# National Transportation Safety Board

Office of Aviation Safety
Washington, D.C. 20594

## Group Chairman's Factual Report

# OPERATIONAL FACTORS

NTSB ACCIDENT NUMBER: ERA17FA066

AIRCRAFT REGISTRATION: N765FA
AIRCRAFT TYPE: Fairchild SA-227AC
OPERATOR: Key Lime Air
ACCIDENT LOCATION: Camilla, GA

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## A. OPERATIONAL FACTORS GROUP

Adam Gerhardt - Chairman
Air Safety Investigator
National Transportation Safety Board

Brian M. Kilburn
Technical Programs Director
Key Lime Air

## B. SUMMARY OF ACCIDENT

On December 5, 2016, about 2222 eastern standard time[1], a Fairchild SA227-AC, N765FA, operating as Key Lime Air Flight 308 (LYM 308), was destroyed during a descent and subsequent inflight breakup near Camilla, Georgia. The airline transport pilot was fatally injured. Night instrument meteorological conditions prevailed and an instrument flight rules flight plan was filed. The flight originated at Northwest Florida Beaches International Airport (ECP) Panama City, Florida and was destined for Southwest Georgia Regional Airport (ABY) Albany, Georgia. The on-demand cargo flight was conducted under the provisions of 14 *Code of Federal Regulations* (CFR) Part 135.

## C. DETAILS OF THE INVESTIGATION

On December 6, 2016, the operations group chairman was notified of the investigation and he arrived at the accident site in Camilla, GA in the late afternoon. Upon arrival at the accident site, a brief meeting was held with the NTSB IIC and Federal Aviation Administration (FAA) Aviation Safety Inspector assigned to the accident before the team conducted basic accident site documentation before night conditions prevailed.

On December 7, 2016, the operations group chairman assembled the operations group at the accident site and had participants review and sign the NTSB Party Member Form. Numerous company documents and pilot records were requested, via email, from the Key Lime Air party member. The NTSB IIC, operations group chairman, and other party members completed the on-scene gathering of factual information. At the completion of the on-scene portion of the investigation, the Key Lime Air party member returned to their company headquarters in Englewood, CO to complete the NTSB information request.

On December 8, 2016, the investigation team[2] followed the airplane to the recovery facility in Griffin, GA to conduct the airframe and engine examination. The examination was completed on December 9 and this concluded the launch phase of the investigation.

The operations group chairman continued his investigative work via telephone interviews and email correspondence throughout the duration of the investigation. The operations group chairman attended the Cockpit Voice Recording (CVR) audition in Washington, DC on January 17, 2017 and the structures group wreckage layout in Griffin, GA on February 28 – March 3, 2017. The NTSB IIC and operations group chairman also visited the operators headquarters in Englewood, CO April 11 and 12, 2017 to interview management personnel.

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[1] All times are eastern standard time (EST) based upon the 24-hour clock, unless otherwise noted. The flight departed from central standard time (CST) and the destination airport and accident site were in EST. Local EST time is +5 hours to UTC, and UTC=Z.

[2]The Key Lime Air party member returned to their company headquarters in Englewood, CO to complete the NTSB information request and did not attend the examination in Griffin, GA.

## D. FACTUAL INFORMATION

### 1.0 History of Flight

About one hour before the scheduled departure time, the pilot completed the check-in call with the operator's flight follower located at the company headquarters and dispatch office in Englewood, CO. Subsequently, the United Parcel Service (UPS) package delivery driver arrived on-time at the departure airport with the cargo, but the pilot delayed the departure to continue to evaluate the weather conditions.

According to an email dated December 5th, 2016, from a flight follower on-duty, around 2140, which was already 10 minutes after the scheduled departure time, the customer (UPS) called the Key Lime Air dispatch office and wanted to "confirm flight LYM 308 [Key Lime Air Flight 308] will happen, noting if it doesn't depart soon, freight will not make service." About 2 minutes later, a flight follower called the pilot and the pilot explained "he [is] departing immediately to try to fly the clear weather corridor extending northeast toward ABY. If he can't get through the storms to his left, he will make TLH [Tallahassee International Airport, Tallahassee, FL] his alternate." The flight departed about 12 minutes later at 2154.

Review of air traffic control (ATC) voice communication provided by the FAA[3] revealed that while enroute, the air traffic controller in Jacksonville (JAX) Air Route Traffic Control Center (ARTCC) advised the pilot of a "ragged line of moderate, heavy, and extreme precip." along his planned route of flight to ABY. The air traffic controller also stated, "I don't show any breaks" in the weather.

Subsequently, the air traffic controller suggested a route of flight that would have had the pilot fly to the northeast for 70 nautical miles to avoid the most severe weather, if he had enough fuel for the diversion. The pilot responded that he did have enough fuel for such a diversion, but concluded that he would "see what the radar is painting" after the descent to 3,000 mean sea level (msl).

About 1 minute and 30 seconds later, during the descent from 7,000 feet msl to 3,000 feet msl, the air traffic controller stated "I just lost you on radar, I don't show a transponder, it might have to do with the weather." About 40 seconds later, the pilot advised the controller that he intended to deviate to the right of the course and the air traffic controller stated to the pilot that he could turn left and right as needed. Shortly thereafter, the pilot stated that "we're going to turn back around, Tallahassee." The air traffic controller cleared the pilot direct to Tallahassee International Airport (TLH) and instructed him to maintain 3,000 feet msl. The pilot responded "present position direct Tallahassee and we'll try to maintain 3000 here." The air traffic controller then stated "do you want to climb back up? I can offer you any altitude" and the pilot responded "we'll see if we can get it up to about 3000." The air traffic controller then recommended a heading of 180 degrees to "get you clear of the weather quicker" and the pilot responded with "alright 180." Shortly thereafter, radar data showed the airplane turning in right circles and subsequently radar contact was lost. There were no further communications from the pilot.

The wreckage was scattered over a large area that included a cotton field and dense forest. The debris field was about 2,640 feet in length and 1,500 feet in width, oriented toward 049 degrees true. The first components located along the debris field were the outboard sections of both

[3] The FAA provided the NTSB investigator-in-charge with an audio file that contained the communications between the pilot and FAA JAX ARTCC.

wings, which exhibited damage and paint transfer consistent with contact with the fuselage. Additional components located along the debris path included the empennage and the mid-span portions of both wings. The fuselage came to rest at the end of the debris path at the side of a residence. The fuselage, cockpit, cabin section, inboard wings, and both engines were destroyed or damaged by the postcrash fire.

## 2.0 Airplane Information

The airplane was a Fairchild model SA227-AC, N765FA. It was powered by two Honeywell TPE331-11U-611 turbine engines, rated at 1,000 shaft horsepower (maximum continuous thrust), and was equipped with McCauley four-bladed constant speed propellers.


**Photo 1: Picture of Accident Airplane**

## 3.0 The Operator – Key Lime Air

The operator, Key Lime Air, held 14 CFR Part 121 and 135 air operator certificates (KY7A882H) with the FAA. The accident flight was operated as a cargo flight under the provisions of 14 CFR Part 135. According to the company website, Key Lime Air was founded in 1997 and was headquartered in Englewood, Colorado. The operator reported that they employed 35 pilots and operated 30 airplanes at the time of the accident.

### 3.1 Key Lime Air's Company Operations Manual

Key Lime Air provided the NTSB with a copy of the "Part 135 Company Operations Manual (COM)." The manual was revision 11 with a control date of April 20, 2016. All Key Lime Air employees were required to conduct their duties and responsibilities in accordance with the policies and procedures. The COM was marked as an "Accepted Manual/ Program" signed by the Director of Operations (DO) and stated in part:

> *Corporate approval is required prior to implementation of any policies, procedures, and/ or standards contained herein. The program is considered "provisionally accepted"*

*upon submission to the CHDO. No FAA CHDO signature is required – record "Approval Not Required" in the FAA CHDO signature block below.*

## 4.0 Pilot in Command

The pilot in command was 40 years old and resided in Panama City Beach, FL. He was hired by Key Lime Air on October 13, 2008 and he began his pilot duty assignment on November 3, 2008, qualified for Pilot-in-Command (PIC) and Second-in-Command (SIC) flight operations on the SA-227-AC, BC, DC and SA-226 TC airplane. The pilot was qualified and current to act as PIC for the Part 135 cargo flight.

## 4.1 Certifications

The pilot in command held the following FAA pilot certifications and ratings:

Airline Transport Pilot, Airplane Multi-Engine Land
Type Rating – SA-227
Commercial Pilot, Airplane Single-Engine Land
Private Pilot, Airplane Single-Engine Sea, Glider
Flight Instructor, Airplane Single-Engine

The pilot held a first class medical certificate, which was issued on September 29, 2016, with no restrictions.

## 4.2 Flight Experience

The pilot reported at his most recent medical examination on September 29, 2016, that his total flight time was 11,133 hours. The operator provided the additional information regarding the pilot's flight experience with Key Lime Air (prior to the accident flight):

| **Experience:** | **Hours:** |
|---|---|
| Total time in make & model (SA-227): | 4,670 |
| Pilot in Command time, make and model: | 4,647 |
| Total time in make & model (SA-227), past 90 days: | 74 |
| Total time in make & model (SA-227), past 30 days: | 29 |
| Total time in make & model (SA-227), past 24 hours: | 0 |

## 4.3 Ground Training

The operator provided the pilot's training records detailing his ground training:

| **Ground Training:** | **Completion Date:** |
|---|---|
| Part 135 Annual Recurrent: | October 10, 2015 |
| Part 135 Annual Recurrent: | November 28, 2014 |
| Part 135 Annual Recurrent: | November 15, 2013 |
| Part 135 Annual Recurrent: | November 11, 2012 |
| Part 135 Annual Recurrent: | December 02, 2011 |
| Part 135 Annual Recurrent: | October 03, 2010 |

The pilot, as of the accident month (December, 2016), was in the grace month for the annual recurrent training requirements. Title 14 CFR 135.323(b) stated the following in part:

> *(b) Whenever a crewmember who is required to take recurrent training under this subpart completes the training in the calendar month before, or the calendar month after, the month in which that training is required, the crewmember is considered to have completed it in the calendar month in which it was required.*

Key Lime Air reported that the pilot was scheduled to complete recurrent annual training one week after the accident. The pilot's training records contained the following ground school tests:

| **Ground School Test**[4]**:** | **Date:** | **Result:** |
|---|---|---|
| Metro Systems Recurrent | October 10, 2015 | 100% |
| Metro Systems Recurrent | November 20, 2014 | 88% |
| Metro Systems Recurrent | November 15, 2013 | 91% |
| Part 135 Indoctrination Final Exam | November 15, 2013 | 86% |
| Metro Systems Exam (Year 3) | No Date Marked | 98% |
| Recurrent Year 2 | October 24, 2008 | 100% |

### 4.4 Proficiency Checks and Simulator Training

The pilot's training records dated back to 2008 and revealed no unsatisfactory proficiency checks. The pilot's initial pilot in command Part 135 airman competency/ proficiency check for the SA-227 airplane was completed on November 3, 2008.

The pilot's training records indicated that his most recent Part 135 airman competency/ proficiency check was completed on June 29, 2016 in a SA-227 AC airplane. According to the company record, the type of check met the requirements of FAR 135.293 (initial and recurrent pilot testing), 135.297 (instrument proficiency), and 135.299 (pilot in command: line checks: routes and airports). The check airman who conducted the check was a Key Lime Air pilot and flight instructor. The result of the check was satisfactory. In a postaccident interview with the check airman, he reported that the evaluation was "to standard" and that is all he could recall.

The pilot's most recent simulator training for the SA-227-DC airplane was completed on April 9, 2016. According to the company record, the type of training met the requirements of FAR 135.293 and 135.297. The check airman was a Key Lime Air pilot and flight instructor. The result of the check was satisfactory.

