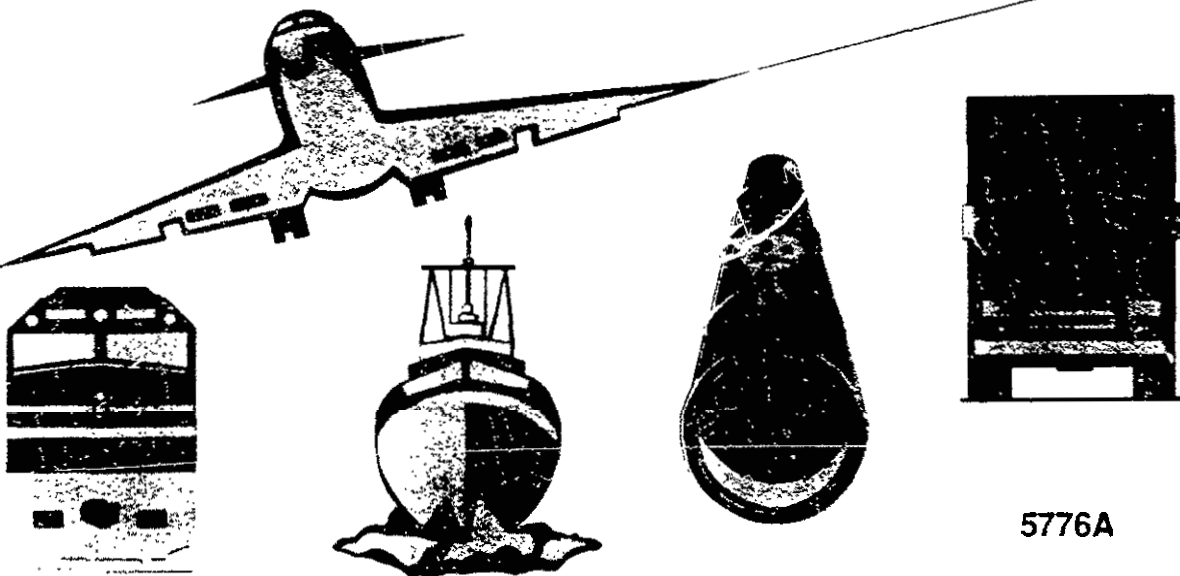


NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C. 20594

AIRCRAFT ACCIDENT REPORT

TOMY INTERNATIONAL, INC.
d/b/a SCENIC AIR TOURS
FLIGHT 22, BEECH MODEL E18S, N342E
IN-FLIGHT COLLISION WITH TERRAIN
MOUNT HALEAKALA, MAUI, HAWAII
APRIL 22, 1992



5776A

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MOUNT HALEAKALA, MAUI, HAWAII
APRIL 22, 1992**

**Adopted: February 2, 1993
Notation 5776A**

Abstract: This report explains Scenic Air Tours flight 22's collision with mountainous terrain on the Island of Maui, Hawaii, while the Beech E18S airplane was on an air tour flight from Hilo, Hawaii, to Honolulu, Hawaii, on April 22, 1992. The safety issues discussed in the report include visual flight in instrument meteorological conditions, navigational errors, pilot preemployment qualifications and background checks, and the overall safety of the air tour industry. Recommendations concerning these issues were addressed to the Federal Aviation Administration and to Tomy International, Inc., d/b/a Scenic Air Tours.

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EXECUTIVE SUMMARY

On April 22, 1992, about 1553 Hawaiian Standard Time, Scenic Air Tours flight 22, a Beech Model E18S, N342E, collided with mountainous terrain on the Island of Maui, Hawaii, while on an air tour flight from Hilo, Hawaii, to Honolulu, Hawaii. The flight was conducted under the provisions of on-demand air taxi operations contained in 14 Code of Federal Regulations Part 135 and under visual flight rules. The pilot and the eight passengers aboard sustained fatal injuries. The airplane was destroyed by impact forces and a postcrash fire.

The National Transportation Safety Board determines that the probable cause of this accident was the captain's decision to continue visual flight into instrument meteorological conditions that obscured rising mountainous terrain and his failure to properly use available navigational information to remain clear of the Island of Maui.

Contributing to the accident was the failure of Scenic Air Tours to conduct substantive pilot preemployment background screening, and the failure of the Federal Aviation Administration to require commercial operators to conduct substantive pilot preemployment screening.

The safety issues raised in this report include:

1. Visual flight in instrument meteorological conditions.
2. Pilot qualifications and preemployment background checks.
3. The overall safety of the air tour industry.

As a result of this investigation, the Safety Board issued safety recommendations to the Federal Aviation Administration and to Tomy International, Incorporated, d/b/a Scenic Air Tours, Hawaii.

■ ■

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

AIRCRAFT ACCIDENT REPORT

TOMY INTERNATIONAL, INC.
d/b/a SCENIC AIR TOURS
FLIGHT 22, BEECH MODEL EUS, N342E
IN-FLIGHT COLLISION WITH TERRAIN
MOUNT HALEAKALA, MAUI, HAWAII
APRIL 22, 1992

1. FACTUAL INFORMATION

1.1 History of the Flight

On April 22, 1992, about 1553 Hawaiian Standard Time, Scenic Air Tours (SAT) flight 22, a Beech Model E18S (BE-18), N342E, collided with mountainous terrain on the Island of Maui, Hawaii, while on an air tour flight from Hilo, Hawaii, (ITO) to Honolulu, Hawaii (HNL). The flight was conducted as an on-demand air taxi operation under the provisions of Title 14 Code of Federal Regulations (CFR) Part 135 and under visual flight rules (VFR). As a result of the accident, the pilot and eight passengers on board sustained fatal injuries. The airplane was destroyed by impact forces and a postcrash fire.

SAT flight 22 departed Hilo at approximately 1512 to proceed to Honolulu via a nonstop route of about 215 nautical miles (nmi). At 1542, the pilot contacted the HNL flight service station (FSS) and communicated his intentions to overfly restricted area¹ R-3104 at 6,500 feet msl. The restricted area is about 5 nmi southwest of the Island of Maui and along a direct return route toward Honolulu.

The last communication with flight 22 occurred at approximately 1550 when the pilot transmitted a position report to another SAT flight that was about

¹Restricted Areas contain airspace in which the activities of aircraft must be confined, in this case due to periodic military training exercises involving artillery firing or aerial gunnery.

70 miles/30 minutes in trail. SAT flight 22 reported its position as, "37 DME² off Upolu,³ standby Lanai."

At 1553, the Honolulu FSS remote radio receiver site on Mt. Haleakala detected an emergency locator transmitter (ELT) signal, which ended at 1600. At 1719, SAT officials reported to the Federal Aviation Administration (FAA) that flight 22 was overdue. Shortly thereafter, a coordinated sea and air search was initiated. Search resources included a Coast Guard helicopter, two fixed-wing airplanes, and Coast Guard Cutter *Washington*. The following morning, the wreckage was located on Mount Haleakala, slightly above the elevation of 9,600 feet.

