NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

November 15, 2017

Group Chairman's Factual Report

OPERATIONAL FACTORS

CEN17FA168

Table Of Contents

A. ACCIDENT

Location: Amarillo, Texas
Date: April 28, 2017
Time: 2348 CDT (central daylight time)
0448 UTC
Airplane: Pilatus PC-12, N933DC

B. OPERATIONAL FACTORS GROUP

Marvin Frantz
Group Chairman
Operational Factors Division (AS-30)
National Transportation Safety Board

Chris McVay
Aviation Safety Inspector
Kansas City Aircraft Evaluation Group
Federal Aviation Administration

Zachary Forsberg
Chief Pilot
Rico Aviation LLC

C. SUMMARY

On April 28, 2017, about 2348 CDT[1], a Pilatus PC-12 airplane, N933DC, impacted terrain near Rick Husband Amarillo International Airport (AMA), Amarillo, Texas. The airline transport pilot and two medical crewmembers were fatally injured. The airplane was destroyed. The airplane was registered to and operated by Rico Aviation LLC, under the provisions of 14 *Code of Federal Regulations* (CFR) Part 135 as an on-demand flight. Instrument meteorological conditions prevailed at the time of the accident and the flight was operated on an instrument flight rules (IFR) flight plan. The flight had departed AMA and was en route to Clovis Municipal Airport (CVN), Clovis, New Mexico.

D. DETAILS OF THE INVESTIGATION

April 30, 2017

The Operational Factors investigator arrived in Amarillo at 1230 CDT and met with the Investigator in Charge (IIC) from the National Transportation Safety Board (NTSB) Central Region Office. After receiving a briefing on the accident, the IIC, FAA party coordinator, and the Operational Factors investigator met with the owner and Director of Operations (DO) of Rico Aviation and visited the accident site for a brief survey. A document binder recovered previously at the accident site that contained flight and airplane specific information was received from Rico Aviation.

[1] Unless otherwise noted, all times in the report are CDT.

The IIC conducted an evening progress meeting at the hotel where the other investigative personnel were staying.

May 1, 2017
The Group Chairman conducted a brief walk-through and photographed the accident site. Data requests were made to the Rico Aviation DO. Documents were reviewed and fueling records from TAC Air AMA were obtained.

The documents recovered from the accident site the previous evening were sorted, scanned and reviewed, and interviews were scheduled. Two video clips from airport cameras that showed the accident airplane taxiing and taking off were also reviewed.

May 2, 2017

Research on other air ambulance operators in the area was conducted. Interviews with the Rico Aviation DO, Chief Pilot, the medical dispatcher who was on duty at the time of the accident, and a flight nurse who had recent experience flying with the accident pilot were requested. The FAA group member was identified and scheduled to assist in group activities beginning on May 3, 2017.

May 3, 2017

The ops group conducted an internal briefing, and interviews were conducted with the Rico Aviation DO, Chief Pilot, the medical dispatcher who was on duty at the time of the accident, and a flight nurse who had recent experience flying with the accident pilot.

May 4, 2017

Field notes were completed and provided to the IIC. The field phase of the Ops group investigation concluded.

E. FACTUAL INFORMATION

1.0 History of the Flight

The accident pilot came on duty at 1900 on April 28, 2017. The first notification of a potential air-ambulance mission came at 2248. The mission was to transport a patient from Clovis, New Mexico, to Lubbock, Texas. There was a delay in the mission while receiving arrangements were made for the patient at the destination medical facility. During the delay, the pilot continued his flight preparation, including requesting and receiving his air traffic control (ATC) clearance. Final acceptance of the mission by the Rico Aviation medical dispatcher and the pilot came at 2334. The accident flight was scheduled to operate from AMA to CVN to pick up the patient for transport. According to ATC records, at 2332:40 the flight received an IFR clearance to proceed direct to Clovis Municipal Airport, and to climb to 8,000 feet mean sea level (msl). At 2341:54, the pilot requested taxi clearance from the AMA ground controller, and at 2343:50, he received take-off clearance from the AMA ATC tower.

The airplane departed runway 04 with ATC instructions to turn right on course direct to CVN. In addition to the pilot, there were two medical crewmembers onboard the airplane. According to radar data, at about 400 feet above ground level (agl), the airplane began a right turn toward CVN, which resulted in a heading of about 230°. In the next 60 seconds, the pilot continued the right turn, then stopped turning after overshooting by about 10-15 degrees as he passed through 4,800 feet msl (900 feet agl). The airplane maintained heading and gained another 900 feet of altitude in the next 11 seconds before it turned back to the left and gained another 300 feet of altitude in the next 10 seconds. The airplane then stopped climbing after reaching 6,000 feet msl, but continued in a left turn. Over the course of the next 20 seconds, the airplane descended 1,300 feet to an altitude of 4,700 feet msl, and increased the rate of turn to the left. The final radar return occurred at an altitude of 4,700 feet. For more information on the flightpath, see the NTSB Aircraft Performance Radar and /Simulation Study.