### 4.5 The Pilot in Command's Duties and Responsibilities

The COM stated that the pilot in command had the following responsibilities:

> *2.3.14 Pilot in Command (PIC)*
>
> *2.3.14.1 Responsible To*

[4] According to the Key Lime Air DO, the pilot was originally employed by Key Lime Air in 2001 and subsequently resigned for another flying job. The pilot returned to Key Lime Air in 2008 and the company had him take a recurrent year 2 test, rather than an indoctrination test. The DO was unaware of why the pilot took a test in 2013 marked as an indoctrination test.

*Chief Pilot*

*2.3.14.2 Duties and Responsibilities*

*The pilot in command of the aircraft is at all times directly responsible for, and is the final authority as to, the operation of that aircraft.*

*The pilot in command is ultimately responsible for the safety of his / her passengers and crew. He / she shall, before the loading of passengers, assign emergency evacuation duties to his / her crew. If in the event there is a passenger on board in need of another's aid in evacuation, an attendant (or passenger) shall be assigned to that person and be briefed on procedures by the pilot in command or flight attendant (as applicable).*

*He / she may delegate functions to other personnel but retains responsibility. He / she must be highly knowledgeable of the operations manual, FAA regulations, operations specifications, flight manuals, etc., and other instructions pertinent to his / her duties.*

*Prior to flight, each pilot in command is responsible for familiarizing him/herself with all available information concerning that flight. Specific duties are as follows:*

*1. Determine that his / her crew is legally certificated, adequately rested and in proper dress.*

*2. Briefs the SIC and flight attendant (if assigned) on normal and emergency procedures.*

*3. Plans flight assignments and obtains briefing information regarding purpose of the flight, weather, operating procedures and special instructions and files the appropriate flight plan(s) for the intended flight.*

*4. Prepare or supervise preparation of flight plans considering such factors as altitude, terrain, weather, range, weight, cruise control data, airport facilities and navigational aids.*

*5. Supervise crewmembers to ensure proper planning and flight preparations.*

*6. Ensure all required items are aboard aircraft in accordance with Chapter 5 of this manual.*

*7. Ensure aircraft is preflighted, inspected, loaded, equipped and manned for the flight assignment.*

*8. Inspect or supervises inspection of engines, fuselage and control surfaces for mechanical and structural soundness and proper operation of communications and navigational equipment.*

*9. Load and distributes cargo and / or passengers and determines that the weight and balance is within prescribed limitations per appropriate sample loading schedules, load computer or applicable information and graphs contained in the Aircraft Flight Manual.*

*10. Ensure cargo is properly secured and provisions for passenger's comfort and emergency equipment such as life rafts, life vests, etc., are aboard.*

*11. Operate aircraft at favorable altitude taking into account turbulence, oxygen requirements and comfort of passengers during flight.*

*12. Ensure proper preparation and execution of flight logs, records and required maintenance forms. Check "Aircraft Status Record" and applicable "Flight / Maintenance Log" to determine the airworthiness status of any aircraft prior to departure.*

*13. Verify through review of "Aircraft Status Record" and applicable "Flight / Maintenance Log" that any planned flight can be completed prior to the next scheduled maintenance.*

*14. Verify which flights or series of flights will be conducted under Part 91 or Part 135 (Key Lime Air is accountable and responsible for the safe operations of these flights or series of flights). All flights or series of flights with cargo or passengers will be conducted under Part 135 (except when authorized by Key Lime Air to conduct the flight under Part 91). All flights or series of flights without cargo or passengers will be conducted under Part 91 (except when authorized by Key Lime Air to conduct the flight under Part 135).*

*15. Obtain approval to operate the aircraft on each assigned flight or series of flights from Key Lime Air prior to departure. Key Lime Air ultimately holds the responsibility for operational control of all aircraft. Failure to adhere to Key Lime Air's directions and instructions, or compliance with directions or instructions from an aircraft owner (other than Key Lime Air), or any other outside private person or private entity, that are contrary to Key Lime Air's directions or instructions, while operating aircraft under the operations specifications, may be contrary to Parts 119 and/or 135, and therefore may be subject to legal enforcement action by the FAA.*

*2.3.14.3 OPERATIONAL CONTROL*

*The Pilot in Command is authorized to exercise operational control in all areas allowing the safe completion of each flight to which he/she is assigned. Operational control includes, but is not limited to, the following areas:*

*1. The PIC must obtain and check current and forecast weather for the applicable airports.*

*2. The PIC will do all flight planning to each flight they are assigned.*

*3. The PIC must select an alternate airport if applicable for the intended flight.*

*4. The PIC will load the aircraft within its applicable CG limits and weight limitations.*

*5. The PIC will check to make sure the aircraft is in airworthy condition prior to flight.*

### 4.6 Schedule and Flight Assignment

According to the operator, since 2008 the accident pilot's primary flight assignment was to operate the 14 CFR Part 135 cargo flight single-pilot between ECP and ABY (Key Lime Air Flight 308 – LYM308). The accident pilot was the sole pilot based at the departure airport. The flight was scheduled every weekday, Monday – Friday. According to an operator document titled, "Flight Duty Record" for the month of December 2016, the pilot's most recent flight duty ended on December 3 about 0830. The pilot was off-duty from this time until he checked in with Key Lime Air Dispatch one hour before the accident flight at 2030 on December 5, 2016. According to the operator, the small cargo feeder route contract for Key Lime Air Flight 308 had a scheduled departure and arrival time published:

| | |
|---|---|
| Scheduled Departure Time (ECP): | 2130 (0230Z) |
| *Actual Departure Time:* | *2154 (0254Z)* |
| Scheduled Arrival Time (ABY): | 2155 (0255Z) |

Upon arrival at ABY, the pilot would spend the night at the airport, where he had rest accommodations, and would return to flight duty at 0730 to complete the return flight (ABY to ECP). The flight schedule afforded the pilot with a rest time of 9 hours and 35 minutes and met the requirements of 14 CFR 135.265 (b) (1)[5]. According to the stored FAA flight plan for Key Lime Air Flight 308, the estimated time enroute (ETE) was 40 minutes, resulting in a scheduled arrival time of 2210, rather than the contract scheduled time of 2155.

## 5.0 The Pilot's Preflight Planning

### 5.1 Weather Briefing

The investigation was unable to determine the pilot's preflight weather planning source. According to Leidos Flight Services[6], they found no record of a verbal or internet-requested preflight weather briefing submission for the accident airplane (N765FA) or Key Lime Air Flight 308. The pilot did acknowledge to a Key Lime Air flight follower that he was aware of "extreme weather" in the area.

According to information provided by ForeFlight LLC., the accident pilot held an active account and entered in the accident route of flight in the application the night of the accident, but no full weather briefing requests were recorded. For additional information regarding the pilot's use of ForeFlight, see section titled: Electronic Flight Bag Application ForeFlight.

According to the operations specifications, Key Lime Air was authorized to the use "weather reporting facilities operated by the U.S. National Weather Service or a source approved by the U.S. National Weather Service." The operator's COM required flight crewmembers to obtain a weather briefing and in part stated:

*5.3 Weather Briefings*

[5] According to 14 CFR 135.265 (b) (1) - Flight time limitations and rest requirements: Scheduled operations, no flight crewmember may accept an assignment, for flight time during the 24 consecutive hours preceding the scheduled completion of any flight segment without a scheduled rest period during that 24 hours of at least 9 consecutive hours of rest for less than 8 hours of scheduled flight time.

[6] Leidos Flight Service was formerly known as Lockheed Martin Flight Service.

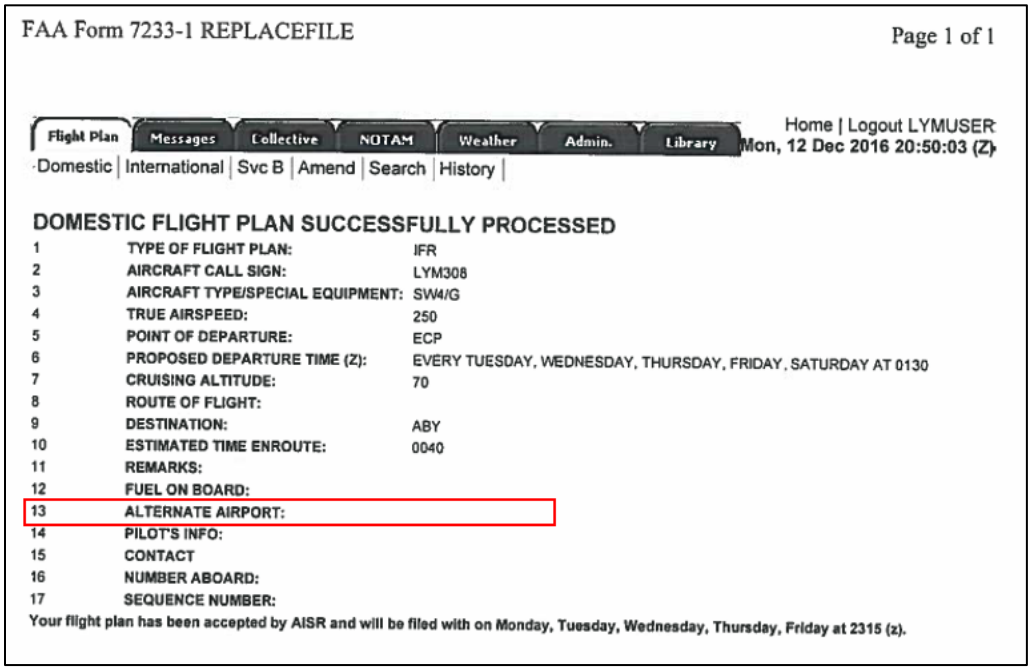
*[135.213, Ops Spec A010]*
*Flight crewmembers will obtain a weather briefing from an approved weather station, FSS, or any other source approved by the FAA prior to all flight operations. The briefing may be received via phone or the internet (QICP approved). Regardless of how the weather briefing is received, it will contain at least the following information:*

1. *Synopsis of current weather*
2. *AIRMETS, SIGMETS*
3. *Surface analysis over route of flight*
4. *Enroute forecast and enroute terminal weather*
5. *Destination forecast and current terminal weather*
6. *Departure forecast and current terminal weather*
7. *Alternate forecasts (if needed)*
8. *Winds and temperature aloft*
9. *PIREPS (if available)*
10. *NOTAM information*

For additional meteorological information, see the Meteorology Group Chairman's Factual report.

## 5.2 Filed Flight Plan and Alternate Airport

According to records provided by the operator, Key Lime Air Flight 308 used a stored flight plan or "canned flight plan" that was automatically filed via the FAA Aeronautical Information System Replacement (AISR) every weekday. The flight plan was for ECP direct to ABY at an altitude of 7,000 feet, 250 knots true airspeed, with an estimated time enroute of 40 minutes.



FAA Form 7233-1 REPLACEFILE Page 1 of 1

Flight Plan | Messages | Collective | NOTAM | Weather | Admin. | Library
Home | Logout LYMUSER
Mon, 12 Dec 2016 20:50:03 (Z)
Domestic | International | Svc B | Amend | Search | History

**DOMESTIC FLIGHT PLAN SUCCESSFULLY PROCESSED**

| | | |
|---|---|---|
| 1 | TYPE OF FLIGHT PLAN: | IFR |
| 2 | AIRCRAFT CALL SIGN: | LYM308 |
| 3 | AIRCRAFT TYPE/SPECIAL EQUIPMENT: | SW4/G |
| 4 | TRUE AIRSPEED: | 250 |
| 5 | POINT OF DEPARTURE: | ECP |
| 6 | PROPOSED DEPARTURE TIME (Z): | EVERY TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, SATURDAY AT 0130 |
| 7 | CRUISING ALTITUDE: | 70 |
| 8 | ROUTE OF FLIGHT: | |
| 9 | DESTINATION: | ABY |
| 10 | ESTIMATED TIME ENROUTE: | 0040 |
| 11 | REMARKS: | |
| 12 | FUEL ON BOARD: | |
| 13 | ALTERNATE AIRPORT: | |
| 14 | PILOT'S INFO: | |
| 15 | CONTACT | |
| 16 | NUMBER ABOARD: | |
| 17 | SEQUENCE NUMBER: | |

Your flight plan has been accepted by AISR and will be filed with on Monday, Tuesday, Wednesday, Thursday, Friday at 2315 (z).