Pilot reports, Geostationary Operational Environmental Satellite (GOES) data, and evidence from atmospheric instrumentation based in the area of the accident site indicate that instrument meteorological conditions (IMC) prevailed at the time and location of the accident. The weather data indicate that the southern and eastern slope and summit of Mt. Haleakala were obscured by clouds. The cloud bases were about 1,000 feet msl.

On the day of the accident, SAT operated flight 22 as tour number 5, which was described in marketing literature as a "Volcano Special." The planned itinerary was for a departure from HNL at 0700 eastward to Hilo via the north shore of the islands of Molokai and Maui. (See figure 1). The tour included overflight of the Kilauea Volcano on Hawaii, "The Big Island," for aerial viewing before landing at ITO about 0900. Passengers were to deplane for a 6-hour ground tour. The return flight was to depart ITO about 1500 and proceed westbound nonstop to HNL. En route sightseeing included a view of the Akaka Falls shortly after departure and overflight of the Islands of Molokini, Lanai and Molokai. The scheduled arrival for the return flight was about 1630.

About 0545, the captain of flight 22 reported for duty at the company operations facility. His demeanor was described by his associates as normal in all respects. He was observed reviewing the aviation weather information for the

²Distance Measuring Equipment. Equipment (airborne and ground) used to measure, in nautical miles, the slant range distance between an aircraft and a DME navigational transmitter on the ground.

³Upolu Point is the northwesternmost land mass along the shore of the Island of Hawaii. The Upolu Point (UPP) VOR [very high frequency omnidirectional radio range] is located on a ridgeline about 5 nmi inland.

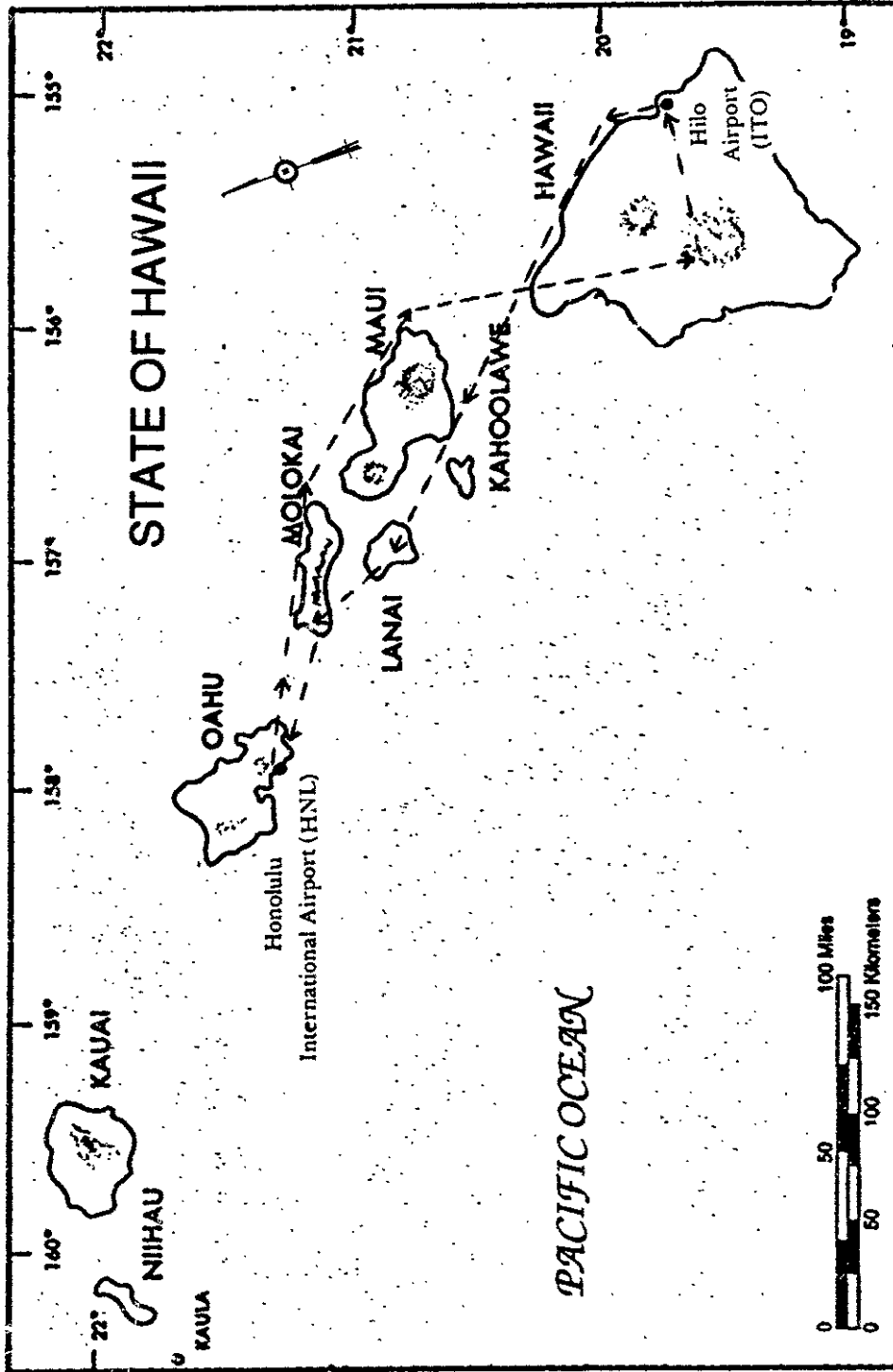


Figure 1.--Tour route.

Hawaiian Islands and preflighting **N342E**, the airplane that he was regularly assigned to fly.

On the day of the accident, the flight itinerary differed from the planned route in that the flight was scheduled to land in Maui to drop off a **company van** driver while en route to Hilo. Transportation of nonrevenue passengers occasionally **took** place to provide additional company support for the ground transportation of tour groups.

There was **also an** added passenger pickup **mission** after the completion of flight **22** in **HNL**. The captain was scheduled to return to Maui to pick up a **group of** tour passengers awaiting a late afternoon return to **HNL**.

Flight **22** departed **HNL** at approximately 0700. The van driver occupied the right front cockpit seat. He related that the captain's behavior appeared to be normal and that the preflight briefing for the passengers, the taxi out, pretakeoff engine runup and flight to Maui were unremarkable. The landing at Maui **was** routine. **The** driver disembarked from the airplane and did not pay further attention to the departure.

The airplane landed in Hilo about **0920**. The captain telephoned the company about **0930** with an arrival message. A brief discussion followed about tour assignments for the next day.

Several flightcrew-related activities took place during the subsequent ground time of approximately **6** hours. The chief pilot for SAT was at ITO on the morning **of** the day **of** the accident. He shared small talk with the captain over a **soft** drink and reported that the captain appeared normal in all respects. They last spoke about **1130**. The captain requested that the main fuel tanks of **N342E** be "topped off." He received 60.2 gallons **of** 100 low lead fuel. A fellow SAT line pilot and personal friend had landed in Hilo (**SAT flight 23**) about **1315**. The two pilots had lunch and remained together from approximately **1315** to 1450. During this period, the captain seemed rested and relaxed as they shared small talk, according to **his** friend.