The flight lasted fewer than three minutes. According to ATC transcripts, at 2346:11, the tower controller asked the pilot to change his transponder code to the code assigned in the flight's initial clearance. The pilot complied, and was then instructed to change frequency to contact the AMA departure controller. The pilot's initial radio contact with the departure controller was at 2346:56, at an altitude of 6,000 feet msl. There was no further communication from the airplane. Surveillance video from a nearby truck-stop showed the airplane descending out of the low cloud layer at a high rate of speed and about a 45° angle, followed by impact with the ground and an explosion. The wreckage was located in a field about 1.5 miles south of the Amarillo airport.

An Automated Surface Observing System (ASOS) weather observation made 9 minutes after the takeoff reported winds to be from the north (360°) at 16 knots, gusting to 28 knots, 10 miles visibility, a broken cloud layer at 700 feet agl and an overcast layer at 1200 feet agl.

2.0 Flight Crew Information

2.1 The Pilot-in-Command (PIC)

The flight was operated by a single pilot acting as PIC. The pilot was 57 years old and had been employed at Rico Aviation since November 2016.

While employed at Rico Aviation the pilot had flown with the DO, the Chief Pilot, and the contracted flight instructor who trained Rico Aviation pilots in the PC-12. None reported any concerns or issues with the pilot's flying skills. They also stated there were no difficulties during the pilot's PC-12 training.

A medical crewmember (non-pilot) who had flown with the accident pilot about 20-24 times, stated in an interview that there was a recent occurrence that he considered unusual. On a flight with the pilot several days before the accident, the crewmember reported an abrupt level-off shortly after takeoff, followed by a brief descent. The remainder of the flight was uneventful. After the flight, the pilot explained that he had forgotten to get a clearance, and that he had to stay out of the clouds.

This medical crewmember, the DO, and the Chief pilot all reported hearing no negative comments from other Rico Aviation employees about the pilot's performance. The medical crewmember mentioned above, and the Chief Pilot each reported no known personal or medical issues which could affect the pilot's performance.

Prior to his employment at Rico Aviation, the pilot had worked for four different 14 CFR Part 135 operators as a PIC. For information on this employment, see section 2.7 below.

2.2 The PIC's Pilot Certification Record

FAA records indicated the following certificates were issued to the PIC:

Mechanic Powerplant certificate issued October 27, 1984

Private Pilot – Airplane Single Engine Land certificate issued January 11, 1990

Repairman – Experimental Aircraft Builder certificate issued December 6, 1991

Ground Instructor – Advanced-Instrument certificate issued August 2, 1993

Notice of Disapproval - Flight Instructor Rotorcraft Gyroplane issued September 14, 1993
Areas for reexamination: Flight Instructor Responsibilities, Logbook Entries, All Flight Maneuvers-None tested. First Attempt.

Commercial Pilot – Rotorcraft-Gyroplane, Private Privileges Airplane Single Engine Land certificate issued September 14, 1993

Flight Instructor – Rotorcraft-Gyroplane certificate issued September 16, 1993
Renewed September 25, 1995; September 7, 1997; September 18, 1999; September 19, 2001

Commercial Pilot – Rotorcraft-Gyroplane, Private Privileges Airplane Single Engine Land, Instrument Airplane certificate issued January 28, 1997.

Commercial Pilot – Rotorcraft-Gyroplane, Airplane Single Engine Land, Instrument Airplane certificate issued November 15, 2000.

Commercial Pilot – Rotorcraft-Gyroplane, Airplane Single and Multiengine Land, Instrument Airplane certificate issued December 15, 2000.

Flight Engineer - Turbojet Powered certificate issued May 3, 2001.

Commercial Pilot – Rotorcraft-Gyroplane, Airplane Single Engine Land and Sea, Airplane Multiengine Land, Instrument Airplane certificate issued August 4, 2002.

Flight Instructor – Rotorcraft-Gyroplane, Airplane Single Engine certificate issued September September 30, 2002.

Flight Instructor – Rotorcraft-Gyroplane, Airplane Single Engine, Instrument Airplane certificate issued October 10, 2002.

Flight Instructor – Rotorcraft-Gyroplane, Airplane Single and Multiengine, Instrument Airplane Certificate issued June 30, 2003.

Commercial Pilot – Rotorcraft-Gyroplane, Airplane Single Engine Land and Sea, Airplane Multiengine Land and Sea, Instrument Airplane certificate issued May 4, 2004.

Flight Instructor – Rotorcraft-Gyroplane, Airplane Single and Multiengine, Instrument Airplane Gold Seal certificate issued December 13, 2004. Renewed April 7, 2005; June 10, 2007; May 3, 2009; May 8, 2011; May 5, 2013; May 27, 2015.

Airline Transport Pilot – Airplane Multiengine Land, Commercial Privileges Airplane Single Engine Land, Airplane Single Engine Sea, Airplane Multiengine Sea, Rotorcraft-Gyroplane certificate issued November 10, 2011.