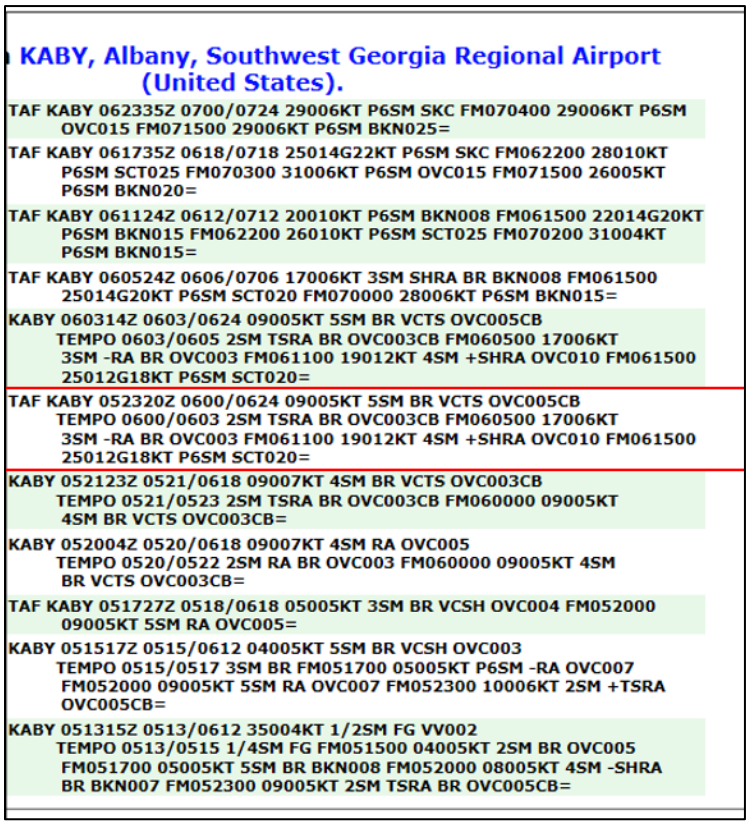
**Figure 1: FAA AISR Screenshot of Flight Plan**

According to Leidos Flight Services, they found no record of an updated flight plan with an alternate airport listed or fuel on board. During an NTSB interview with a Key Lime Air flight

follower who spoke to the accident pilot before takeoff, the pilot stated that if he could not get to his destination, he would divert to "Tallahassee." The operator's COM[7] stated in part:

> *5.46.1 Weather Requirements for Filing an Alternate*
>
> *No alternate airport is required if the weather reports at the first airport of intended landing, for one hour before and one hour after the estimated time of arrival, the appropriate weather reports or forecasts, or any combination of them, indicate that:*
>
> *1. The ceiling will be at least 1,500 feet above the lowest circling approach MDA; or*
>
> *2. If a circling instrument approach is not authorized for the airport, the ceiling will be at least 1,500 feet above the lowest published minimum or 2,000 feet above the airport elevation, whichever is higher; and*
>
> *3. Visibility for that airport is forecast to be at least three miles, or two miles more than the lowest applicable visibility minimums, whichever is the greater, for the instrument approach procedure to be used at the destination airport.*

The Terminal Aerodrome Forecast (TAF) issued on December 5, 2016 at 2320Z for the destination airport KABY, forecasted temporarily from 0000Z to 0300Z, visibility 2 statute miles, thunderstorms and moderate rain, mist, and an overcast ceiling of cumulonimbus clouds at 300 feet above ground.



**KABY, Albany, Southwest Georgia Regional Airport (United States).**

TAF KABY 062335Z 0700/0724 29006KT P6SM SKC FM070400 29006KT P6SM OVC015 FM071500 29006KT P6SM BKN025=

TAF KABY 061735Z 0618/0718 25014G22KT P6SM SKC FM062200 28010KT P6SM SCT025 FM070300 31006KT P6SM OVC015 FM071500 26005KT P6SM BKN020=

TAF KABY 061124Z 0612/0712 20010KT P6SM BKN008 FM061500 22014G20KT P6SM BKN015 FM062200 26010KT P6SM SCT025 FM070200 31004KT P6SM BKN015=

TAF KABY 060524Z 0606/0706 17006KT 3SM SHRA BR BKN008 FM061500 25014G20KT P6SM SCT020 FM070000 28006KT P6SM BKN015=

KABY 060314Z 0603/0624 09005KT 5SM BR VCTS OVC005CB TEMPO 0603/0605 2SM TSRA BR OVC003CB FM060500 17006KT 3SM -RA BR OVC003 FM061100 19012KT 4SM +SHRA OVC010 FM061500 25012G18KT P6SM SCT020=

TAF KABY 052320Z 0600/0624 09005KT 5SM BR VCTS OVC005CB TEMPO 0600/0603 2SM TSRA BR OVC003CB FM060500 17006KT 3SM -RA BR OVC003 FM061100 19012KT 4SM +SHRA OVC010 FM061500 25012G18KT P6SM SCT020=

KABY 052123Z 0521/0618 09007KT 4SM BR VCTS OVC003CB TEMPO 0521/0523 2SM TSRA BR OVC003CB FM060000 09005KT 4SM BR VCTS OVC003CB=

KABY 052004Z 0520/0618 09007KT 4SM RA OVC005 TEMPO 0520/0522 2SM RA BR OVC003 FM060000 09005KT 4SM BR VCTS OVC003CB=

TAF KABY 051727Z 0518/0618 05005KT 3SM BR VCSH OVC004 FM052000 09005KT 5SM RA OVC005=

KABY 051517Z 0515/0612 04005KT 5SM BR VCSH OVC003 TEMPO 0515/0517 3SM BR FM051700 05005KT P6SM -RA OVC007 FM052000 09005KT 5SM RA OVC007 FM052300 10006KT 2SM +TSRA OVC005CB=

KABY 051315Z 0513/0612 35004KT 1/2SM FG VV002 TEMPO 0513/0515 1/4SM FG FM051500 04005KT 2SM BR OVC005 FM051700 05005KT 5SM BR BKN008 FM052000 08005KT 4SM -SHRA BR BKN007 FM052300 09005KT 2SM TSRA BR OVC005CB=

**Figure 2: Weather Forecast Archive**

[7] The COM met the requirements of 14 CFR 135.221 - IFR: Alternate airport weather minimums and 14 CFR 135.223 - IFR: Alternate airport requirements.

According to the operator, Key Lime Air 308's scheduled arrival time was 2155 (0255Z). Due to the arrival time and the forecasted weather conditions, an alternate airport was required to be filed by the pilot in command per company policy. For detailed weather information for TLH, reference the NTSB Meteorology Factual Report.

## 6.0 The Key Lime Air Dispatch Office

On the night of the accident, Key Lime Air had two flight followers on-duty in the dispatch office, which was located at the company headquarters in Englewood, CO. Neither "flight followers" were FAA certificated dispatchers, and the investigation found no requirement to hold such certification in the Key Lime Air company operations manual or 14 CFR Part 135.

According to the operator, the primary functions of the flight followers was to liaison between the customer (e.g. UPS) and the pilot and monitor the progress of each flight. The "Flight Explorer" weather and flight tracking website was routinely used in the dispatch office, and was used on the night of the accident.

According to both flight followers, it was routine to talk with the cargo pilots and the customer on a nightly basis. Their immediate supervisor was not in the dispatch office on the night of the accident, but they did have the persons contact information and permission to call as needed. The flight followers on-duty reported that they did not contact their management before the accident occurred.

Both dispatchers talked to the pilot the night of the accident, see the section titled – "The Pilot's Telephone Calls with Key Lime Air Flight Followers" for a detailed discussion. One of the flight followers on-duty the night of the accident sent the following email summary, dated December 5, 2016, with the subject "LYM308 765FA Dispatch timeline 12/05/2016." The email was sent to Key Lime Air management at 0158 and described the communication between the Dispatch Office, the customer, and the accident pilot.

**Carrizo, David**

**From:** Struhs, Jonathan
**Sent:** Monday, December 05, 2016 11:58 PM
**To:** Honeycutt, Cliff; Rich, Glen; Giovannini, Michael; Taylor, Jeff; Carrizo, David; Perdue, Linda; Baca, Daphne
**Subject:** LYM308 765FA Dispatch Timeline 12/05/2016

**All times MST**

**~19:40** Brett Backiewicz (BB) in Dispatch answers call. UPS GA call wants to confirm flight LYM308 will happen, noting if it doesn't depart soon, freight will not make service.

**~19:42** Jonathan Struhs calls Lance McCaw (LM). LM says he his departing immediately to try and fly the clear weather corridor extending northeast toward ABY. If he can't get through the storms to his left, he will make TLH his alternate.

**19:54** Flight Explorer indicates LYM 307departed ECP.

**20:21** Flight Explorer indicates LYM308 destination changed to TLH.

**20:28** Flight Explorer indicates LYM308 aged-out.

**~20:55** UPS GA calls to ask if the freight has landed at TLH, but we find no indication of LYM308 arrival at TLH on Flight Explorer, Flight Aware, or e-mailed log page.

**~20:58** BB calls LM's mobile phone for verbal confirmation of arrival and gets voicemail.

**21:00** BB calls TLH tower to verify record of LYM308 having landed. They say they've have had no radio contact.

**~21:03** BB calls Jacksonville Center. As soon as BB identifies himself as Key Lime Air, the respondent indicates he has been anticipating contact from us. He notifies BB that the aircraft has gone down just south of ABY and that they have no status on the condition of the pilot.

**Figure 3: Flight Follower Summary Dispatch Timeline**

### 6.1 The Pilot's Telephone Calls with the Flight Followers

The NTSB interviewed two Key Lime Air flight followers on-duty the night of the accident, both spoke to the pilot the night of the accident. The flight follower that was assigned to the "cargo side" of the operations received a routine "check-in" phone call from the pilot during his preflight preparations. The flight follower reported that the conversation was short, but the two did discuss the flight and weather.

The flight follower reported that the accident pilot stated "everything is good down here" and confirmed that he was at the airport and that the packages were ready to get loaded onto the airplane or were already loaded in the airplane. The flight follower added that he "scrolled over" to the Flight Explorer website/ tool, and noticed "significant weather down there." The flight follower subsequently asked the pilot, "are you going to be able to make it into Albany, everything look good on that? What's going on with that, that way I can inform UPS."

The pilot responded that he was "holding on the ground" and added that the storms were "extreme" and stated that the storms had "tornado activity" within them. The flight follower responded with, "oh, are you actually going to do the flight and make it to Albany, or should I be getting ready to inform UPS?" In response, the pilot stated that, "I'm holding right now, but I will be taking off from Panama City in a little bit."

The other flight follower on-duty the night of the accident also talked with the pilot via telephone. The telephone conversation occurred after the initial check-in call, and according to this other flight follower, the call occurred "a while after from when he [the accident pilot] was supposed to have departed."

The flight follower reported that the pilot stated he was "holding because of the weather" at the departure airport. The flight follower in response informed the pilot that the customer, UPS, had called the Dispatch Office to ask whether Key Lime Air 308 was going to depart. According to the flight follower, the pilot subsequently stated in response "yeah, I'm going to get going here in just a few minutes." The pilot further stated, "I see some clear weather that I think I can fly towards the northeast, toward Albany" and concluded by stating, "If I can't get up to Albany, then I will just turn south and use Tallahassee as my alternate [airport]." The flight follower concluded the telephone conversation with the pilot by stating, "Ok, I will let UPS know you are getting ready to get going then."

The investigation found no other communications between the operator's dispatch office and the pilot the night of the accident.

## 6.2 Flight Follower/ Dispatcher Duties and Responsibilities

The Key Lime Air COM did not define a flight follower's responsibilities, but did define a dispatcher's responsibilities. Within section 2.3.2.2 the title "Dispatcher/ Flight Follower" was used and is the only mention of a flight follower in the COM.