About 1512, SAT flight 22 departed ITO with the original eight passengers en route to **HNL**. After departure at **1520**, the captain radio-filed a VFR flight plan with the **HNL FSS**. He stated that his routing would be direct to **HNL** with an en route time of 1 hour and 25 minutes with **4 hours** of fuel onboard. The

captain **then** requested and was provided a full VFR weather briefing by the FSS specialist **on** duty. The briefing included an advisory that VFR flight was not recommended over the interior sections of all islands **and** a forecast for isolated **areas** of 3 miles visibility because of **haze and** moderate **rain** showers.

SAT personnel described the normal return route from Hilo to **be** flown at 2,500 feet msl **as** follows:

night westbound along the north coast of Hawaii; upon reaching **Upolu** Point, continued flight westbound **or** about a 294-magnetic heading (see figure 2) to **overfly** the village of Makena on the southern shore of Maui, pass over Lanai, and then **return** to Honolulu **on** about a 290-magnetic heading.

While en route, at 1542, the captain called **the** HNL FSS to inquire about the status of restricted area X-3104 over the island of Kahoolawe. **The** restricted area is a few miles south of the company's normal ITO/HNL routing.

The pilot was advised **#at** X-3104 was closed from the surface to 5,000 feet **msl** and that transition at 5,000 feet msl or **below** was **not** authorized. The captain replied that he would be flying over the top at 6,500 feet msl. **The** captain was subsequently advised that transition through R-3104 above 5,000 feet was authorized for the next 30 minutes. The HNL FSS had no further communication with flight **22**.

The captain of SAT flight 23 stated that he departed ITO about **1540**, approximately 30 minutes in trail of the accident flight. Approximately 10 nmi west of **ITO, near Akaka** Falls, he opened a return route VFR flight plan with the HNL FSS. Then, on company frequency 122.75 MHz, the captain of SAT flight 23 requested a position report from flight 22. It was in reply to that request that the captain of flight 22 indicated **his** position **as** 37 nmi from Upolu.

The captain of flight 23 reported that his return flight to HNL was conducted initially at 2,000 feet, then at 3,000 feet, and finally at 6,000 feet msl while crossing the channel between Upolu Point and **Lanai**. He remained **on or** south of the 294-degree radial of the UPP VOX as he passed Maui. He reported **that** there were multiple layers of scattered clouds in the area of Makena, Maui, with tops at around 8,000 feet msl. He said he could not see Mt. Haleakala because of restricted visibility from haze.

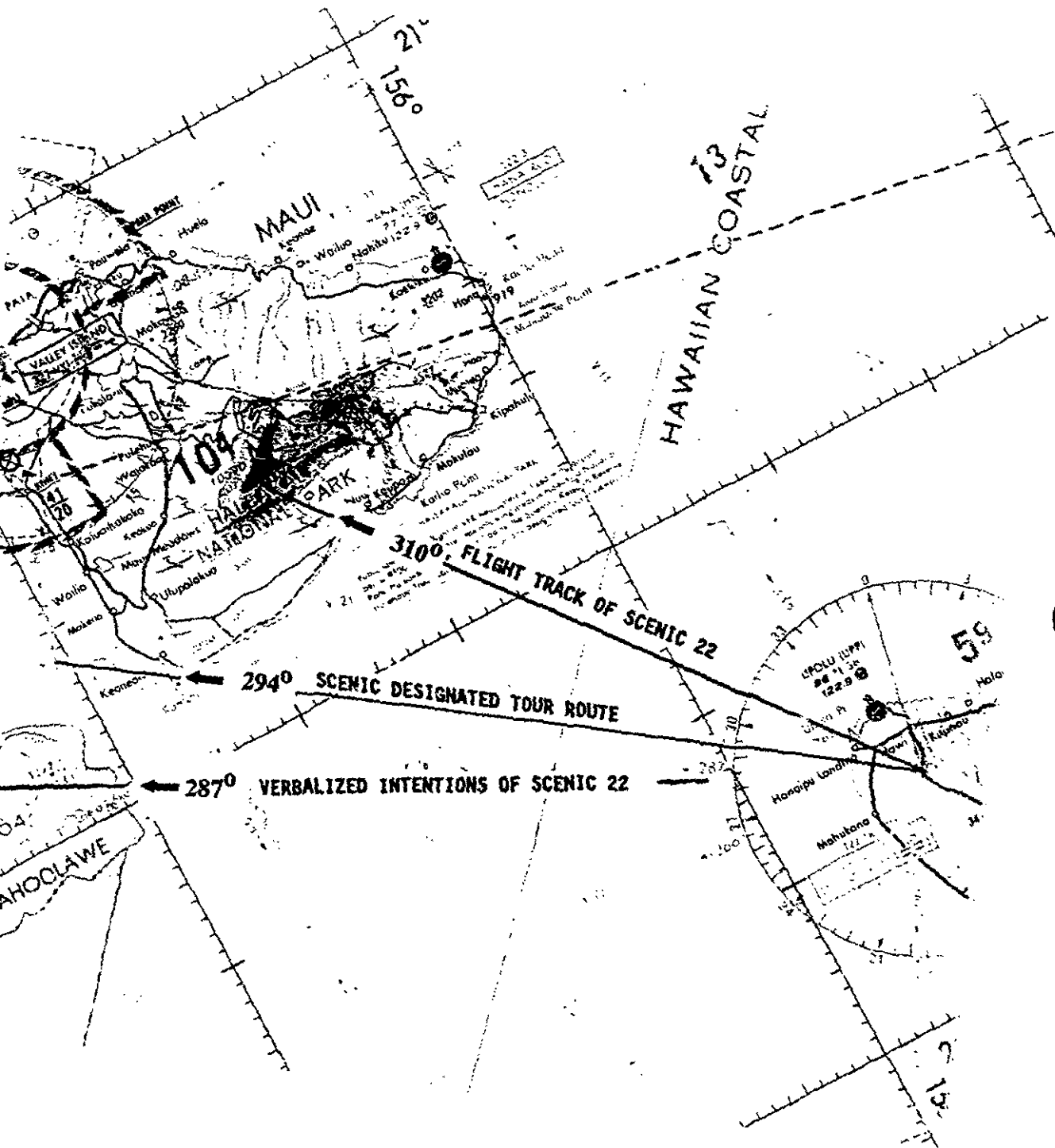


Figure 2.--Return route from Hilo

The Department of the Navy's Fleet Area Control and Surveillance Facility (FACSFAC) at Pearl Harbor, Hawaii, provided radar data that records target position, altitude, and discrete transponder beacon code information. A review of this data showed a radar track of flight 22 northwest of the UPP VOR which terminated approximately 2.1 nmi from the accident site. (See figure 3). The Mode C (altitude readout) of flight 22 showed an initial altitude of 5,500 feet and a continued ascent until the last recorded altitude of 8,500 feet msl. It was determined that flight 22 crossed the shoreline of Maui at 8,100 feet.