2.3 The PIC's Certificates and Ratings Held at Time of the Accident

Airline Transport Pilot issued November 10, 2011
Airplane Multiengine Land: Commercial Privileges Airplane Single Engine Land and Sea; Airplane Multiengine Sea; Rotorcraft-Gyroplane

Flight Instructor issued May 27, 2015
Airplane Single and Multiengine; Instrument Airplane; Rotorcraft-Gyroplane
Gold Seal

Ground Instructor issued August 2, 1993
Advanced; Instrument

Flight Engineer issued May 3, 2001
Turbojet Powered

Mechanic issued October 27, 1984
Powerplant

Repairman dated December 6, 1991
Experimental Aircraft Builder
Aircraft: (pilot name) Model Fling-Wing
Serial No. 0001
Certification Date: December 6, 1991

FAA Medical Certificate issued January 19, 2017

Second Class
Limitations: Must have available glasses for near vision

2.4 The PIC's Training and Proficiency Checks Completed

The PIC's recent training history based on Rico Aviation records:

Date of Hire at Rico Aviation	October 26, 2016
Date Completed Rico Aviation Ground Training	December 8, 2016
Date Completed PC-12 Initial Flight Training	December 15, 2016
Date of Most Recent Part 135 Proficiency Check[2]	December 21, 2016
Date of Most Recent PIC Line Check[3]	December 21, 2016

2.5 The PIC's Flight Times

The PIC's flight times based on Rico Aviation records, Spur Aviation Services records, and pilot's resume:

Total flight time:	5,866 hours
Total PIC time:	5,759 hours
Total PC-12 time:	73 hours
Flight time previous 24 hrs:	0.3 hour[4]
Flight time last 30 days:	15 hours
Flight time last 90 days:	28 hours
Flight time last 365 days:	115 hours

2.6 The PIC's 72-Hour History

The pilot had been off duty from April 21, 2017 to the time when he reported for duty at 1900 on April 25, 2017. During the 13-hour duty period from 1900 on April 25, 2017 through 0800 on April 26, 2017, he flew a total of 1.4 hours. He returned for duty at 1900 on April 26, 2017, and did not fly in this duty period which ended at 0700 on April 27, 2017. He reported for duty again at 1900 on April 27, 2017, and flew .3 hours to Dalhart Municipal Airport (DHT) in Dalhart, Texas that evening, spending the duty period at DHT. The next morning, he flew another .3 hours back to AMA, before going off-duty at 0730 on April 28, 2017. He reported for duty at 1900 on April 28, 2017 and departed on the accident flight at 2344.

While on duty in Amarillo, Texas (April 25-26, 2017 and April 26-27, 2017), the pilot stayed at the Rico Aviation Hangar at the Amarillo airport. When on duty in Dalhart (April 27-28, 2017) the pilot stayed at a crew house in Dalhart, Texas provided by Rico Aviation. When off-duty in Amarillo, the pilot stayed at a local motel. The chief pilot stated that the accident pilot had

[2] Per 14 CFR 135.293 and 135.297.
[3] Per 14 CFR 135.299
[4] Does not include the accident flight.

checked out of the motel the morning of April 28, 2017, and his activities during the day were not known.

In an email to the IIC, the pilot's wife, who resided in another state, stated that the pilot did not have any problems adapting to the overnight duty schedule. She stated he would sleep during the day and stay awake when on duty overnight. When preparing to start an overnight duty schedule, he would get on that sleep/work schedule a day or two before to prepare. She was not aware of any sleep or health issues relating to his schedule. In the three days before the accident, she reported nothing unusual or out-of-the ordinary in any of her routine daily contacts with the pilot.

2.7 The PIC's Previous Employment

The Pilot Records Improvement Act (1996) (PRIA) required 14 CFR Part 121 and 135 air carriers to request and evaluate certain information concerning a pilot's training, experience, qualification, and safety background, from previous employers before that pilot may begin service with a new employer.

Rico Aviation was unable to provide any documents regarding PRIA information requests made to, or information received from, the accident pilot's previous employers. In an email, the Rico Aviation DO stated that he "did not get a PRIA from his previous employers" in reference to the accident pilot. In another email, the Lubbock Flight Standards District Office (FSDO), responsible for oversight of Rico Aviation's air carrier certificate, stated Rico Aviation did not comply with the PRIA requirements for the pilot.

The NTSB obtained records from PRIA checks on the pilot conducted by four former employers. Those records indicated that from March 2011 through September 2016, the pilot had worked for four 14 CFR Part 135 operators. During this period, he had passed 11 required proficiency checks. No record was found of any proficiency check failures. With the exception of the item listed below, no record was found of any significant difficulties in training or performance issues.

According to records received from Baron Aviation of Vichy Missouri, in March 2015, the pilot failed to meet the minimum course requirements in a recurrent training program. The training was conducted at the FlightSafety International Training Center in Wichita, Kansas. The pilot left the training after completing all the required ground training hours, and an additional two hours beyond the four hours of required simulator training.[5] Shortly thereafter, he resigned from Baron Aviation. In a telephone conversation with the Group Chairman, the DO at Baron Aviation stated he remembered that the pilot was reported by FlightSafety as "being behind the plane" during the simulator training.[6] He also remembered that the pilot was having difficulties renewing his pilot medical certificate during this period. He did not know any details of the medical issue. The DO had decided to send the pilot to the FlightSafety recurrent training, and then deal with the medical certificate after the pilot completed the recurrent training. The DO stated that the pilot had been to initial Part 135 training at FlightSafety in February 2014 when he had first joined Baron, and had no difficulties completing that training.