The Key Lime Air COM in part stated:

> *2.3.9 Dispatchers*
>
> *2.3.9.1 Responsible To*
>
> *Chief Pilot and Director of Maintenance*
>
> *2.3.9.2 Duties and Responsibilities*
>
> *The Dispatchers are responsible for air operations regarding management of pilot schedules, monitoring of real-time aircraft operations, quoting and dispatching and monitoring of adhoc (unscheduled) charters and coordination with maintenance department regarding dispatch of aircraft to and from maintenance bases for required maintenance. He/she will assist the Director of Operations and Director of Maintenance by providing an additional level of oversight to help ensure continuity and safety during flight planning and real time flight operations at Key Lime Air.*
>
> *2.3.9.3 OPERATIONAL CONTROL*
>
> *The Dispatchers maintain the following items of operational control as authorized by Key Lime Air:*
>
> *Scheduling crews (PIC's and SIC's and Flight Attendants as required) for each flight based on available qualified personnel.*
>
> *Scheduling aircraft for each flight based on available assets.*

*Monitoring the progress of each flight in real time and initiating timely actions when the flight cannot be completed as planned, including diverting or terminating the flight.*

According to the flight followers on-duty the night of the accident, both believed that they did not have the independent authority to cancel a Key Lime Air cargo flight.

## 7.0 Flight Risk Assessment Tool

According to the COM, a Flight Risk Assessment Tool (FRAT) was required to be complete for every flight. The COM stated in part:

*3.4 Flight Risk Assessment Tool*

*3.4.1 General*

*The Flight Risk Assessment Tools (FRAT) is part of a mature Safety Management System (SMS). This tool will provide a method for Key Lime Air (KLA) to determine which flights have more risk, and allow KLA management to intervene and reduce risk when necessary.*

*This FRAT is only a tool and part of the larger SMS system. Each flight has hazards and some level of risk associated with it. It is critical that KLA and pilots are able to differentiate, in advance, between a low risk flight and a high risk flight, then establish a review process and develop risk mitigation strategies to address flights throughout that range.*

*This FRAT allows operators and pilots to see the risk profile of a flight in its planning stages. KLA has established an acceptable level of risk for flights based upon the type of operation, environment, aircraft used, crew training, and overall experience. When the risk for a flight exceeds the acceptable level, the hazards associated with that risk should be further evaluated and the risk reduced. A higher risk flight should not be operated if the hazards cannot be mitigated to an acceptable level. The FRAT cannot guarantee a safe flight. Safety is ultimately the responsibility of the pilot and operator. However, it does provide an additional tool to help the pilot and operator make sound safety decisions.*

Although the COM stated that a FRAT is "part of a mature Safety Management System (SMS)," the investigation found that the operator did not have a formal 14 CFR Part 5 SMS, nor was there any regulatory requirement as a 14 CFR Part 135 operator to do so. For additional discussion, see section below titled "Safety Management System." The COM Section 3.4.1 describes the personnel responsible for generating the FRAT and in part stated:

*3.4.1 General*

*The following personal will be responsible for generating the FRAT for flight that they are dispatching or, as assigned by KLA management in their operational duties, coordinating and overseeing the flight:*

- *The Ramp Supervisor or a Dispatcher for Cargo Flights.*
- *The Charter Coordinator or a Dispatcher for all On Demand Passenger Flights.*

- *Dispatch for all Scheduled Passenger Flights.*

*Generating the FRAT may be delegated to a properly qualified KLA employee but the overall responsibility remains with the responsible personal listed above.*

The COM further stated that all FRATs will be preserved electronically for 30 days. The DO for Key Lime Air reported that a FRAT was not completed for the accident flight, and in addition, there was no record that a FRAT had been completed for Key Lime Air Flight 308 in the past 30 days. In an email correspondence on December 15, 2016, the DO in part stated:

*Per our Company Operations Manual (COM) the FRAT is to be completed by the cargo ramp supervisor or dispatch. Early morning cargo flight FRATs are to be completed by our cargo ramp supervisor on duty in Denver (UPS facility) or by dispatch if the supervisor is unavailable. All passenger flight FRATs are completed by a dispatcher/flight follower. All evening cargo flight FRATs are completed by a dispatcher/flight follower.*

During a postaccident interview with the flight follower who was assigned to the cargo operations the night of accident, he stated that he did not complete the FRAT for the accident flight and further stated in part:

*At no point in my initial training or when I started did anyone, or any of my coworkers, or any of my bosses, or anyone in the company, tell me that we were responsible for doing FRATs for any cargo flight at all.*

According to the other flight follower on-duty, the dispatch office only completed the FRATs for passenger flights and to his understanding since his date of hire in December 2015, FRATs were not required to be complete for Key Lime Air cargo flights.

According to the Director of Operations (DO), Key Lime Air flight followers undergo "on-the-job" training and do not receive formal ground school training. He added that the flight followers on-duty the night of the accident were trained by a Key Lime Air dispatcher who held a FAA certificated dispatcher certificate. According to the DO, this dispatcher was no longer employed by Key Line Air at the time of the accident. He added that this dispatcher did not train the two flight followers to complete Flight Risk Assessment Tools (FRATs) for night (PM) cargo flights. The DO stated during an interview that the failure to complete the FRAT was a "management oversight" and the management team was not aware that the FRATs were not being completed for PM cargo flights.

### 7.1 The FRAT Go/ No-go Procedures

The COM described the action required based upon the "Flight Total Value" and stated in part:

*3.4.3 Flight Total value less than 21:*

*If the value for the flight/leg is less than 21, pilots need not be contacted and may depart without further action.*

*3.4.4 Flight Total value 21-25:*

*If the value for the flight/leg is 21-25, the person responsible for generating the FRAT will consult with the pilot to assure the risk is known and properly mitigated*

*The consultation should include a conversation about mitigating the risk by possibly:*

1. *Delaying the flight*
2. *Adding an SIC*
3. *Changing aircraft*
4. *Changing the destination airport*
5. *Changing the PIC*

*After consultation, a cooperative decision will be made whether to depart or not. Pilots have the ultimate decision to depart.*

*3.4.5 Flight Total value above 25:*

*If the value for the flight/leg is above 25, the person responsible for generating the FRAT will consult with the pilot to assure the risk is known and determine if the risk can be mitigated to an acceptable level.*

*The consultation should include a conversation about mitigating the risk using the five criteria listed above. After consultation, if the value remains above 25, the person responsible for generating the FRAT must consult with one of the following persons and get authorization for the flight to depart*

1. *Director of Operations*
2. *Chief Pilot*
3. *Director of Safety*
4. *Vice President of KLA*
5. *President of KLA*

*A cooperative decision will be made if the flight to depart or not. Pilots have the ultimate decision whether the flight is to depart or not.*

As part of the investigation, the NTSB completed a Key Lime Air FRAT form using the known risk conditions to the pilot based on the available evidence (See Figure 4). The resultant score of 19 would have placed the flight in the "<21 - GO" category, rather than the "consult" or "permission needed" category. As previously mentioned, flight followers did not complete a FRAT for the accident flight.

3.4.9 Flight Risk Assessment Tool (FRAT)

| Flight Risk Assessment Tool | | |
|---|---|---|
| Crew | Risk Value | Flight Value |
| Capt. with less than 100 hrs. in type | 3 | |
| Duty day greater than 10 hours | 2 | |
| 3Flight time over 3 hours per leg | 2 | |
| Pop up trip (less than 3 hours notice) | 2 | |
| Crew rest less than 9 hours | 4 | |
| Training flight | 10 | |
| | | |
| Operating Environment | | |
| Departure Airport | | |
| VMC (1000/3) | 5 | 5 |
| Surface winds greater than 20 kt cross | 3 | |
| Mountain Airport | 3 | |
| Wet runway/contaminated | 3 | |
| Braking action less than fair | 5 | |
| Night takeoff | 3 | 3 |
| Convective activity present | 3 | 3 |
| Icing predicted/present | 3 | |
| Visibility less that 1 mile | 4 | |
| Runway < 5000' | 3 | |
| | | |
| Arrival Airport | | |
| VMC (1000/3) | 5 | |
| Surface winds greater than 20 kt cross | 3 | |
| Mountain Airport | 2 | |
| Wet runway/contaminated | 3 | 3 |
| Braking action less than fair | 5 | |
| Night landing | 3 | 3 |
| Convective activity present | 3 | 3 |
| Icing predicted/present | 3 | |
| IMC with precision approach | 2 | 2 |
| IMC with Non Precision Approach | 3 | |
| Visibility less than 1 mile | 5 | 5 |
| Circling approach necessary | 2 | |
| | | |
| Equipment | | |
| Ferry Permit | 3 | |
| Open MEL | 2 | |
| Passenger Flight | 3 | |
| | | |
| Mitigation | | |
| Crew familiarity | -5 | - 5 |
| SIC aboard | -3 | |
| Turbine Powered | -3 | - 3 |
| Flight Total | | |
| GO | <21 | 19 |
| Consult | 21-25 | |
| Permission needed | >25 | |

**Figure 4: Sample FRAT Completed by NTSB[8]**

## 7.2 Key Lime Air's Flight Cancelation Policy

The operator's COM had a refusal to fly policy and a non-retaliation policy, which stated in part:

> *3.4.6 Reporting a refusal*
>
> *If, after consultation, a flight is refused by the pilot, the Director of Operations or Chief Pilot will be contacted by the person completing the FRAT. The refusal will be listed on the Operations Report and in the Notes section of the FRAT tool. The Director of Safety will review all refusals for risk analysis.*
>
> *3.4.7 Non Retaliation*

[8] Enroute weather conditions were not required to be accounted for in the "Risk Value" assessment.

> *KLA will not retaliate or take negative action against a pilot who elects not to depart due to clear and justifiable reasons regarding excessive risk associated with the flight.*

The operator was asked in an email correspondence from the NTSB operations group chairman, what happens to a Key Lime Air pilot if he is late, or chooses to cancel their flight due to weather, and the operator's Technical Programs Director, on February 2, 2017 reported:

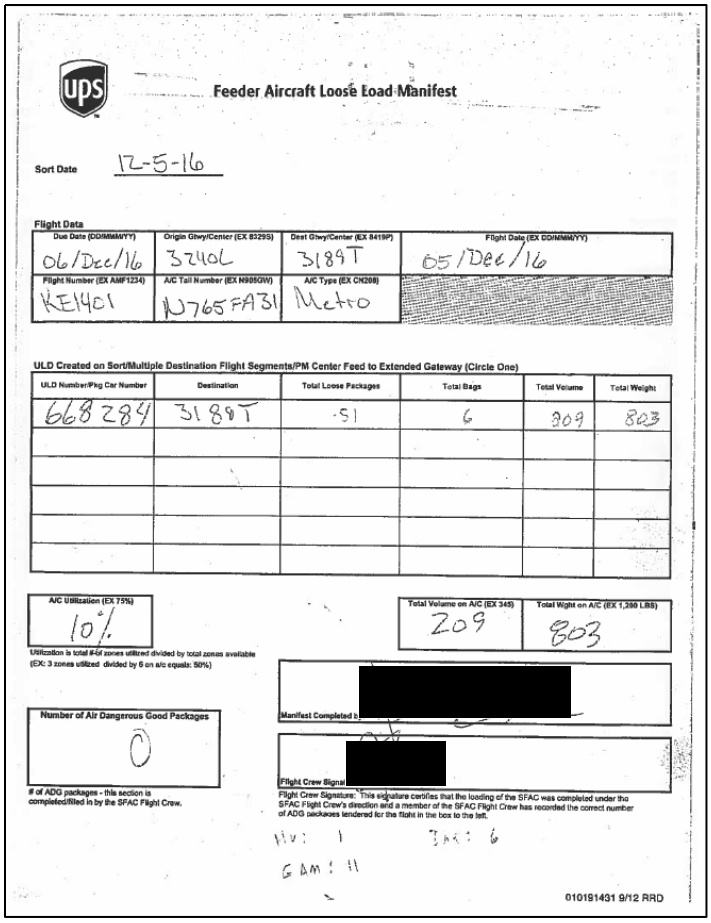
> *Late pilots [in reference to the required check-in time] are dealt with per our disciplinary policy which requires counseling of the employee if the behavior is systemic or chronic. Occasional/infrequent occurrences are noted but no actions are typically taken. If a pilot cancels a flight due to WX [weather], no action is taken other than to accommodate the pilot as needed (hotel/rental car, etc.). Pilots are expected to contact the company whenever a flight must be cancelled due to any reason. The pilot is still paid for the day even if there is a WX [weather] cancellation.*

The operator was also asked about what action, if any, does the customer (UPS) take when a Key Lime Air cargo flight is canceled? Specifically, would Key Lime Air still be paid, per the cargo feeder contract? The operator's Technical Programs Director reported:

> *The "action" is dependent upon the reason for the cancelation. Flights canceled due to weather do not count against the carrier reliability metrics. KLA [Key Lime Air] is only paid when the aircraft moves. In the case of a weather cancelation, KLA will, in effect, still be paid since the freight will eventually be moved once the WX [weather] is acceptable. Flights canceled due to mechanical or pilot issues count against the carrier reliability metrics used by UPS for evaluating its feeders.*

## 8.0 Weight and Balance and Load Manifest

The weight and balance and load manifest documents provided to the NTSB indicated that the airplane was within weight and balance limitations for the flight. According to a UPS document titled "Feeder Aircraft Loose Load Manifest," the airplane was loaded with 6 cargo bags with a total weight of 803 pounds. The document contained a signature in the "flight crew signature" box.