A witness standing near the summit of Mt. Haleakala at the White Hill observation point from approximately 1545 to 1615 did not see the airplane but reported hearing engine sounds for 10 to 15 seconds from what he believed to be a multiengine airplane. From the sound, he believed the airplane was headed toward him in a southerly direction. The engine noise was described as smooth until it stopped abruptly. The witness reported that the Mt. Haleakala volcano crater was obscured by heavy, rolling clouds. The accident occurred during the hours of daylight at 20 degrees 42 minutes and 33 seconds north latitude and 156 degrees 14 minutes and 48 seconds west longitude.

1.2 Injuries to Persons

<u>Injuries</u>	<u>Crew</u>	<u>Passengers</u>	<u>Others</u>	<u>Total</u>
Fatal	1	8	3	9
Serious	0	0	0	0
Minor/None	0	0	--	0
Total	1	8	0	9

1.3 Damage to Aircraft

The airplane was destroyed by impact and postcrash fire. The value of the airplane was estimated at \$50,000.

1.4 Other Damage

None.

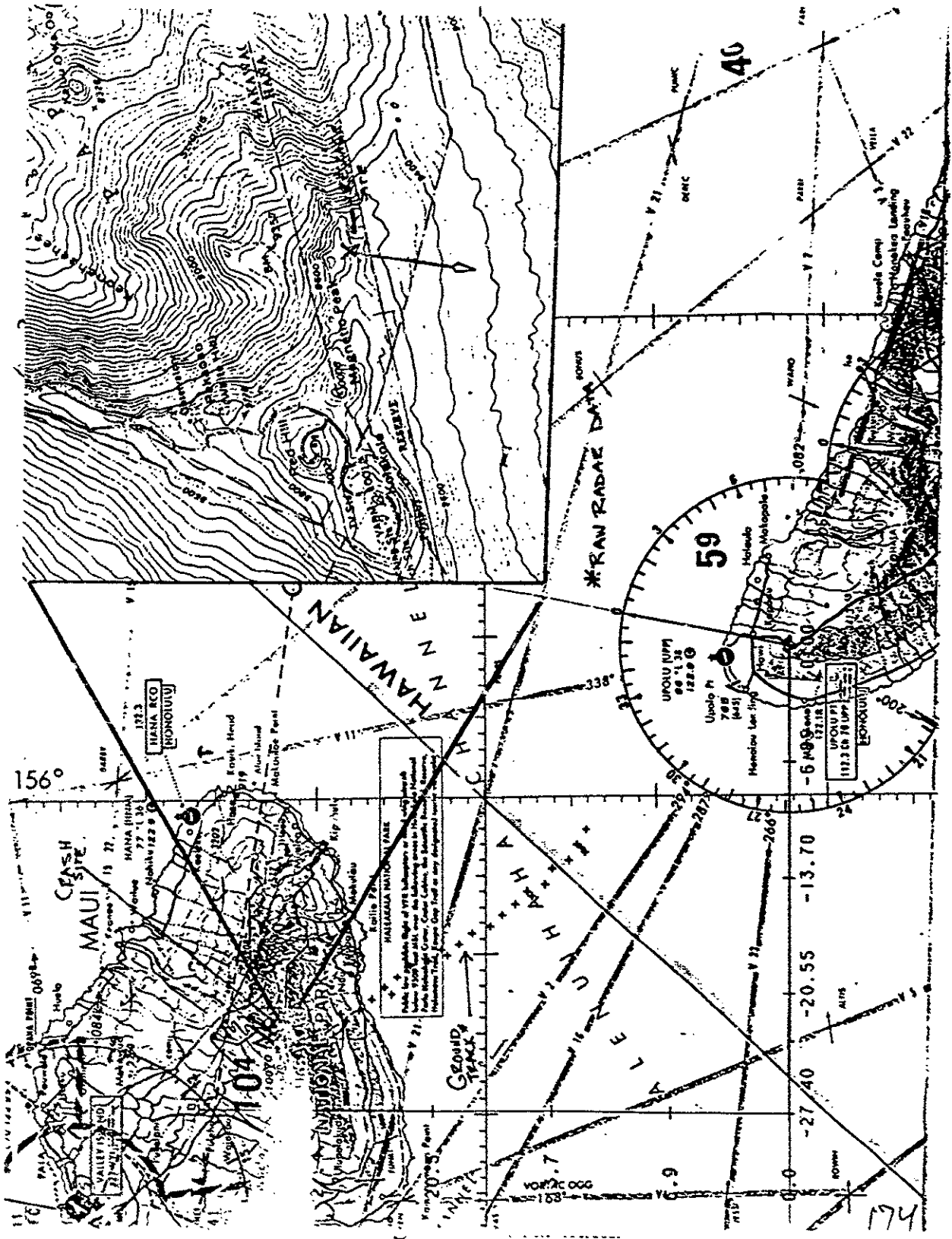


Figure - Radar track.

1.5 Personnel Information

The captain, male, age 26, was originally employed by SAT from January to August 1988 as a van driver. During *this* period he attained an FAA Commercial Pilot certificate and an Instrument Rating. He left SAT to pursue full time pilot employment. In August 1991, he was rehired by SAT as a pilot-in-command on the BE-18 airplane. He possessed an Airline Transport Pilot certificate without type rating issued on January 14, 1991. The certificate contained ratings and limitations of airplane multiengine land with commercial privileges for airplane single engine land. His first-class medical certificate, dated February 11, 1992, contained no limitations. FAA records did not indicate any prior accident/incident history or enforcement actions. The captain satisfactorily completed all company training and no company disciplinary actions were recorded

Before beginning flight training with SAT in August 1991, the captain took five or six familiarization (FAM) rides as an interested observer. His initial new-hire training included 16 hours of ground instruction provided by the SAT Director of Operations. The training included instruction in Federal Aviation Regulations (FARs), the company operations manual, aircraft differences, weight/balance, flight procedures, tour procedures and narration, meteorology, and emergency procedures. The meteorology ground training outline did not contain any details of mountain flying or mention specific atmospheric and geological conditions that are unique to the Kawaiian Islands.

The captain completed 3.6 hours of initial flight training on August 2. Prior to going on line as a tour pilot, the captain received one initial operating experience (IOE) route check.

On February 20, 1992, the captain satisfactorily completed a 14 CFR Part 135.293 and 135.299 competency and proficiency check. The check was 1.5 hours duration and was administered by SAT's Director of Operations, an FAA authorized check airman in the BE-18. Items noted as satisfactory during the check included the following:

Inflight Maneuvers - steep turns, approaches to stalls, specific flight characteristics, powerplant failure; Emergencies - normal and abnormal procedures, emergency procedures; Instrument procedures-communication/navigation procedures; General-judgment.