[5] See Attachment 4, Letter from Training Center
[6] See Attachment 9, Record of Conversation: Baron Aviation DO

2.8 The PIC's Medical and Pathological Information

For information on the pilot's medical background and FAA medical certificates, see the Medical Factual Report.

3.0 Airplane Information

Photo 1: Exemplar Pilatus PC-12 (not the accident airplane) (Source: Wikipedia)

The airplane was a Pilatus PC-12, a nine-passenger, single-engine, turboprop airplane. It was configured as an air-ambulance, with pilot and copilot seats, four seats in the cabin, and a patient bed. The airplane was manufactured in 1994, serial number 0105. The airplane was powered by a Pratt and Whitney PT-6A-67B engine.

The company was authorized by FAA Operations Specifications[7] to operate the airplane with an approved Minimum Equipment List (MEL)[8]. At the time of the accident, there were no known inoperative items on the airplane.

[7] Operations Specifications (Ops Specs) are issued to a carrier by the FAA and contain authorizations, limitations, and certain procedures under which each type of operation may be conducted by the certificate holder.
[8] Use of an FAA-approved MEL is a method that allows aircraft to continue to operate, with specified limitations,

For additional information on the airplane, see the Maintenance Factual Report.

3.1 Weight and Balance Information

The weight and balance computations done by the pilot prior to the departure used a pre-printed worksheet that contained information about himself and the two medical crewmembers, and included a patient weight of 180 pounds. According to Rico Aviation, there was no 180-pound patient carried on the accident flight. The worksheet also contained an 1,800-pound figure for fuel on-board at takeoff. It is not known how much fuel was actually aboard the accident flight at takeoff. The last fueling of the aircraft occurred at 1628 on April 27, 2017, when TACAir at AMA uploaded 200 gallons to the airplane. There is no record of what the total fuel onboard was at that point. After the fueling, and before the accident flight's departure, the airplane made one round-trip flight between Amarillo and Dalhart, Texas, a total flight time of about 36 minutes.

In a phone conversation with the Chief Pilot, he indicated the standard practice was to depart for a mission with 2,000 pounds of fuel.[9] He thought the pilot may have entered 1,800 pounds of fuel and a 180-pound patient on his worksheet as weights he would be departing CVN with. The worksheet completed by the pilot is included as attachment 6.

Additionally, the worksheet did not contain the correct airplane empty weight. Following modification of the pitot-static system in August 2016, a new empty-airplane weight and empty cg was calculated. This new empty-weight of 6,478.1 pounds, was not transferred to the worksheet that the pilot would normally use. That worksheet showed 6,472 pounds as the empty weight. The result was that the actual empty-weight of the plane was 6 pounds greater than the information the pilot used in his calculations.

The NTSB performed a weight and balance computation using the correct empty-weight, not including the patient weight of 180 pounds, and using the Chief Pilot's estimate of 2,000 pounds for the fuel. This calculation showed the airplane weight to be under the maximum allowed takeoff weight, and within the center of gravity limits listed in the Airplane Flight Manual for the computed takeoff weight.

	Weight Description	Pilot calculated	NTSB calculated
	Basic Empty Weight (BEW)	6,472*	6,478.1
	Pilot Weight	230	230
	Medical Personnel weight	420	420
	Patient weight	180	0
	Baggage Weight	200	200
	Zero Fuel Weight	7,502	7,328

despite certain inoperable components.

[9] See Attachment 10: Record of Conversation: Rico Aviation Chief Pilot

	Maximum Zero Fuel Weight	**9,039***	**9,039**
	Fuel Weight	1,800	2,000
	Takeoff Weight	9,302	9,328
	Maximum Structural Takeoff	**9,921***	**9,921**
	Takeoff CG Limits (per Airplane Flight Manual)	221-242 inches aft of datum*	229.5-241.5 inches aft of datum
	Takeoff Center of Gravity (CG)	236.9	236.0

* numbers from the pre-printed worksheet the pilot used

4.0 Meteorological Information

At 2253, about 50 minutes before the accident flight's takeoff, and the last weather observation available for receipt by the pilot, the ASOS at AMA was reporting 10 miles visibility, with winds from 010 degrees at 20 knots gusting to 27 knots. There was a broken could layer at 600 feet agl, and an overcast cloud layer at 3,700 feet agl. The temperature was 8°C, and the dew-point temperature was 7°C, and the altimeter setting was 29.77 inches of mercury (in. hg). The lower cloud layer was reported as variable between 400 and 1,300 feet agl. A thirty-minute period of rain had ended about 30 minutes before this observation was issued.

