,8	659	74	5764
13.45.08.5	80,8	1947	12,3	537	73	5764
13.45.10.3	72,3	1607	28,8	659	74	5764
13.45.12.1	77,9	1397	14,1	554	56	5764
13.45.13.9	74,2	1418	11	516	51	5764
13.45.15.6	81,2	1521	18,6	559	0	5764
13.45.17.4	94,1	1885	35,2	654	0	5764
13.45.19.2	89,5	0	35,6	642	0	5764
13.45.21.0	89,6	0	35,6	631	0	5764
13.45.22.7	77,5	0	33,7	554	0	5764
13.45.24.5	47,7	0	19,3	390	0	5764
13.45.26.3	31,3	0	12,9	314	0	5764
13.45.28.1	31,3	0	11,4	302	0	5764
13.45.29.9	28,9	0	11,4	302	0	5764
13.45.31.6	28,9	0	11,4	302	0	5764
13.45.33.4	31,3	0	12,9	314	0	5764

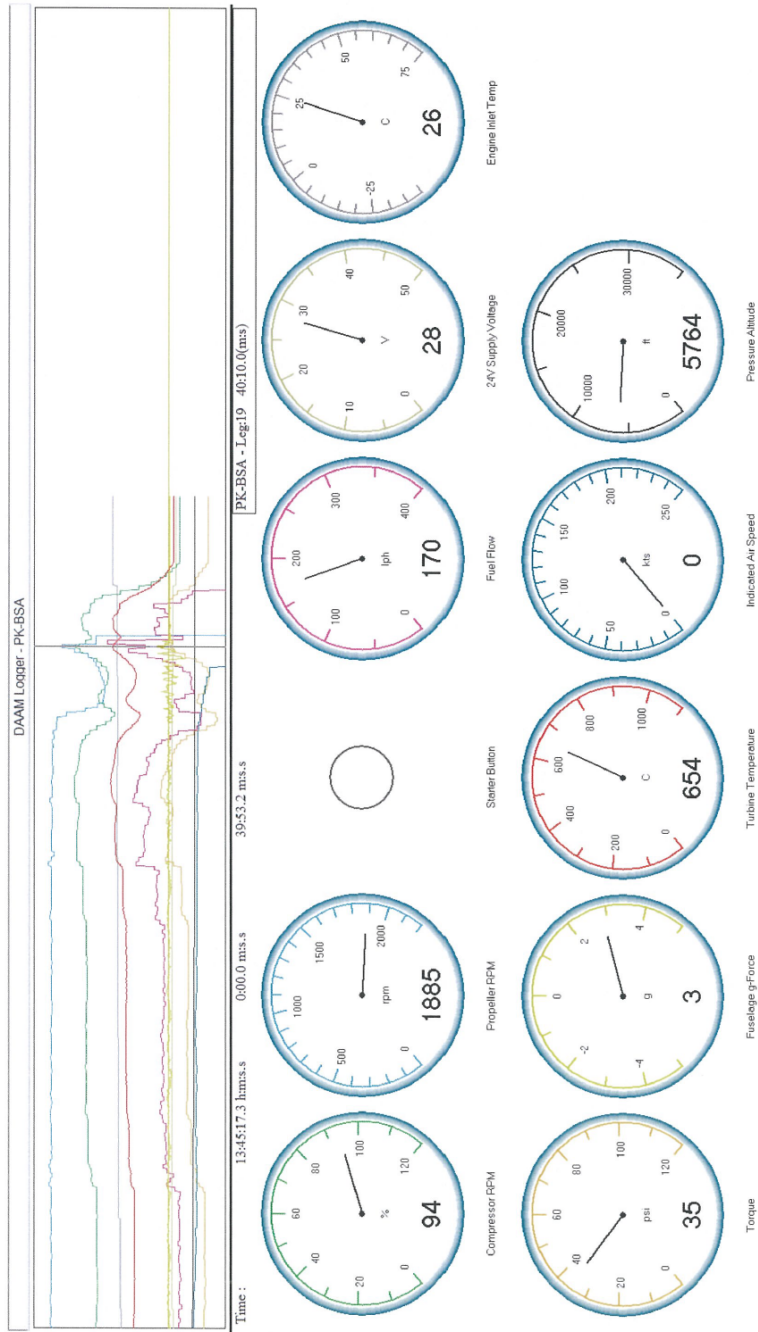
6.2 Appendix B: Data Acquisting Alarm Monitoring System.