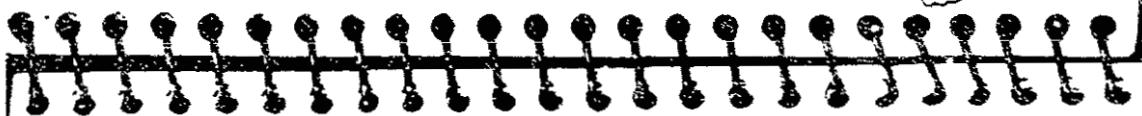
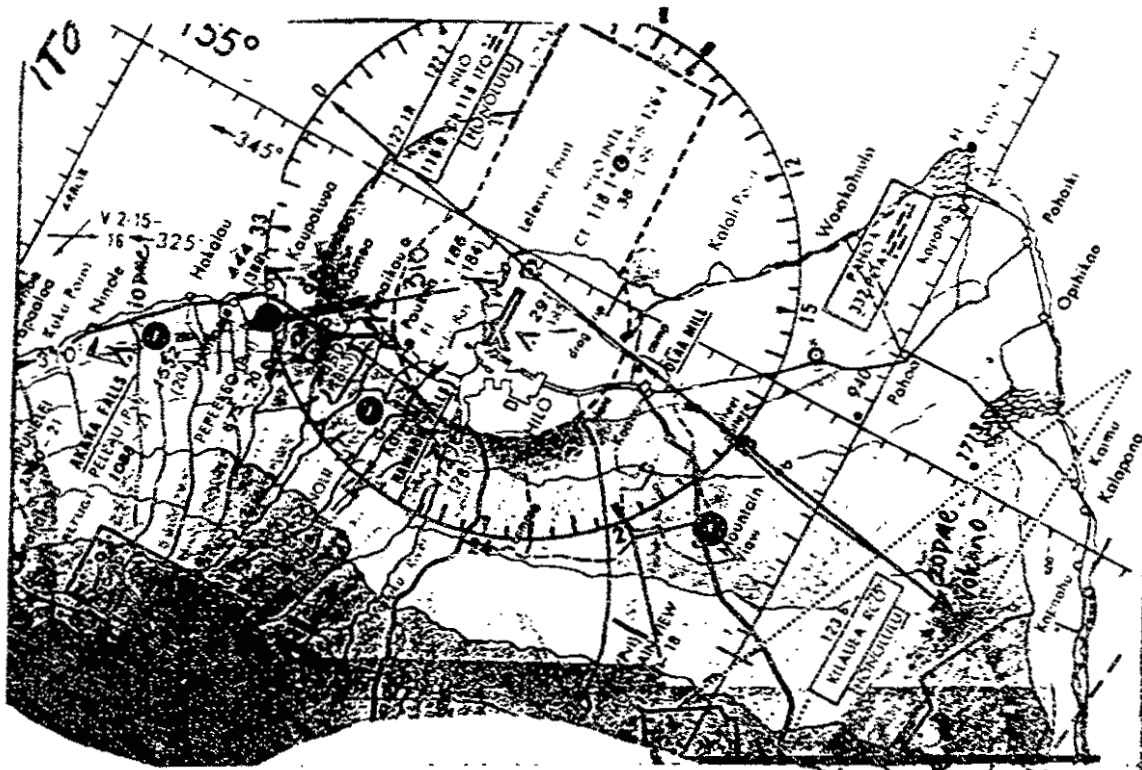
The Chief Pilot and the Director of Operations both stated that the instrument training and flight check were performed by having the pilot either lower his seat or use a view restricting device for about 10 minutes. Slow flight, steep turns, stalls and recover), from unusual attitudes with reference to basic instruments were not part of the training.

The Director of Operations stated that during each captain's ground training, he presented recommended headings and altitudes to fly along the tour routes, weather permitting. The distances between islands for the various sightseeing routes were also discussed. The director said that he encouraged each pilot to include such information in a navigation memory aid booklet for reference but that he did not require them to do so.

The captain's memory aid booklet, found at his home, was provided to the Safety Board by his parents. The booklet indicated the following: The 310 degree radial of the ITO VOR (116.9 MHz) after departure from ITO passes Akaka Falls. Continuing on the ITO 310 radial places aircraft north of Hana, Hawaii (northeastern tip of Maui). The UPP VOR (112.3 MHz) 335-degree radial also leads to Hana. The 294 degree radial of UPP passes Makena, a small settlement on the southern coast of Maui. The booklet did not contain any DME distances between the UPP VOR and Maui. The information contained in Figures 4a and 4b was excerpted from the captain's booklet. The captain's most recent flight history before the accident included four round trips to Hilo on April 17, 18, 20, and 21. On the day before the accident, he flew a route identical to that of the accident flight. However, the trips on the 3 previous days were flown with routing northbound from Hilo direct to Hana, Maui, via the 310-degree radial/heading from the Hilo VOR.

A captain's bag with "Jeppesen" embossed on it was recovered from the scene of the accident. The bag contained aviation-related paraphernalia, including photocopies of Hawaiian Islands approach plates in plastic covers with "Hutch Airlines" stamped on them and a folded VFR aviation sectional chart of the Hawaiian Islands.

The captain lived at home with his parents. His full time employer was SAT. Information on his activities for the 72 hours prior to the accident was obtained from his parents and individuals who observed him during this period. None of the activity was remarkable.

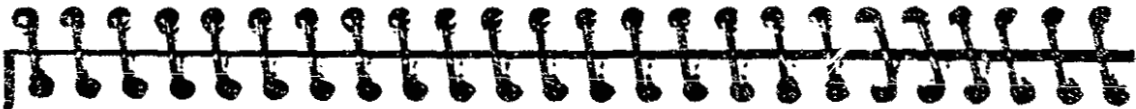


ITO - 4.10
 TWR : 118.1
 GND : 121.9
 App. : 119.7
 RCO CENTER 126.5

ATIS: 126.4
 FSS : 122.6 or 122.2
 VOR : 116.9
 ILS : 110.7 - 259°
 RWY 26
 FN

38°

Figure 4a.--Information from captain's memory aid booklet.



~~the~~ "Big Island" or "Orchid Isle" pop: 82,000
 - Alanihaha channel to Kona.
 - one of deepest in world - Marlin - 18000' deep.

Kona - Base of Hualalai mtn. (3rd tallest) 8,200'
 - dormant volcano erupted in 1801.
 - Built on lava flow 20 yrs ago.
 - home of the Ironman triathlon - October.
 - Grow Mac nuts, coffee, guava, mango.

2 types of lava - "a'a" - dark color - jagged. - 1mi/day
 pa hōtē hōe - 40mi/hr - light - smooth.

Kona Village - excellent resort - one road in -

Figure 4b.--Information from captain's memory aid booklet.

Attempts to locate the captain's personal flight log were not successful. A SAT Pilot Experience Form, signed and completed by the captain on July 28, 1991, indicated that his total flight time was **3,400** hours, of which **3,200** was as pilot-in-command. The form further indicated that his twin engine experience was **1,450** hours. He reported his total instrument flying time as **400** hours, of which **150** hours was accrued under actual flying conditions.