The next regularly-scheduled ASOS observation was issued at 2353, a few minutes after the accident occurred. This observation reported winds from 360 degrees at 21 knots gusting to 28 knots, 10 miles visibility, a broken layer of clouds at 700 feet agl and an overcast layer at 1,200 feet agl. The cloud ceiling was reported as variable between 500 and 900 feet agl. The temperature was 7°C, and the dew-point temperature was 7°C. The altimeter setting was 29.78 in. hg. A peak wind from 360 degrees at 32 knots had occurred at 2326 (about 18 minutes before the flight's takeoff). The report also indicated rain began at 2314 and ended at 2325.

There were no PIREPs[10] for the Amarillo area in effect at the time of the flight's departure.

The crew of a regional jet that landed about 25 minutes prior to the departure of the accident flight was contacted about two weeks after the accident. They stated that they remembered nothing abnormal about the flight, and had encountered some "light chop to light turbulence" during their approach to landing. They did not make or receive any PIREPs about conditions at Amarillo.

The flight crew of a Boeing 737 that departed less than an hour after the accident flight was contacted about 3 weeks after the accident. The captain and the first officer both stated they remembered moderate to heavy turbulence during their departure from Amarillo that night. The crew did not make or receive any PIREPs concerning the turbulence.

For additional weather information, see the Meteorology Group Chairman's Factual Report.

[10] Pilot Reports (PIREPs) are reports of in-flight weather conditions made by pilots and maintained and disseminated to other pilots by the FAA or air traffic control personnel.

5.0 Aids to Navigation

There were no known navigational aids issues.

6.0 Communications

There were no known communications issues.

7.0 Airport Information

Rick Husband Amarillo International Airport is in class C airspace. The control tower operated from 0600-0000 daily. AMA approach and departure radar services were also available during these hours. After hours, approach and departure services for the airport shifted to Albuquerque Center. The airport had four runways, 04/22 and 13/31. The FAA airport diagram for AMA is shown in figure 1.

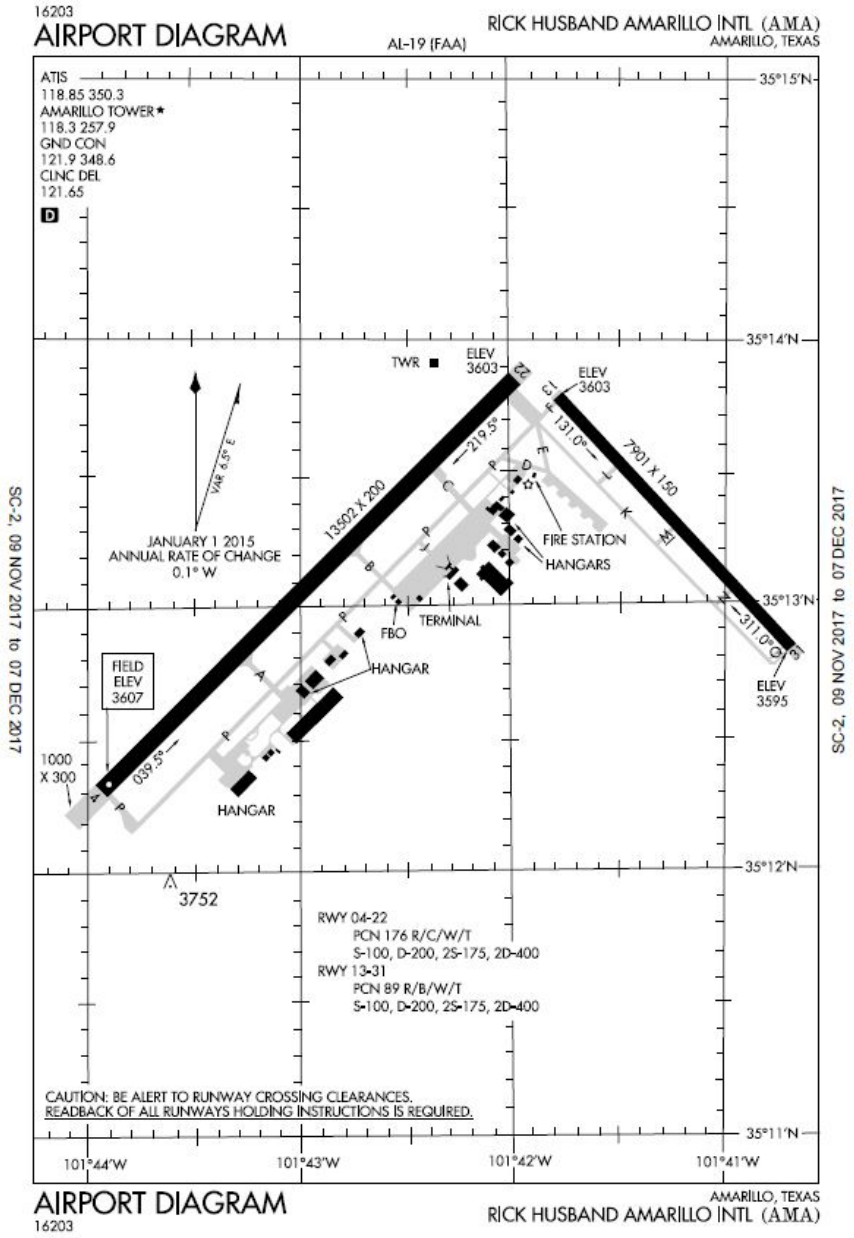


figure 1: Rick Husband Amarillo International Airport Diagram
(Source: Federal Aviation Administration)