Feeder Aircraft Loose Load Manifest

Sort Date 12-5-16

Flight Data

| Due Date (DD/MM/YY) | Origin Gtwy/Center (EX 8329S) | Dest Gtwy/Center (EX 8419P) | Flight Date (EX DD/MM/YY) |
|---|---|---|---|
| 06/Dec/16 | 3240L | 3189T | 05/Dec/16 |
| **Flight Number (EX AMF1234)** | **A/C Tail Number (EX N905GW)** | **A/C Type (EX CN208)** | |
| KE1401 | N765FA31 | Metro | |

ULD Created on Sort/Multiple Destination Flight Segments/PM Center Feed to Extended Gateway (Circle One)

| ULD Number/Pkg Car Number | Destination | Total Loose Packages | Total Bags | Total Volume | Total Weight |
|---|---|---|---|---|---|
| 668284 | 3189T | 51 | 6 | 209 | 803 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

A/C Utilization (EX 75%): 10%

Utilization is total # of zones utilized divided by total zones available (EX: 3 zones utilized divided by 6 on a/c equals: 50%)

Total Volume on A/C (EX 345): 209

Total Wght on A/C (EX 1,200 LBS): 803

Manifest Completed b: [redacted]

Number of Air Dangerous Good Packages: 0

# of ADG packages - this section is completed/filled in by the SFAC Flight Crew.

Flight Crew Signat: [redacted]

Flight Crew Signature: This signature certifies that the loading of the SFAC was completed under the SFAC Flight Crew's direction and a member of the SFAC Flight Crew has recorded the correct number of ADG packages tendered for the flight in the box to the left.

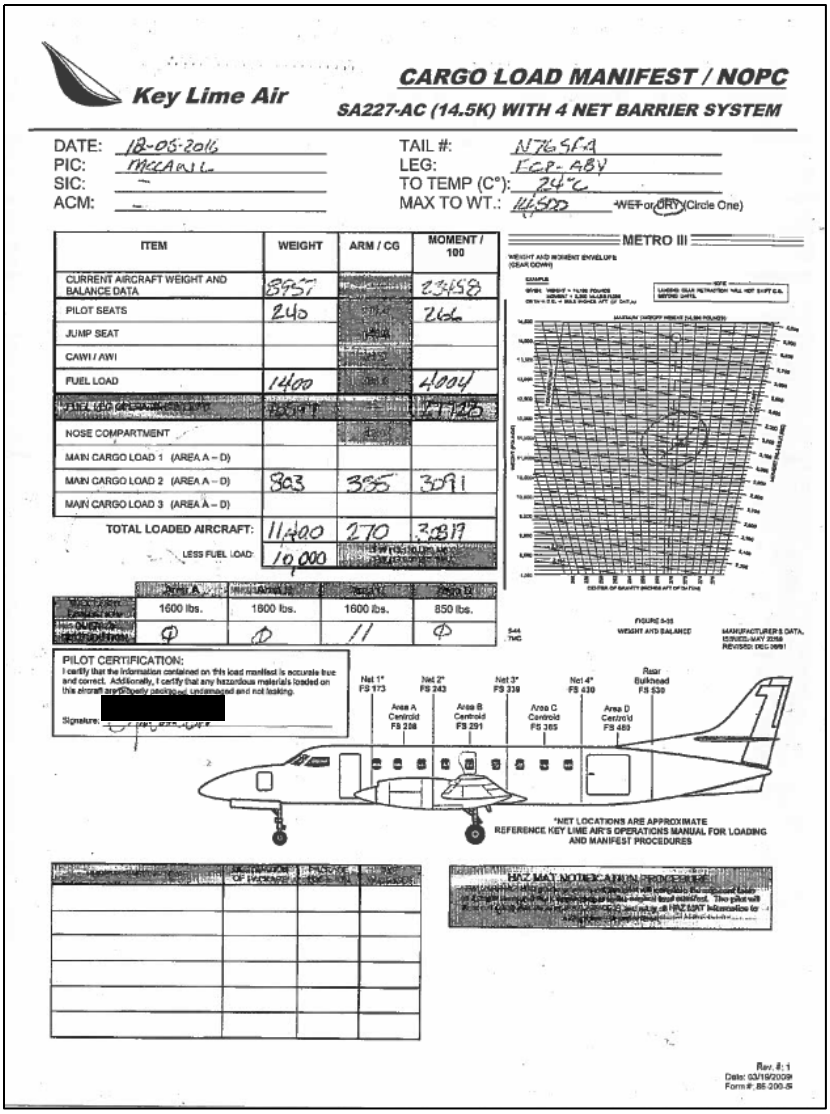
HV: 1 BAK: 6

GAM: 11

010191431 9/12 RRD

**Figure 5: UPS Feeder Aircraft Loose Load Manifest**

According to a Key Lime Air document titled, "Cargo Load Manifest/ NOPC," the accident airplane was N765FA. According to the document, the total loaded takeoff weight was 11,400 lbs., and was marked within center of gravity limits according to the chart on the form. The total weight was 3,100 lbs. under the maximum takeoff weight permitted.


Key Lime Air

CARGO LOAD MANIFEST / NOPC

SA227-AC (14.5K) WITH 4 NET BARRIER SYSTEM

DATE: 12-05-2016 TAIL #: N765FA

PIC: MCCARN L LEG: ECP-ABY

SIC: TO TEMP (C°): 24°C

ACM: MAX TO WT.: 14,500 WET or DRY (Circle One)

| ITEM | WEIGHT | ARM / CG | MOMENT / 100 |
|---|---|---|---|
| CURRENT AIRCRAFT WEIGHT AND BALANCE DATA | 8957 | | 23458 |
| PILOT SEATS | 240 | | 266 |
| JUMP SEAT | | | |
| CAWI / AWI | | | |
| FUEL LOAD | 1400 | | 4004 |
| NOSE COMPARTMENT | | | |
| MAIN CARGO LOAD 1 (AREA A – D) | | | |
| MAIN CARGO LOAD 2 (AREA A – D) | 803 | 395 | 3091 |
| MAIN CARGO LOAD 3 (AREA A – D) | | | |
| TOTAL LOADED AIRCRAFT: | 11,400 | 270 | 30817 |
| LESS FUEL LOAD: | 10,000 | | |

METRO III

| | Area A | Area B | Area C | Area D |
|---|---|---|---|---|
| | 1600 lbs. | 1800 lbs. | 1600 lbs. | 850 lbs. |
| | Ø | Ø | 11 | Ø |

PILOT CERTIFICATION:
I certify that the information contained on this load manifest is accurate true and correct. Additionally, I certify that any hazardous materials loaded on this aircraft are properly packaged, undamaged and not leaking.
Signature: [redacted]

Net 1" FS 173 | Net 2" FS 243 | Net 3" FS 338 | Net 4" FS 438 | Rear Bulkhead FS 538
Area A Centroid FS 208 | Area B Centroid FS 291 | Area C Centroid FS 385 | Area D Centroid FS 488

*NET LOCATIONS ARE APPROXIMATE
REFERENCE KEY LIME AIR'S OPERATIONS MANUAL FOR LOADING AND MANIFEST PROCEDURES

HAZ MAT NOTICE/ ATRUN PROCEDURE

Rev. #: 1
Date: 03/19/2009
Form #: 86-200-SI

**Figure 6: Cargo Load Manifest Document**

## 8.1 Electronic Flight Bag Application ForeFlight

In response to an NTSB query, ForeFlight LLC.[9] provided information that the last route entered by the accident pilot was "KECP RENOE KABY" entered on December 5, at 2204:15.

[9] ForeFlight is a limited liability corporation that offers a flight planning and electronic flight bag application. According to a description in the Apple Inc. "App Store," ForeFlight is an application that allows pilots to "plan and file flight plans, access preflight and in-flight weather, download and view electronic charts and maps, manage flight publications, log flight time, and more."

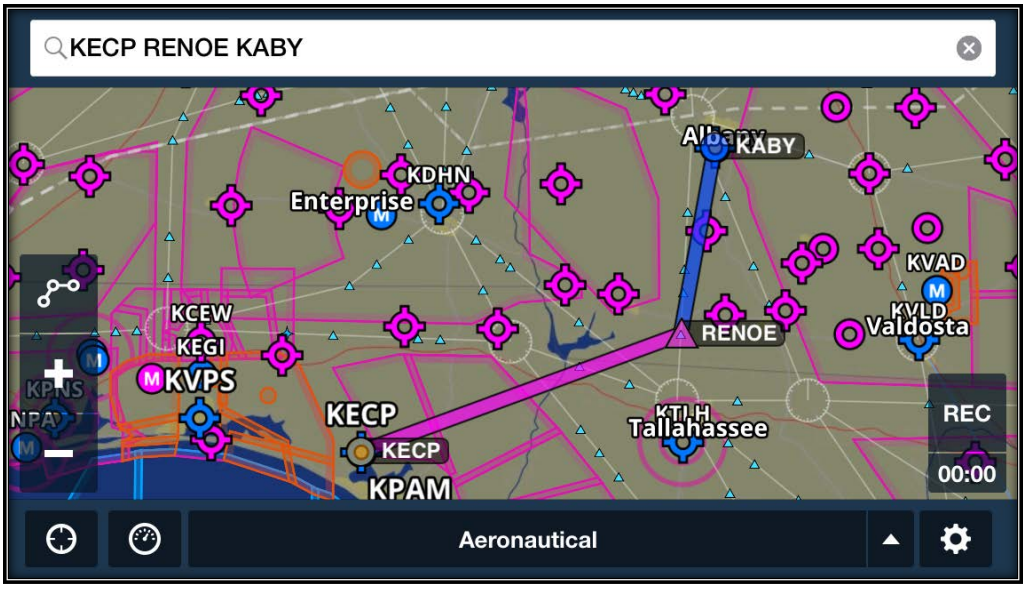



**Figure 7: Exemplar ForeFlight Screenshot of Route of Flight**

The flight departed ECP at 2154 and was provided a "cleared as filed routing" on the ground, which was direct. While enroute, an air traffic controller provided Key Lime Air 308 with an updated route: direct GPS waypoint RENOE, then direct ABY (destination airport). The time stamp recorded by ForeFlight was after the departure time, while the airplane was enroute to the destination. Furthermore, the updated routing from the air traffic controller was provided once in-flight and matched the last entry ForeFlight recorded. The investigation was unable to determine if the pilot was using the application for navigation and/ or weather avoidance. The operator's operations specifications and COM did not permit the use of EFBs in-flight.