To illustrate his relevant pilot experience, the captain provided SAT with an undated resume of his general aeronautical background. The resume was divided into sections consisting of qualifications, flight experience, aircraft experience, navigation experience, and employment history. The res-me showed the following:

Total time: **3,200** hours
Pilot-in-command: **2,750** hours
Multiengine: **1,500** hours

Under the section entitled Aircraft Experience, the captain indicated that he had prior experience in the **BE-18** airplane.

Under the section entitled Employment, the captain indicated that he had been employed as a pilot by **six** different companies between January 1988 and June 1991. The name of each company was provided. The resume did not include the flight hours accrued with each company, or the specific address and telephone number and point of contact for each company.

The captain's documented aeronautical experience in flight hours was reconstructed using information from previous employers, his FAA airman certification records, and his FAA aeromedical certification file. At the time he was hired as a captain by SAT in 1991, those records indicated that he had accumulated fewer than **1,600** hours of total time and less than **400** hours of multiengine experience. SAT's minimum pilot experience requirement was **2,500** total time and **1,000** hours in multiengine airplanes. Including all of the pilot experience known to the Safety Board, the captain had no more than **2,100** hours of total time, of which **800** hours were in multiengine airplanes as of the time of the accident.

Available records indicate that the captain's total flight time in the **BE-18** was accrued only with SAT and totaled **464.7** hours. His flight time was

extracted from **SAT** flight records. His duty times were within the prescribed **FAA** limits.

SAT's Director of Operations said that the hiring of the captain in July 1991 for a pilot position in the **BE-18** was based, in part, upon the recommendation of the previous owner of the company. He said the company did not **have** a policy to verify applicant background. The preemployment check he made into the captain's aeronautical experience consisted of a telephone **call** to a **14 CFR Part 135** cargo and charter operation headquartered at HNL, where the captain had worked between August 1988 and July 1989. **That** operator reported that the captain had flown single engine day and night operations. He departed employment in **good standing** to join a major air carrier on the mainland.

Records at the major carrier indicate the captain was dismissed **during** initial ground training for **inadequate** performance.

The Safety Board investigation revealed that the captain had **been** employed by at least nine employers, including two positions **wiii SAT** under different owners, since 1988. Five of these employers had dismissed **him**. Causes for dismissal included **misrepresentation** of **qualifications** and experience, **failure to** report for duty, **disciplinary** action, poor training performance, and **work** performance that was below standards.

In 1991, a scheduled Part **135** operator, Aloha IslandAir, rejected the captain's application for a pilot position for failing to disclose information and misrepresentation concerning previous employment. The application included a letter of recommendation submitted on stationery of the captain's most recent employer. Safety Board investigators were advised by the former employer **that** the letter did not come from an official source at the company and they considered the letter to be fraudulent.

1.6 Aircraft Information

More than 1,800 BE-18 series airplanes were built between 1945 and 1970. The airplane is classified as a light cabin class **aircraft** (under 12,500 pounds gross takeoff weight). It **is** powered by two Pratt and Whitney R-985 radial engines, each developing **450** horsepower.

The accident airplane, **N342E**, a Model **E18S** "Super **18**," was manufactured in **1957**. The passenger seating configuration was last modified by Supplemental Type Certificate (STC) **SA19250** for nine high density passenger seats on December 8, 1975.

The airplane was modified over its life from an initial approved maximum gross weight of **9,300** pounds to a maximum gross weight of **10,100** pounds. The most recent major alteration of the airplane was recorded on June 29, **1981**, when the **10,100** pound gross weight modification was accomplished in accordance with Hamilton Aircraft Company STC **SA572WE**. Records indicated that **N342E** was the only **BE-18** operated by **SAT** that had a **10,100** pound gross takeoff weight.

Examination of the airplane's log books indicated no open or deferred maintenance items at the time of the accident. Records showed that the airplane was in compliance with applicable airworthiness directives.

N342E was equipped with basic flight instruments, as well as vacuum gyroscopic instruments and radio navigation equipment required for instrument flight. Heading information was provided by a magnetic compass and an unslaved directional gyro. There was an attitude indicator and a turn and slip indicator. **VOR** signals were displayed on a course deviation indicator. The airplane was not equipped with a remote magnetic directional indicating system. Also, the airplane was not equipped with a ground proximity warning system (GPWS).

On October 27, 1989, the operator requested that the **FAA** modify the company operating specifications to delete all items pertaining to **IFR** operations. The operator stated that it was not cost-effective to continue such operations. The company was thereafter authorized to conduct day and night operations, **VFR** only.

An interview was conducted with a pilot who flew **N342E** for **3.3** hours the day before the accident. He reported that the magnetic compass indicated the general direction of the cardinal heading and was properly maintained when he inspected it as part of his preflight duties. No abnormal compass operation was noticed during flight. At takeoff, the directional gyro was aligned with the runway heading. During the flight, he reset the directional gyro to the magnetic compass every 10 to 20 minutes. He did not notice any significant difference

between the two instruments. He said that he did not perform a VOW check⁴ because VFR was the only type of flying conducted at SAT. However, he noted that when he used the navigation equipment to report his position while under air traffic control (ATC) radar, the VOR agreed with the radar location. The VOR did not show any erroneous information during flight. He also characterized the climb performance of N342E as not significantly different from that of other SAT airplanes.

SAT's Director of Operations said that the weights of the passengers were primarily based upon the estimates of the tour agents, or were provided by the passengers to the agents, and then telephoned or sent by facsimile to SAT operations. The line pilot also had the option of ascertaining the weights of the passengers. However, SAT personnel acknowledged that passengers were never weighed and were rarely, if ever, asked to provide their weight. The investigation revealed that SAT did not own a scale suitable for weighing passengers.

A copy of the Passenger Manifest/Weight & Balance Form for N342E for the accident flight on April 22, 1992, was completed and signed by the captain. Examination of the form revealed that the recorded passenger weight prior to the departure from HNL did not subtract the weight of a passenger who had canceled. The manifest also showed that the airplane was refueled with 340 pounds of fuel in Maui and that no fuel was added in Hilo. A fuel receipt showed that flight 22 was not refueled in Maui, but that in Hilo 60.2 gallons (361.2 pounds) were added. Despite two these two errors in the flight records documentation, postaccident calculations revealed that the weight and balance at takeoff and at the time of the accident were within FAA prescribed limits for the airplane.

1.7 Meteorological Information

The HNL FSS reported that there were no SIGMETs (significant meteorological information) or AIRMETs (airman's meteorological information) that were valid for the Mt. Haleakala area around the time of the accident.

The characteristics of the weather in the area of Haleakala National Park at the time of the accident were obtained from atmospheric instrumentation, observations by individuals near the summit of the crater and pilot reports.

⁴Verification of VOR receiver performance through the use of a ground-based test signal or confirmation of actual geographical position.