8.0 Company Information

According to the company Operations Specifications A001, Rico Aviation was authorized to conduct 14 CFR Part 135 on-demand operations. The company was based at AMA in Amarillo, Texas. In addition to the accident airplane, the company operated two Cessna Conquest CE-441 and one Cessna Citation CE-525A airplanes. Rico Aviation had been operating for 20 years. The

owner and president was the current DO. The FAA FSDO in Lubbock, Texas provided oversight for Rico Aviation. Both the Chief Pilot and the DO had been designated by the FAA as company flight instructors.

Rico Aviation operated air-ambulance flights typically consisting of one pilot, one to two medical crewmembers, and a patient.

8.1 Company Training

According to Rico Aviation training records for the accident pilot, Rico Aviation instructors conducted the basic indoctrination, emergency, hazardous materials, and specialty ground training required by 14 CFR Part135. The pilot completed that training December 8, 2016. The records indicated that the training was provided by the DO and the Chief Pilot.

For Pilatus PC-12 airplane-specific ground and flight training, Rico Aviation contracted with ACFT Services, LLC. Rico Aviation training records did not show the dates of the airplane-specific ground training that ACFT Services provided. Rico Aviation records indicated initial flight training in the PC-12 occurred between October 26, 2016 and October 28, 2016, and was conducted by the ACFT Services instructor. ACFT Services issued the pilot a certificate of completion of training dated October 28, 2016. ACFT Services also kept records of the training they provided.[11] Further flight training was provided by the Rico Aviation DO on December 14, 2016 and by the Rico Aviation Chief Pilot on November 15, 2016, and December 15, 2016.[12]

Title 14 CFR 135.324(a) stated the following in part:

> *Other than the certificate holder, only another certificate holder certificated under this part or a training center certificated under part 142 of this chapter is eligible under this subpart to conduct training, testing, and checking under contract or other arrangement to those persons subject to the requirements of this subpart.*

For an outside organization that met the above requirement to conduct training for 14 CFR Part 135 certificate holder such as Rico Aviation, that organization must be listed on FAA Ops Spec A031, issued to the Part 135 operator by the FAA. ACFT Services, LLC was not a certificate holder under either 14 CFR Part 135 or 14 CFR Part 142, as required by 14 CFR 135.324(a), and was not listed on the A031 Ops Spec issued to Rico Aviation.[13]

9.0 Relevant Airplane Systems

9.1 Autopilot

The airplane was equipped with a Honeywell KFC 325 autopilot. According to maintenance records and interviews, the airplane had multiple logged discrepancies associated with the autopilot.[14] In a letter to the NTSB, the owner of ACFT Services, LLC confirmed that this

[11] See Attachment 5: LCFT Services, LLC Pilot Training Records
[12] See Attachment 3: Rico Aviation Pilot Training Records
[13] See Attachment 7: Rico Aviation Operations Specification A031
[14] See Attachment 1: Interview Summaries, and Attachment 8, N933DC Maintenance Log Page.

problem was an issue with other PC-12s he described as “legacy” airplanes, and those with serial numbers from 101-888.[15] According to interviews, the issue involved a fault which lead to the autopilot’s inability to adjust the horizontal stabilizer trim. For more information on the autopilot system, see Systems Group Chairman’s Factual Report.

Airplane maintenance logs (Attachment 8) show this problem was noted twice in the previous 5 months. The accident pilot wrote-up the discrepancy on December 21, 2016, and another Rico Aviation pilot did the same on April 26, 2017.

According to interviews, the recurring malfunction was typically annunciated to the pilot with an airplane master warning light, an autopilot-trim warning tone (continuous beeping), red *TRIM* light on the autopilot mode control panel, (figure 2), and a red *A/P TRIM* light on the Crew Alerting and Warning System (CAWS) panel (figures 3). The autopilot would automatically disengage.

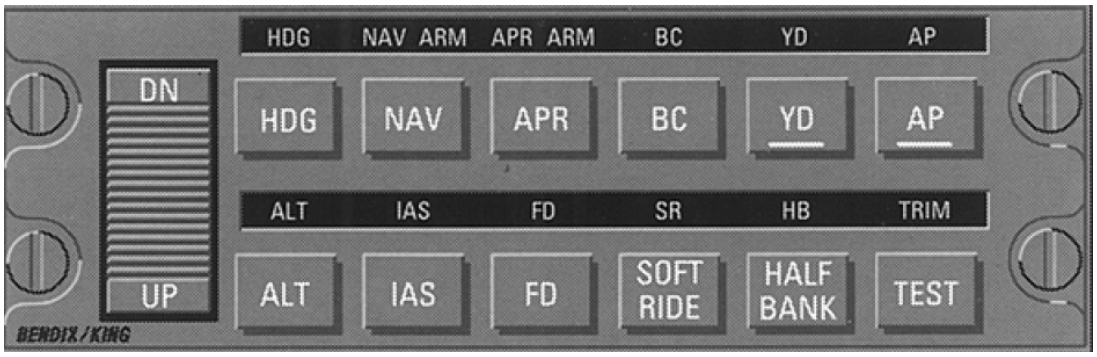


Figure 2: Honeywell KFC 325 Autopilot Control Mode Panel (source: Bendix King)