The operator was specifically asked about the use of EFBs in-flight via email correspondence, and their Technical Programs Director reported on February 2, 2017 in part:

> *KLA does not prohibit the use of PEDs in flight, but we do not allow the use of a PED as an EFB as we have not been issued OPS A061. All of our aircraft are equipped with paper navigation products and manuals. We do anticipate launching an EFB program at some point in the future.*

## 9.0 Relevant Cockpit Systems

### 9.1 On-Scene Cockpit Documentation

The cockpit was significantly burned by fire and was found at rest lying to the right side. The thrust levers were found in an equal position (together) and not at max thrust position, about ¾ of max thrust. The stop feather switches were pushed in (normal position). The fuel selector switches were in an undetermined position. The flap lever was found in the UP position.

The left side control column separated from the attach points from impact and was damaged by post-crash fire. Aileron cable continuity was established on the right side of the airplane. The right side control wheel was damaged by fire. A lap belt was found buckled, lying free in the cockpit. Two flight crew seats were found in the cockpit and were consumed by fire.

The left side flight instruments were consumed by fire and were not readable. The right side airspeed and attitude indicators were found with the back face readable, but an indication was not readable. The right side altimeter indicated 29.92 inches of mercury. The right side directional gyro indicated 130 degrees.

One iPad was found and was consumed by fire. One cell phone was found and was consumed by fire. The angle of attack transducer and the Bendix King radar sensor were found in the nose section of airplane, partially intact without fire damage. The NTSB lab confirmed that the devices do not contain non-volatile memory. Several paper FAA U.S. terminal procedure publication charts were found scattered in the cockpit.

## 9.2 Installed Cockpit Avionics and Instrumentation

The following pilot instrumentation and navigation equipment was installed on the accident airplane, according to the airworthiness packet within the FAA Electronic Document Retrieval System (EDRS):

**Equipment:**

| | |
|---|---|
| Dual Collins VIR-32 Navigation Receivers | Bendix King RDS-81 Weather Radar |
| Dual Collins ADF-60A ADF Systems | Bendix King KEA-346 Encoding Altimeter |
| Dual Collins RMI-30 RMI | Bendix King KAS-297 Altitude Alerter |
| Dual Collins MCS-65 Compass System | Aerosonic Altimeter |
| Collins DME-42 DME Transceiver | King KLN-90B GPS System |
| Dual Jet 510-24L Gyro Horizons | |

**Photo 2: Exemplar SA-227AC Cockpit**


**Photo 3: Pilot Side Flight Instruments**

The airplane was equipped with a Cockpit Voice Recorder. Reference the Cockpit Voice Recorder Group Chairman's Factual Report for detailed information. The airplane was not equipped with an autopilot and no regulatory requirement was found to have an autopilot installed.

### 9.3 Navigation Source

According to the air traffic control transcripts and the filed flight plan, the pilot was navigating to the destination via GPS. The airplane was equipped with an installed GPS - King KLN-90B. Regarding IFR use, the GPS - King KLN-90B pilot's guide stated in part:

> *IMPORTANT: Special installation procedures must be followed in order for the KLN 90B to be certified for IFR use. Consult the KLN 90B Flight Manual Supplement for the operating limitations of this unit.*

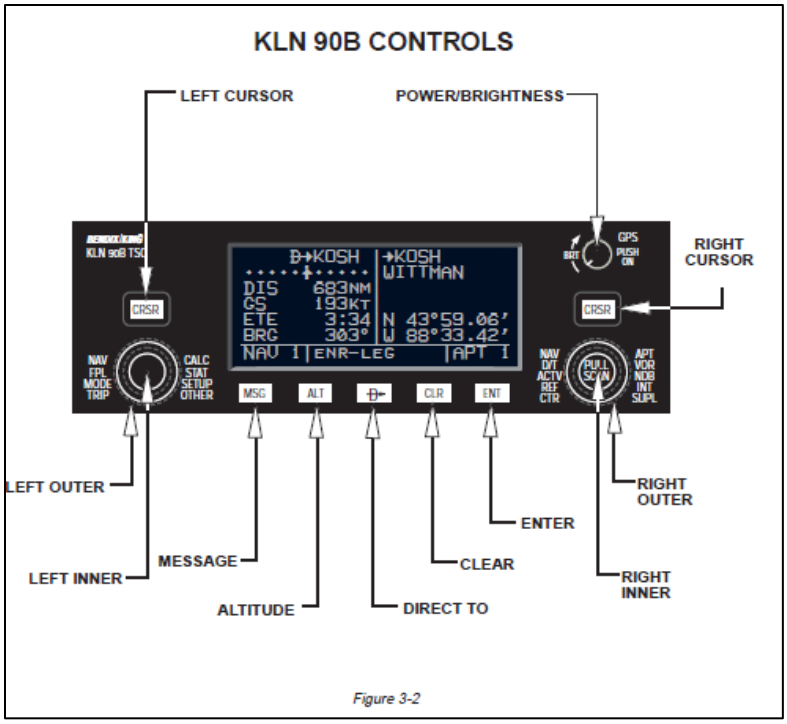



**Figure 8: KLN 90B Controls**

According to the operator's operations specifications marked "HQ Control December 4, 2010, HQ Revision 040," section B034 IFR Class I Enroute Navigation Using Area Navigation Systems, the Bendix/ King KLN-90B for the SA-227 airplane was authorized for IFR class I terminal and enroute navigation. The operator further reported that the installation of the KLN-90B GPS was upgraded to an approved IFR status in April 2014. The change was documented and approved via the operator's engineering order process.

## 9.4 Onboard Radar

The airplane was equipped with a Bendix King RDS 81 onboard radar sensor and display. The equipment was designed to display varying levels of precipitation and had pilot controllable range selectors, weather alert functions, automatic and manual radar gain control. According to the ATC transcript, the pilot stated that he planned to "see what the radar is painting" during the enroute descent. Due to the post-crash fire, the investigation was unable to determine if the device was operational or in use during flight.

The check airman who conducted the most recent annual proficiency check with the pilot was asked during a postaccident interview if he would question pilots about the use of the onboard weather radar during the oral exam, or during the proficiency check flight. The check airman stated that "it's something that you need to use in real world conditions to learn how to use it."

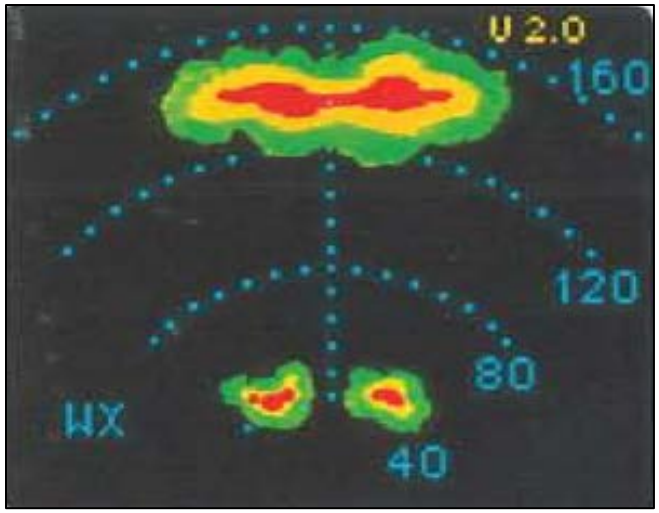



**Figure 9: Exemplar Radar Sensor Storm Picture**

### 9.5 Key Lime Air's Meteorology and Onboard Radar Training

According to the operator, during initial and recurrent training, weather radar special curriculum segments were provided to the pilot. The operator used multimedia presentations (videos), a training PowerPoint, and provided pilots with the Bendix King RDS 81 Pilot Guide.

The Bendix King RDS 81 pilot's guide contained operational guidance information for pilots. Specifically, the guide stated in part:

> *Your radar is a weather-avoidance device. It should never be used as a weather-penetration system. With proper interpretation, it will help you see and plan avoidance maneuvers around significant weather encountered during flight.*

The pilot's guide further stated in part:

> *Do not approach a storm cell containing magenta and red any closer than 20 NM. Echoes should be separated by at least 40 NM before attempting to fly between them.*

The operator also provided an initial and recurrent training "Meteorology" PowerPoint presentation that covered the use of onboard radar. The PowerPoint stated in part:

> *Airborne radar installed in Key Lime Air aircraft will be utilized for severe weather avoidance, and whenever possible, used in conjunction with ground radar to avoid severe weather. When airborne or ground radar indicates potential thunderstorm activity, the pilot in command will alter his / her route of flight to avoid the core of the cell by a minimum of 20 miles.*
>
> *During flight, use any means available to avoid thunderstorms by at least:*
>
> *20 nautical miles [at or above flight level (FL) 230]*
>
> *10 nautical miles below FL 230, in order to minimize exposure to thunderstorm hazards when approaching or departing an airport in an area where thunderstorms are occurring or are forecast*

*Attempt to maintain visual meteorological conditions (VMC)*

*Maintain at least 5 nautical miles separation from heavy rain showers*

*Avoid areas of high lightning potential, i.e., clouds within ± 5,000 feet of the freezing level*

The operator's training "Meteorology" PowerPoint covered path planning and considerations and stated in part:

*Path Planning*

*Plan a deviation path early. Simply skirting the red or magenta portion of a cell is not enough. Plan an avoidance path for all weather echoes which appear beyond 100 miles since this indicates they are quite intense.*

*The most intense echoes are severe thunderstorms. Remember that hail may fall several miles from the cloud, and hazardous turbulence may extend as much as 20 miles from the storm. Avoid the most intense echoes by at least 20 miles, that is, echoes should be separated by at least 40 miles before you fly between them. As echoes diminish in intensity, you can reduce the distance by which you avoid them.*

*Path Planning Considerations*

*Avoid cells containing magenta and red areas by at least 20 miles.*

*Do not deviate downwind unless absolutely necessary. Your chances of encountering severe turbulence and damaging hail are greatly reduced by selecting the upwind side of a storm.*

*If looking for a corridor, remember corridors between two cells containing magenta and/or red areas should be at least 40 miles wide from the outer fringes of the radar echo. The magenta displays areas of very heavy rainfall and statistically indicates a high probability of hail.*

## 9.6 Key Lime Air's Policies Regarding Convective Weather

The COM discussed severe weather, airborne weather radar use, and flight near severe weather. The first section titled, "Weather Radar (EMB-120 and DO328-300)" covered the operation of installed airborne weather radar sensors, which the accident airplane had, but in parenthesis, the SA-227 accident airplane was not included. It is not known whether the policy applied to the SA-227 series airplane. The COM stated in part:

*5.52 Weather Radar (EMB-120 and DO328-300)*
*[135.175 (a)(b)(c)(e)]*

*5.52.1 General*

*Airborne radar installed in Key Lime Air aircraft will be utilized for severe weather avoidance, and whenever possible, used in conjunction with ground radar to avoid severe*

*weather. When airborne or ground radar indicates potential thunderstorm activity, the PIC will alter his route of flight to avoid the core of the cell by a minimum of 15 miles.*

*When attempting to use ground radar as a primary source of severe weather avoidance, it is important to understand that frequently the center radar is in the horizontal polarization mode to gain maximum attenuation of primary targets and may not paint all the cellular activity encountered in flight.*

*Should airborne radar become inoperative in forecast severe weather conditions, the PIC will ascertain from the controller if his radar is in fact in the horizontal mode and request radar vectors out of the area of un-forecast severe weather.*

The COM further stated in in part:

*5.53 Severe Weather Avoidance*

*No Key Lime Air aircraft is ever to deliberately penetrate a thunderstorm. A thundershower is at best very difficult to determine. Pilots will base their decisions on all available information, i.e., forecasts, availability of radar, cloud formations, amount of precipitation with particular attention to forecast severe thunderstorm and tornado areas.*

The COM and company training documents provided varying distances to avoid thunderstorms/ convective activity. The COM required pilots to alter his or her route of flight to avoid the core of the cell by a minimum of 15 nautical miles. The meteorology training PowerPoint provided distances of 20 nautical miles when above 23,000 ft. (FL230) and when below FL230, 10 nautical miles was specified when approaching or departing an airport in an area where thunderstorms are occurring or are forecast. The meteorology training PowerPoint further stated the pilot must avoid cells containing magenta and red areas by at least 20 nautical miles.