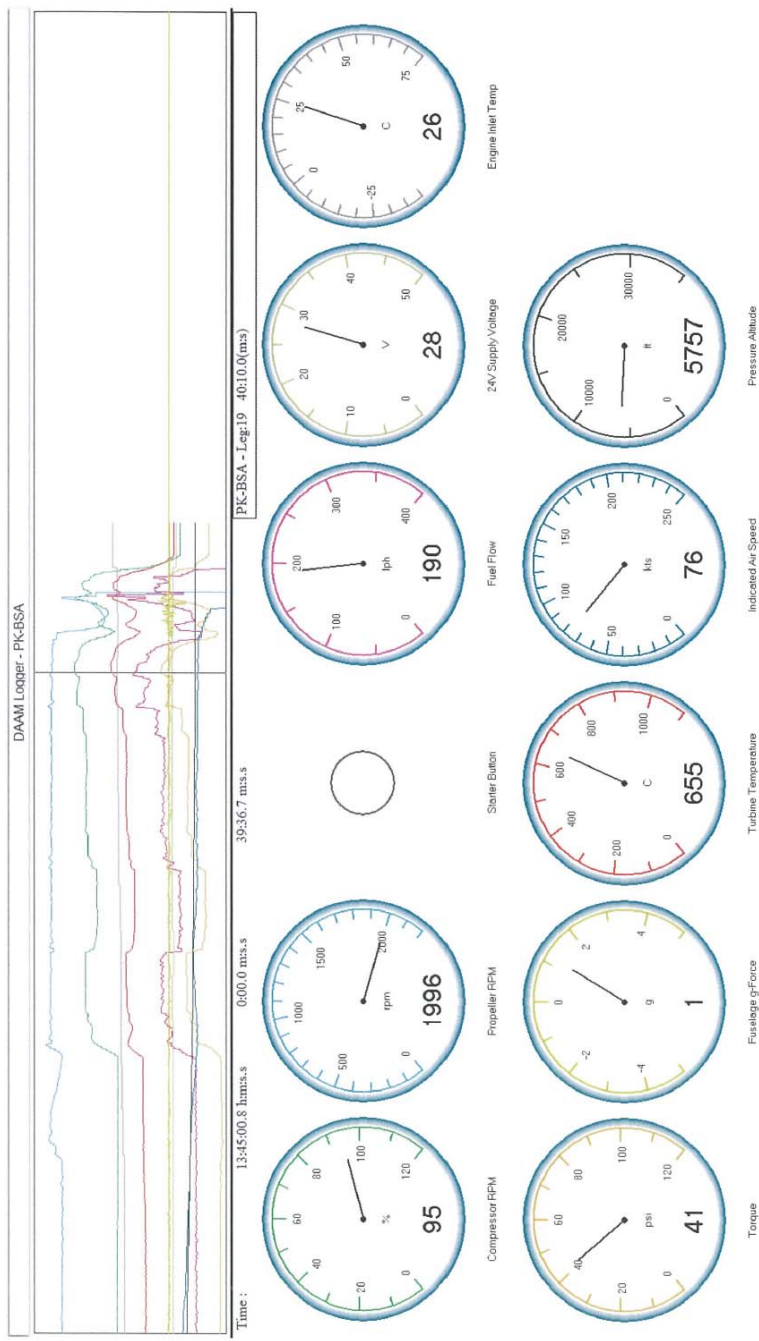
PK-BSA – Approach



Just before touch-down



Impact



On ground, reverse selected