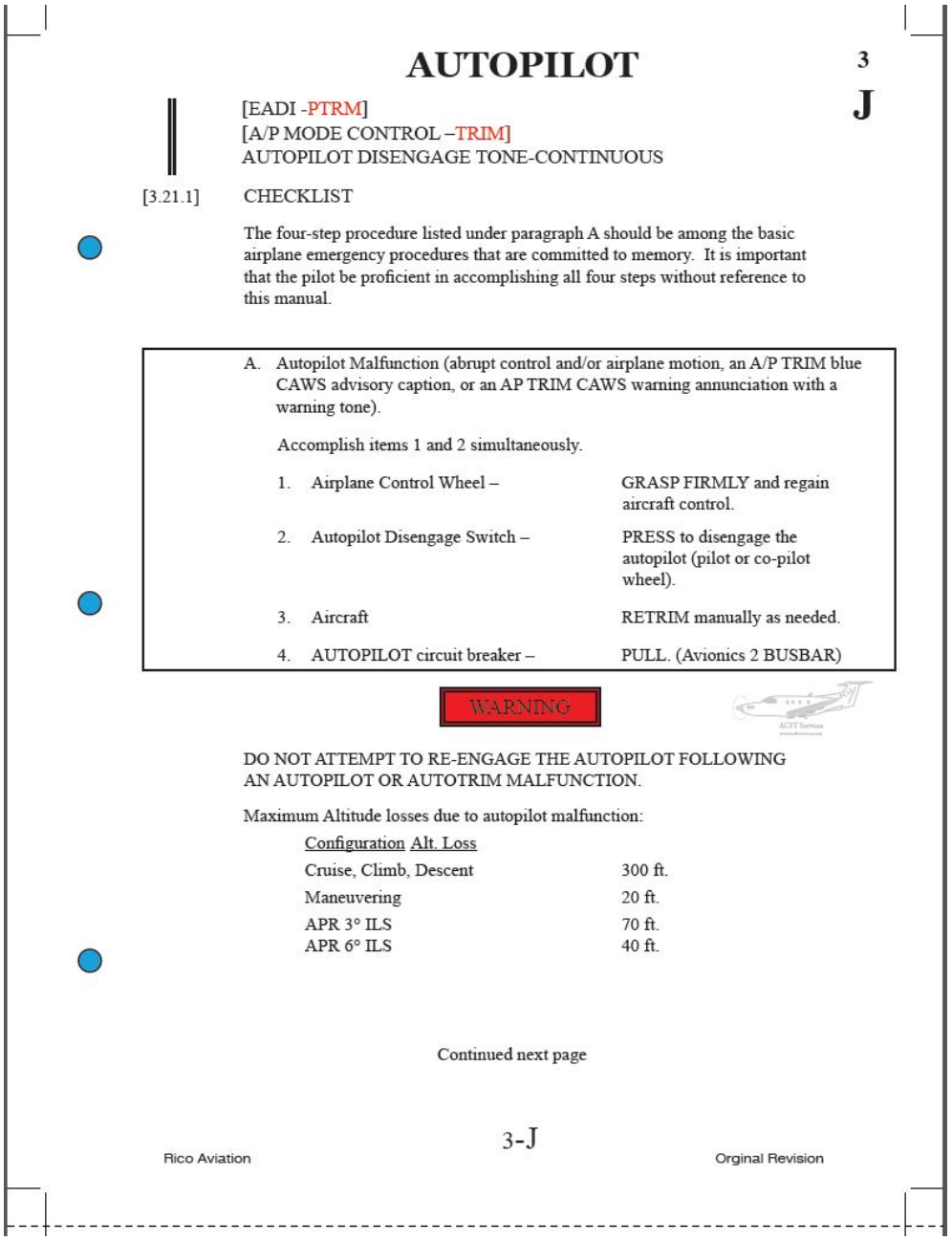
PASS DOOR	CAR DOOR	CAB PRESS	AIR/GND	PROP LOW P	A/P TRIM
ESNTL BUS	AV BUS	STAB TRIM	OIL QTY	ENG FIRE	A/P DISENG
GEN 1 OFF	GEN 2 OFF	BUS TIE	PUSHER	FIRE DETECT	PUSHER ICE MODE
BAT OFF	INVERTER	BAT HOT	FLAPS	CHIP	N ESNTL BUS
L FUEL LOW	FUEL PRESS	HYDR	ECS	AOA DE ICE	R FUEL LOW
L FUEL PUMP	PASS OXY	DE ICE	INERT SEP	PROBES DE ICE	R FUEL PUMP
IGNITION	DE ICE BOOTS	WSHLD HEAT	PROP DE ICE	COOL	A/P TRIM

Figure 3: PC-12 CAWS Panel (source: Systems Group Chairman's Factual Report)

[15] See Attachment 2, Letter from ACFT Service, LLC Instructor

The Rico Aviation Chief Pilot stated in an interview that when this malfunction occurred, the only way to get the continuous beeping alert to stop and to extinguish the red *TRIM* and *A/P TRIM* lights was to press the autopilot test button on the autopilot mode control panel. The ACFT Services instructor stated that in his experience teaching in the PC-12, pressing the autopilot TEST was what most PC-12 pilots would do when faced with this type of malfunction.