A building complex located on the **summit** of Mt. Haleakala is **known** as Science City. National Weather Service (NWS) Automated Meteorological Observation System (AMOS) instrumentation is part of the scientific equipment **within this complex.**

Included in the NWS data from the summit was a video recording taken from a wide field-of-view camera. The camera, which monitors cloud and fog activity on the summit, is aimed in a northeasterly direction. **This** view is toward the accident scene and about 200 feet **higher** than the crash site in elevation. **An** exposure is recorded at 8-second intervals. **A tape** extract was prepared to illustrate the existing conditions from about **1** hour before the accident until 1 hour **after** it occurred. The video documents **an** almost continuous cloud cover moving over the summit of the crater.

A solar observer at Science City said that the weather at the crater at **1545** was foggy and that because of *this* condition, the observatory dome was **closed** from 1430 to 1730. **During this** period, **he saw** fog rise **up the southern slope** of the volcano. He described the cloud layer as fairly thick at 9,500 feet to 10,000 feet msl and level with the dome. The observer estimated that the Kona (southern wind) was blowing at **10 to 15** miles **per** hour.

At **1554**, the NWS specialist on duty at the Kahului Airport, about **12 nmi** from the crash scene, performed visual observations of the weather conditions toward the area of Haleakala National Park. Clouds were hanging over the slopes leading to the crater, however no showers were observed. The NWS observer **could** not see the Pukalani area (about 6 nmi distant) or Mount Haleakala.

The pilot of a U.S. Marine Corps Beech **C-12** airplane reported flying within about **2** miles south of the center of the Haleakala Crater about **1550**. He was at **flight level 210** (about 21,000 feet msl) headed in **an** easterly direction toward ITO. The pilot reported that a heavy cloud layer surrounded the area of the crater. He described **an** opening in the cloud cover of about 350 yards by 350 yards which enabled him to observe one of the domes within Science City; otherwise, he said the area surrounding the crater was totally obscured. The pilot characterized the lower area of Kihei, a city on Maui about 10 miles east **of** the accident site, as **surrounded** by a solid cloud layer. The pilot reported no variations in **his** navigation instruments during overflight of the crater **or** the Science City facilities.

Flight 23 was following about 30 minutes behind the accident airplane. Both airplanes had the same company-planned tour route for the return to Honolulu. The pilot of flight 23 reported that he followed a track that remained on or south of the 294-degree radial of the UPP VOR. He related that the slopes that make up Haleakala National Park were obscured by clouds and rain showers. Visibility was 3 to 5 miles in haze. Maui was not visible except for the village of Makena and the areas south of Makena.

Upper air data from Hilo, Hawaii, around the time of the accident indicates winds easterly at 2,000 feet with a speed of 4 knots, changing to west southwesterly at 10,000 feet with a speed of 14 knots.

1.8 Aids to Navigation

There were no reported anomalies or equipment outages regarding aids to navigation. The HNL Flight Inspection Field Office (FIFO) conducted en route flight checks on the ITO and UPP VOR facilities on May 5, and 6, 1992. No discrepancies were observed.

The manager of the U.S. Air Force Optical Station at Science City on Mt. Haleakala reported that the Maui Space Surveillance Site (MSSS) facility does not have lasers or electronic devices capable of causing airborne flight instrumentation interference. There are no particle beams at the MSSS. On the day of the accident, the MSSS was not conducting laser operations outside the confines of the building. An 8-milliwatt low-powered helium neon (eye safe) alignment laser was operated in the afternoon within the facility; however, the dome was closed the entire afternoon, preventing the beam from leaving the observatory. The manager stated that it is standard procedure at the MSSS to coordinate with the FAA all laser operations conducted outside the observatory.

1.9 Communications

There were no known communications difficulties. There was no SAT or FAA requirement for flight following communications between the tour airplane

and the company or between the airplane and ATC except for normal VFR position reports.⁵

1.10 Aerodrome Information

Not applicable.

1.11 Flight Recorders

N342E was not equipped, nor was it required to be equipped, with either a cockpit voice recorder or a flight data recorder.

1.12 Wreckage and Impact Information

The airplane was found aligned on a magnetic heading of approximately 200 degrees or a descending slope of about 9 degrees. The terrain consisted of loose gravel and lava rocks. The area immediately under the center and aft fuselage sections was covered with ashes from the airplane and its contents. There was no indication of fire or burning of fluids found outside the immediate area of the accident site. The initial point of impact was indicated by paint scrapings and glass fragments that were about 20 feet behind the tail of the airplane.

The center fuselage section of the airplane was consumed by fire. Both wings were still attached to the fuselage. The lower spar strap was found installed and intact. The inboard areas of the wings, near the fuselage, were burned. Wing sections outboard of the engine attach points were not burned. The fabric-covered aileron surfaces on both wings were totally burned. The aluminum ribs under the fabric were intact. The horizontal and vertical stabilizers were attached. All flight control surfaces and trim tabs were found attached. Flight control system cable continuity was established to the point of impact-related damage. There was no evidence of preimpact failure of any flight control system component. The trailing edge flaps and the landing gear were found in their retracted positions.

The right engine was located forward of the wreckage approximately 90 feet. The two-bladed propeller was damaged but still attached to the engine.

⁵FAA Right Service provides "Hawaiian Island Reporting Service," an optional flight following program utilizing communications monitoring. However, SAT flights were not part of this program.

There were **ground** impact marks similar to propeller strikes found in a line from the wing to the resting place of the engine. Oil was found splattered along the ground from the wing to the engine. The left engine, with one propeller blade and a portion of the other blade, remained attached to the wing. The separated piece of propeller blade was located nearby. The propellers had evidence of chordwise scratches, spanwise twisting, and bending opposite the direction of rotation. There was no indication of preexisting failure of either engine or propeller.

The pilot seat was unburned and found lying about 60 feet forward of the main wreckage. The bottom cushion of the seat was damaged in a manner consistent with **high** vertical deceleration forces. The copilot seat was found approximately 30 feet in front of the wreckage.

Nine metal passenger seat frames were removed from the wreckage. Damage to the seats appeared **similar**. The forward left (as viewed from aft looking forward) support leg of most of the seats was bent or broken. All of the seat materials, other than the metal frames, were consumed by fire.

Cockpit switches, instrumentation such as the attitude indicator, airspeed indicator, altimeter, engine-indicating instruments, navigation equipment and indicators, and communication equipment were examined; however, extensive fire and impact damage precluded any useful determination of preimpact readings. There was no evidence of open maps or charts in the cockpit debris.

1.13 Medical and Pathological Information

The medical examiner determined that the **cause** of death for all occupants of the airplane was multiple traumatic injuries.

The examination of toxicological specimens from the pilot revealed that no alcohol or performance impairing drugs were present at the time of death. The investigation revealed that the pilot had an unremarkable medical history and that he was not suffering from any chronic or acute ailments or illnesses at the time of the accident.

1.14 Fire

There was no evidence of in-flight fire. The fuselage was largely consumed by the postcrash fire.

1.15 Survival Aspects

The wreckage was discovered on the **morning** after the accident by a U.S. Coast **Guard** aircraft involved in the search for the missing flight.