The meteorology training PowerPoint also stated that when a pilot is informed of turbulent flight conditions he or she must "avoid any convective activity enroute [at or above FL230] by at least 20 nautical miles and 10 nautical miles below FL230."

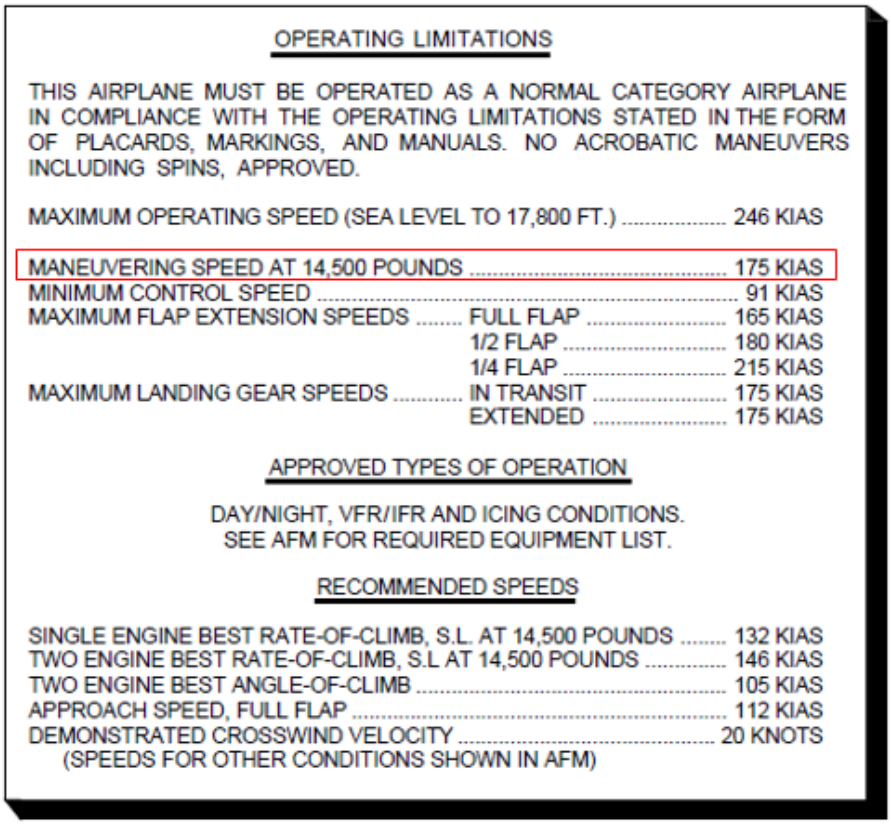
The FAA Pilot's Handbook of Aeronautical Knowledge stated in part:

*Flying under thunderstorms can subject aircraft to rain, hail, damaging lightning, and violent turbulence. A good rule of thumb is to circumnavigate thunderstorms identified as severe or giving an extreme radar echo by at least 20 nautical miles (NM) since hail may fall for miles outside of the clouds. If flying around a thunderstorm is not an option, stay on the ground until it passes.*

## 10.0 The Airplane's Maneuvering Speed & Turbulence

The Airplane Flight Manual (AFM) for the accident airplane stated that the $V_A$ Maneuvering Speed was 175 Knots Indicated Airspeed (KIAS) at 14,500 pounds. The AFM did not publish a turbulent air penetration speed. The AFM also did not require maneuvering speed to be marked on the airspeed indicator, nor was there any regulatory requirement for such a marking. The AFM did require a placard titled "OPERATING LIMITS" to be placed above the left side console in

the cockpit, in which one of line items on the placard listed the maneuvering speed at 14,500 pounds as 175 KIAS.



OPERATING LIMITATIONS

THIS AIRPLANE MUST BE OPERATED AS A NORMAL CATEGORY AIRPLANE IN COMPLIANCE WITH THE OPERATING LIMITATIONS STATED IN THE FORM OF PLACARDS, MARKINGS, AND MANUALS. NO ACROBATIC MANEUVERS INCLUDING SPINS, APPROVED.

MAXIMUM OPERATING SPEED (SEA LEVEL TO 17,800 FT.) ..... 246 KIAS

MANEUVERING SPEED AT 14,500 POUNDS ..... 175 KIAS
MINIMUM CONTROL SPEED ..... 91 KIAS
MAXIMUM FLAP EXTENSION SPEEDS ..... FULL FLAP ..... 165 KIAS
1/2 FLAP ..... 180 KIAS
1/4 FLAP ..... 215 KIAS
MAXIMUM LANDING GEAR SPEEDS ..... IN TRANSIT ..... 175 KIAS
EXTENDED ..... 175 KIAS

APPROVED TYPES OF OPERATION

DAY/NIGHT, VFR/IFR AND ICING CONDITIONS.
SEE AFM FOR REQUIRED EQUIPMENT LIST.

RECOMMENDED SPEEDS

SINGLE ENGINE BEST RATE-OF-CLIMB, S.L. AT 14,500 POUNDS ..... 132 KIAS
TWO ENGINE BEST RATE-OF-CLIMB, S.L AT 14,500 POUNDS ..... 146 KIAS
TWO ENGINE BEST ANGLE-OF-CLIMB ..... 105 KIAS
APPROACH SPEED, FULL FLAP ..... 112 KIAS
DEMONSTRATED CROSSWIND VELOCITY ..... 20 KNOTS
(SPEEDS FOR OTHER CONDITIONS SHOWN IN AFM)

**Figure 10: Airplane Flight Manual Operating Limitations Placard**

The AFM limitations chapter within the remarks section for maneuvering speed stated in part:

> *Maximum speed at which individual application of full available aerodynamic control will not overstress the aircraft at 14,500 pounds gross weight. This speed decreases approximately 7 KIAS per 1000 pounds reductions in weight.*

According to a Key Lime Air document titled, "Cargo Load Manifest/ NOPC," the takeoff weight was 11,400 lbs., which was 3,100 lbs. under the maximum takeoff weight permitted. As a result of the lower takeoff weight, the actual maneuvering speed for the accident airplane at takeoff was about 154 KIAS, 21 knots less than the AFM published 175 KIAS.

The FAA Airplane Flight Manual defines "VA" Maneuvering Speed:

> ***VA.*** *The design maneuvering speed. This is the "rough air" speed and the maximum speed for abrupt maneuvers. If during flight, rough air or severe turbulence is encountered, reduce the airspeed to maneuvering speed or less to minimize stress on the airplane structure. It is important to consider weight when referencing this speed. For example, VA may be 100 knots when an airplane is heavily loaded, but only 90 knots when the load is light.*

The check airman who conducted the most recent annual proficiency check with the pilot was asked during a postaccident interview what he would expect a Key Lime Air pilot to do, when flying in the SA-227 series airplane in moderate or greater turbulence. He stated that as part of the oral exam, they covered what should be done. He added that "what's taught is what is taught at all levels of aviation, which is to slow down to your "maneuvering speed" and try to maintain an attitude rather than an altitude."

The investigation found no policy or procedures regarding maneuvering speed and turbulence encounters within the operator's company operations manual, normal checklist, abnormal checklist, or emergency checklist for the SA-227 airplane, nor did the airplane flight manual contain such policy.

The operator, when asked via email correspondence, what would Key Lime Air want their company pilots to do when they encounter rough/ turbulent air (SA-227 operations), their Technical Programs Director reported on February 2, 2017:

> *There are no published turbulent air penetration speeds for the SA227. Pilots would be expected to reduce their airspeed to a speed which allows for normal cockpit operations.*

## 11.0 Key Lime Air's Operations Specifications

The operator's FAA approved operations specifications (Ops Specs) marked "HQ Control October 19, 2009, HQ revision 030," A008 Operational Control in part stated:

> *Certificate Holder Responsibilities:*
> *(1) The certificate holder retains all responsibility for the operational control of aircraft operations, and this the safety of each flight conducted under this certificate and operations specification, including the actions or inactions of all direct employees and agents of the certificate holder.*

## 11.1 Operational Control Positions

According to the operator's operations specifications, chapter 2 within the COM specified positions that are authorized to exercise operational control.

### Director of Operations

*The Director of Operations is authorized to exercise operational control in all aspects of Key Lime Air's operations.*

### Chief Pilot

*The Chief Pilot is authorized to exercise operational control in the absence of the Director of Operations.*

### Pilot in Command

*The Pilot in Command is authorized to exercise operational control in all areas allowing the safe completion of each flight to which he/she is assigned. Operational control includes, but is not limited to, the following areas:*

*1. The PIC must obtain and check current and forecast weather for the applicable airports.*

*2. The PIC will do all flight planning to each flight they are assigned.*

*3. The PIC must select an alternate airport if applicable for the intended flight.*

*4. The PIC will load the aircraft within its applicable CG limits and weight limitations.*

*5. The PIC will check to make sure the aircraft is in airworthy condition prior to flight.*

**Second in Command** (in the event the Pilot in Command becomes incapacitated)

**Dispatchers**

*The Dispatchers maintain the following items of operational control as authorized by Key Lime Air:*

*Scheduling crews (PIC's and SIC's and Flight Attendants as required) for each flight based on available qualified personnel.*

*Scheduling aircraft for each flight based on available assets.*

*Monitoring the progress of each flight in real time and initiating timely actions when the flight cannot be completed as planned, including diverting or terminating the flight.*

### 11.2 Operational Management Duties and Responsibilities

The COM listed the Key Lime Air operational management positions and duties and responsibilities.

### 11.3 The President

The COM stated that the President had the following responsibilities:

*2.3.1 President*

*1. Has the overall responsibility to maintain a safe and compliant operation.*
*2. Has responsibility for the quality, content and execution of the process of maintaining required management personnel.*
*3. Has the authority in conjunction with the DS to authorize external resources to conduct audits and/or evaluations of KLA operations, the KLA manual system, and external contractors that provide operational services or training to KLA.*
*4. Interfaces and communicates with the DOT for all matters relating to Economic Authority including mandatory reporting.*
*5. Is responsible for the operating budget, vendor selection, and capital expenditures.*

*6. Monitors subordinate(s) performance to ensure employees perform duties and responsibilities in a satisfactory manner.*
*7. May delegate any duty or authority but retains the responsibility.*

**11.4 The Director of Operations**

The COM stated that the Director of Operations had the following responsibilities:

*2.3.2 Director of Operations*

*2.3.2.1 General*

*The DO reports to the Vice President of KLA. The DO must discharge his duties to meet the applicable legal requirements and to maintain safe operations.*

*2.3.2.2 Duties, Responsibilities and Authority*

*1. Has overall responsibility for the quality and content of the following processes:*
*a. Deicing procedures*
*b. All KLA Manual Development and Revisions (Currency, Content Consistency, Distribution, Availability and Supplemental Operations)*
*c. Airmen Duties/Flight deck Procedures*
*d. Passenger Handling/Cabin Procedures*
*e. Exit Seating*
*f. Carriage of Cargo*
*g. Aircraft Performance Operating Limitations*
*h. Lower Landing Minimums*
*i. Computer-based Record Keeping*
*j. HAZMAT (Handling and Training)*
*k. Operational Control and Other Persons with Operational Control*
*l. Load Manifest/Weight Balance Procedures*
*m. MEL Dispatch/Flight Crew Procedures*
*n. Training of Flight Crewmembers, Check Airmen, Instructors, Dispatcher/Flight Follower and Station Personnel*
*o. Simulators/Training Devices, Outsource Crew Training*
*p. Pilot Operating Limitations/Recent Experience/Checks and Qualifications*
*q. Scheduling/Reporting/Pilot Flight Time/Duty Rest*
*r. Appropriate Operational Equipment*

*2. Retains authority to establish and revise the information, instructions, policy and procedures for ALL of the processes listed in item 1 above except Manual Currency/Consistency/Distribution and Availability.*

*3. Responsible for ensuring that all aspects of KLA's Air Carrier Certificate are compliant.*