The PC-12 Airplane Flight Manual (AFM), and Rico Aviation's PC-12 Emergency Procedures Manual provided actions to be taken upon the occurrence of this problem. These actions did not involve testing the autopilot to stop the repeating tone and reset the system. The procedure called for the pilot to disengage the autopilot and then remove power from it by pulling the autopilot circuit breaker. An excerpt from the Rico Aviation PC-12 Emergency Procedures is shown at figure 4.



AUTOPILOT

3

J

[EADI -PTRM]
[A/P MODE CONTROL –TRIM]
AUTOPILOT DISENGAGE TONE-CONTINUOUS

[3.21.1] CHECKLIST

The four-step procedure listed under paragraph A should be among the basic airplane emergency procedures that are committed to memory. It is important that the pilot be proficient in accomplishing all four steps without reference to this manual.

A. Autopilot Malfunction (abrupt control and/or airplane motion, an A/P TRIM blue CAWS advisory caption, or an AP TRIM CAWS warning annunciation with a warning tone).

Accomplish items 1 and 2 simultaneously.

1.	Airplane Control Wheel –	GRASP FIRMLY and regain aircraft control.
2.	Autopilot Disengage Switch –	PRESS to disengage the autopilot (pilot or co-pilot wheel).
3.	Aircraft	RETRIM manually as needed.
4.	AUTOPILOT circuit breaker –	PULL. (Avionics 2 BUSBAR)

WARNING

DO NOT ATTEMPT TO RE-ENGAGE THE AUTOPILOT FOLLOWING AN AUTOPILOT OR AUTOTRIM MALFUNCTION.

Maximum Altitude losses due to autopilot malfunction:

Configuration	Alt. Loss
Cruise, Climb, Descent	300 ft.
Maneuvering	20 ft.
APR 3° ILS	70 ft.
APR 6° ILS	40 ft.

Continued next page

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Rico Aviation Orginal Revision

Figure 4: Excerpt from Rico Aviation PC-12 Emergency Procedures (source: Rico Aviation)

It is not known if the pilot engaged the autopilot during the accident flight. The flight reached 1,000 feet agl (the minimum altitude allowed by the manufacturer for autopilot use) about 80 seconds after takeoff, immediately after completing the right turn towards Clovis, New Mexico.

For more information on the autopilot system, see the Systems Group Chairman's Factual Report.

9.2 Autopilot Use Procedures and Training

According to the ACFT Services instructor who provided the PC-12 flight training to the accident pilot, pilots were taught to follow the manufacturer's limitation as to when to engage the autopilot after takeoff. In the PC-12 AFM, Pilatus stated that the autopilot must not be engaged when the airplane is below 1,000 feet agl. The standard procedure at Rico Aviation, confirmed by the Chief Pilot, was to engage the autopilot at 1,000 feet after takeoff, or when comfortably established in the climb.[16]

The Chief Pilot had flown with the accident pilot on several occasions, and had conducted flight instruction with him in preparation for his Part 135 proficiency check.[17] He stated that the accident pilot used the autopilot normally, and had good knowledge of the autopilot, but could fly fine without it.

The Rico Aviation training records also indicated that the DO had flown with him 7 days before the pilot's proficiency check. The DO also stated he had flown with the pilot about a month before the accident on a repositioning flight, and after the accident pilot's proficiency check. During these flights, he noticed no areas that needed extra training. He thought the accident pilot would rather hand-fly the airplane than use the autopilot.

F. LIST OF ATTACHMENTS

Attachment 1: Interview Summaries
Attachment 2: Letter from ACFT Services, LLC Instructor
Attachment 3: Rico Aviation Pilot Training Records
Attachment 4: Letter from Training Center
Attachment 5: ACFT Services, LLC Pilot Training Records
Attachment 6: Rico Aviation Weight and Balance Worksheet
Attachment 7: Rico Aviation Operations Specification A031
Attachment 8: N933DC Maintenance Log Page
Attachment 9: Record of Conversation: Baron Aviation DO
Attachment 10: Record of Conversation: Rico Aviation Chief Pilot

Submitted by:

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Marvin Frantz
Air Safety Investigator

[16] See Attachment 1, Interview Summaries, and Attachment 2, Letter from ACFT Services, LLC Instructor.
[17] See Attachment 3, Rico Aviation Pilot Training Records