*4. Serves as a member of the CAS Review Board.*

*5. The DO is responsible to the Chief Inspector to correct any deficiencies reported to*

*him/her by the Chief Inspector are properly corrected in accordance with the procedures in the CAS.*

*6. Has the authority to request amendments to KLA's Air Carrier Certificate when appropriate.*

*7. Actively manages the operational portion of the Weight and Balance program.*

*8. Responsible for the execution and oversight of the Alcohol Misuse Prevention Program (AMPP) and Anti-Drug Program Policy (ADPP).*

*9. Responsible for ensuring all flight operations publications are revised and approved as required to incorporate newly acquired aircraft.*

*10. Manages the Appropriate Operational Equipment.*

*11. Manages the Operational Control (including Other Personnel with Operational Control).*

*12. Manages the Aircraft Performance Operating Limitations process by ensuring all performance information is current and applicable. Manages the Lower Landing Minimums process, when applicable.*

*13. Monitors subordinate(s) performance to ensure employees perform duties and responsibilities in a satisfactory manner.*

*14. Responsible for maintaining a permanent training record for each KLA flight crewmember*

*15. May delegate any duty or authority but retains responsibility.*

*2.3.2.3 OPERATIONAL CONTROL*
*The Director of Operations is authorized to exercise operational control in all aspects of Key Lime Air's operations.*

**11.5 The Director of Safety**

The COM stated that the Director of Safety had the following responsibilities:

*2.3.5 Director of Safety*

*2.3.5.1 Responsible To*

*President*

*2.3.5.2 Duties and Responsibilities*

*The Director of Safety is responsible for the implementation, maintenance and oversight of our safety program.*

*2.3.5.3 Objective*

*His/her main objective is to manage the systematic process of collecting information about hazards, evaluating the risk and developing, implementing and monitoring mitigation strategies. Along with top management, the DOS is the organization's most important safety advocate and holds a top management position.*

*The DOS's lines for communication and data collection regarding safety related issues are unobstructed by management and open to all company and related personnel including but not limited to pilots, mechanics, ramp personnel, etc. The DOS is responsible only to the President which gives him/her unburdened authority to conduct analysis, and implementation of safety related procedures concerning Key Lime Air's operations in accordance with our Safety Program.*

**11.6 The Chief Pilot**

The COM stated that the Chief Pilot had the following responsibilities:

*2.3.8 Chief Pilot*

*2.3.8.1 General*

*The Chief Pilot reports to the Director of Operations. The Chief Pilot must discharge his duties to meet the applicable legal requirements and to maintain safe operations.*

*2.3.8.2 Duties, Responsibilities and Authority*

*1. Manages the following programs:*
- *a. Training of Pilots, Dispatchers, Check Airmen, Instructors*
- *b. Pilot Operating Limitations/Checks and Qualifications*
- *c. Scheduling/Reporting system*
- *d. Flight Crewmember Flight/Duty/Rest time*
- *e. Airmen Duties/Flight deck Procedures*

*2. Has the authority to establish and revise the content of the SOP.*
*3. Responsible for the construction of the KLA flight schedule.*
*4. Monitors subordinate(s) performance to ensure employees perform duties and responsibilities in a satisfactory manner.*
*5. He/she will check and review crew medical certificates and have procedures in case of a temporary medical condition.*

*2.3.8.3 OPERATIONAL CONTROL*

*The Chief Pilot is authorized to exercise operational control in the absence of the Director of Operations.*

**12.0 Safety Management System (SMS)**

The operator did not have a formal 14 CFR Part 5 safety management system (SMS) implemented at the time of the accident, nor was there any regulatory requirement to do so. According to 14 CFR Part 5.1:

*§5.1 Applicability.*

*(a) A certificate holder under part 119 of this chapter authorized to conduct operations in accordance with the requirements of part 121 of this chapter must have a Safety Management System that meets the requirements of this part and is acceptable to the Administrator by March 9, 2018.*

The operator reported that they have had a "system safety-based program" since 2012, but it was not 14 CFR Part 5 SMS compliant. According to the operator, they are on schedule to implement a formal 14 CFR Part 5 SMS before the March 2018 deadline, as required for 14 CFR Part 121 operators. The operator reported that the new SMS will apply to all company flight operations.

KLA's safety program in place at the time of the accident had a Safety Program Manual (SPM), which was a document available to all employees on the company website. The SPM provided a description of the "safety program" and stated in part:

*Purpose*

*The purpose of the Key Lime Air (KLA) Aviation Safety Program is to provide KLA management a means to achieve and maintain the highest degree of safety. [49 USC 44701 and 44702; 121.135(b)(26)]*

*In recognition of this fact, KLA is committed to providing a safe and healthful working environment free of recognized hazards for its employees and a safe operating environment for its customers. KLA has incorporated the principles of SMS (Safety Management System) throughout this safety program and throughout the organization. SMS is not simply a program, but rather a systematic approach to how we do business.*

*Principles of System Safety*

*The foundation of the KLA safety program is built upon the principles of system safety. KLA is committed to eliminating hazards and minimizing potential risks through the diligent practice of risk analysis and risk management. Hazards and incidents resulting from KLA operations shall be identified at all levels. Conditions and acts posing unacceptable risk shall be eliminated or mitigated to prevent personnel injury or illness and property damage or loss. [121.135(b)(1)]*

The operator's SPM defined the safety program's structure and scope, which stated in part:

*Program Scope*

*In pursuit of KLA's commitment to safety, an aggressive safety strategy has been incorporated into all company operations. Safety is not only a responsibility of all KLA management personnel but it is also an individual responsibility and must exist in each employee's thinking, planning, and actions. All KLA personnel, including contract employees, shall be held accountable for fulfilling their responsibilities under this safety program.*

*The organization and structure, which is described in this chapter, for the KLA Safety Program is appropriate for the scope and size of KLA operations. [119.65(b)]*

*Structure and Scope*
*The structure of the KLA Safety Program and assigned safety staff is appropriate for the scope and size of KLA operations [119.65(b)].*

*1. The program is designed to encompass both Part 91 and Part 121 operations.*

The SPM does not state that the Safety Program was applicable to 14 CFR Part 135 company operations, but does state it encompasses both 14 CFR Part 91 and 121 operations.

## 13.0 FAA Oversight

The Certificate Management Office (CMO) was an FAA Flight Standards District Office (FSDO) located in Denver, Colorado. The FAA Principal Operations Inspector (POI) assigned to the Key Lime Air operating certificate at the time of the accident reported that this was the only operating certificate he oversaw, due to his oversight of both 14 CFR Part 121 and 135 certificates the operator held.

## 13.1 FAA Enroute Line Checks

FAA Inspector guidance was found in FAA Order 8900.1. According to the FAA, "this order establishes the Flight Standards Information Management System (FSIMS) as the repository of all Flight Standards policy and guidance concerning aviation safety inspector job tasks. Technically speaking, FSIMS is a Flight Standards directive, which aviation safety inspectors use as the system of record for all Flight Standards policy and guidance."

FAA Order 8900.1 CHG 270, Volume 6, Surveillance, Chapter 2 Part 121, 135, and 91 Subpart K: Inspections (Section 9: Cockpit En Route Inspections) stated, in part:

> *The primary objective of cockpit en route inspections is for an inspector to observe and evaluate the in flight operations of a certificate holder within the total operational environment of the air transportation system. En route inspections are one of the Federal Aviation Administration's (FAA) most effective methods of accomplishing its air transportation surveillance objectives and responsibilities. These inspections provide the FAA with an opportunity to assess elements of the aviation system that are both internal and external to an operator.*

According to the FAA Order, cockpit enroute inspections allow inspectors the opportunity to observe and evaluate crewmembers. The FAA order stated in part:

> *F. Crewmember Observations. Inspectors should observe and evaluate the crew during each phase of flight. This should include an evaluation of crewmember adherence to approved procedures and a proper use of all checklists. The inspector should also observe the PIC's crew management techniques, delegation of duties, and overall conduct. All crewmembers must follow sterile cockpit procedures. Some of the areas that should be observed and evaluated during each flight phase are as follows:*
>
> > *1) Preflight. Inspectors should determine that the flightcrew has all the necessary flight information, including the appropriate weather, dispatch, or flight release information, flight plan, NOTAMs, and W&B information. MEL items should be resolved in accordance with the operator's MEL and*

> *appropriate maintenance procedures. Inspectors should observe the flightcrew performing appropriate exterior and interior preflight duties in accordance with the operator's procedures.*

The FAA order also stated in part that while in-flight the inspector should observe:

> *Airspeed Control*
> *Use of Radar*
> *Use of turbulence procedures*

There was no record that the FAA CMO located in Denver, CO completed an enroute check on the accident flight route, nor was any requirement found to do so. Although no enrotue check was completed on the accident route of flight, the FAA CMO provided a record of 72 enroute checks with Key Lime Air between January 2015 and January 2017. The FAA CMO was scheduled to complete a custom enroute check one day after the accident. The inspector who was scheduled to complete the check reported that he planned to evaluate the fueling, cargo handling and airplane airworthiness release and logbook entries.

**14.0 Previous Fatal Accident with Operator**

**CEN15FA090**

On December 30, 2014, about 0429 mountain standard time a Cessna 404, N404MG, was substantially damaged when it impacted a residential area north of Centennial Airport (APA), Englewood, Colorado. A post impact fire ensued. The airline transport pilot, who also served as the operator's Director of Safety, was fatally injured. The airplane was operated by Key Lime Air under the provisions of 14 Code of Federal Regulations Part 91 as a positioning flight. Night visual meteorological conditions prevailed for the flight, which operated on an instrument flight rules flight plan. The flight was originating at the time of the accident and was en route to Denver International Airport (DEN), Denver, Colorado

The National Transportation Safety Board determined that the probable cause of this accident was the loss of power to the right engine for reasons that could not be determined during postaccident examination and teardown and the pilot's failure to properly configure the airplane for single-engine flight.

## List of Attachments

- Operations - Attachment 1 - Operator Submitted -NTSB Accident Report 6120.1
- Operations - Attachment 2 - NTSB Record of Conversation - FAA KLA POI
- Operations - Attachment 3 - FAA - Inspector Statement
- Operations - Attachment 4 - NTSB Interview Summaries – KLA Flight Followers
- Operations - Attachment 5 - NTSB Interview Summary – KLA - Line Check Airman
- Operations - Attachment 6 -NTSB Memorandum for Record – KLA – Dispatch Email
- Operations - Attachment 7 - NTSB Record of Conversation – KLA – DO – December 15, 2016
- Operations - Attachment 8 - NTSB Record of Conversation – KLA DO & Ops Manager – April 11, 2017
- Operations - Attachment 9 - NTSB Record of Conversation – KLA Director of Safety – April 11, 2017

- Operations - Attachment 10 – KLA 308 - Weight and Balance - Cargo Manifest Documents
- Operations - Attachment 11 - NTSB Memorandum for Record – KLA – Investigative Questions & Answers – February 2, 2017
- Operations - Attachment 12 - NTSB Memorandum for Record – KLA - Investigative Questions & Answers – February 9, 2017
- Operations - Attachment 13 - NTSB Memorandum for Record – KLA – DO
- Operations - Attachment 14 – KLA Example FRAT - LYM308 – December 15, 2016
- Operations - Attachment 15 - Foreflight - User Information Memorandum Email
- Operations - Attachment 16 – KLA - Airman Competency & Proficiency Check Records
- Operations - Attachment 17 – KLA - Ground School Tests
- Operations - Attachment 18 – KLA - Ground School Training Records
- Operations - Attachment 19 – KLA - SA-227 - Aircraft Checklist
- Operations - Attachment 20 – KLA - Pilot Background - Internal Records
- Operations - Attachment 21 – KLA FAA Enroute Check Record
- Operations - Attachment 22 – KLA Company Operations Manual Excerpts
- Operations - Attachment 23 – KLA Safety Program Manual Excerpts
- Operations - Attachment 24 – KLA Meteorology Training PowerPoint
- Operations - Attachment 25 - Additional Ops Group Documentation Excerpts

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