The pilot, and a female passenger in the right cockpit seat, had been ejected forward from the airplane and were separated from their respective cockpit seats. A male passenger was also ejected forward from the airplane and was found strapped in a passenger seat. The remaining **six** passengers and passenger seats were found within the forward portion of the cabin wreckage.

1.16 Tests and Research

Not Applicable.

1.17 Additional Information

1.17.1 Airline Background

Tomy International, Inc., doing business as (d/b/a) Scenic *Air* Tours, Hawaii, is domiciled in Honolulu, Hawaii. The company employs approximately 20 personnel including 9 pilots, 2 certificated mechanics and 3 mechanic personnel. The company had four aircraft remaining after the accident. All of them were BE-18s used primarily for 14 CFR 135 aerial tours. SAT administrative personnel reported that during the 12 months ending on March 31, 1992, the company carried 11,000 passengers.

Scenic Air **Tours**, Hawaii, was originally certificated on July 31, 1979, as Lani Bird, Inc., d/b/a Scenic **Air** Tours, Hawaii. The company was recertificated on June 11, 1991, as Tomy International, Inc., d/b/a Scenic **Air** Tours, Hawaii. The recertification was the **result** of a change in ownership following a Chapter 11 financial reorganization. The certification action was accomplished as if **the** operator were new. A letter of compliance was submitted, the operations **manual** was redone, and the **training program** was completely revised and reapproved. There were no enforcement actions pending against the company at **the time of** the accident.

The most recent FAA inspection activities are as follows:

<u>Activity</u>	<u>Results</u>	<u>Completed</u>
Ramp Inspection	Satisfactory	April 9, 1992
Proficiency Check	Incomplete, short flight	February 24, 1992
Check Airman	Satisfactory	January 22, 1992
RASIP ⁶ - Part 135	Findings - 47	May 14, 1992
RASIP	Findings - 13	May 14, 1992

1.172 Company Accident History

SAT experienced a major accident on November 10, 1991. **On this** date, about 0850 hours HST, a Beech **18**, N4193, ditched in Hilo Bay approximately one quarter of a mile offshore **after** the loss of the left engine while inbound to the Hilo, Hawaii, airport. The aircraft was on a cross country sightseeing flight. Visual meteorological conditions prevailed at the time **and** a VFR flight plan was filed for the operation, which was conducted under the provisions of 14 CFR Part 135 of the Federal Aviation Regulations. The airplane **incurred** substantial damage and **sank** in about 20 feet of water. Neither the airline transport rated pilot **nor** the ten passengers on board were injured. The flight originated at Honolulu, Hawaii, on November 10, 1991, about 0700 hours as a combination aerial and ground tour for the 10 passengers.

According **to** the pilot's statement, the aircraft was about 45 miles **out from landing at Hilo** when the left engine's RPM began to fluctuate. Approximately 15 miles from landing at Hilo, the left engine **quit** altogether. The pilot stated **that the airplane could not maintain flight** on one engine at 110 KIAS and he ditched **the airplane in Hilo Bay** about 1 1/2 miles from **the Hilo airport**. The passengers exited the floating airplane and were picked up by rescue boats **that responded from the shore**.

The investigation revealed **a mechanical failure** in the left engine. However, **pilot** single engine procedures **and** right engine power output were not verified.

⁶RASIP Inspection. **An FAA Regional Aviation Safety Inspection Program special inspection conducted following the accident of April 22, 1992. As a result of the inspection, the company discovered that it did not have complete aircraft flight manuals and correct weight and balance and major repair and alteration records.**

As a result of this accident, FAA safety recommendation 92.154 was submitted by the Honolulu Flight Standards District Office (FSDO) on April 17, 1992. The recommendation addressed the need for periodic verification of single engine performance in multiengine aircraft. The Director, Flight Standards Service, declined to accept the recommendation for performance verification with the following comment:

The Aircraft Certification Service advises us that the basic, longstanding philosophy behind an aircraft type certificate is that proper maintenance will sustain the original aircraft performance. Therefore, with proper maintenance and approved equipment, the performance data in the airplane flight manual (AFM) will remain valid....

The philosophy that proper maintenance will sustain the original performance is contained in the FAR in Section 43.13(b), which states that:

Each person maintaining or altering, or performing preventive maintenance, shall do that work in such a manner and use materials of such a quality, that the condition of the aircraft, airframe, aircraft engine, propeller, or appliance worked on will be at least equal to its original or properly altered condition (with regard to aerodynamic function, structural strength, resistance to vibration and deterioration, and other aualities affecting airworthiness). (emphasis added)

Therefore, the FAR follows the philosophy that if the operator properly maintains the aircraft, it will perform "at least equal to its origina\...aerodynamicfunction" (e.g., AFM performance data). As previously stated, the recommendation lacks specific information on maintenance a5 well as conditions and equipment.

No further action was directed by the FAA in regard to this case.

In June 1989, an accident occurred under the previous certificate holder's name of Lani Bird Inc., d/b/a Scenic Air Tours? The airplane was on a VFR sightseeing tour. The airplane, a BE-18, crashed in a scenic canyon area about

⁷NTSB Accident Brief, June 11, 1989, Waipio Valley, Hawaii. N34AP.

600 feet below the canyon rim. There were 11 fatalities, and the airplane was destroyed. The Safety Board determined that the probable cause of the accident was improper **in-flight** planning and decision making by the pilot-in-command. Factors related to the accident included Scenic Air Tour's lack of specific direction to its pilots concerning safety procedures for sightseeing flights. The Safety Board issued two recommendations to the FAA as a result of this accident as follows:

Amend **the** operations specifications of commercial sightseeing operators to include appropriate restrictions and/or limitations concerning **flight** routes and operations near canyons, volcanoes, and glaciers. (A-89-108)

Require **the** principal operations inspectors to encourage commercial sightseeing operators to place company policy, guidance and cautions about particular sightseeing highlights in their operations **manuals**. (A-89-109)

In response to the Safety Board recommendations, on January 17, 1992, the FAA issued Handbook Bulletin (HBB) **92-01, Air Tour/Sightseeing Operations**. (See appendix D). **This** bulletin directed principal operations inspectors (POIs) to amend the operations specifications for their assigned **14** CFR Part **135** operators conducting air tour operations within the Grand Canyon National Park. The bulletin also provided guidance **for** operations in parks, prominent attractions, and other areas such as those found in Hawaii. The bulletin advised **POIs** to remind⁸ operators to include procedures **in** their operations manual for conducting air tour/sightseeing operations for areas other than the Grand Canyon.

The Safety Board recognizes that despite the wording of HBB **92-01**, changes to the existing operations specifications of these air tour operators will **not** necessarily result, since the FAA has limited authority to change, unilaterally, **an** operator's previously approved operations specifications. The bulletin **should** prove more effective for the initial approval of **the** operations specifications for new operators in the Grand Canyon area.

In a letter to the Safety Board dated March 2, 1992, the Acting FAA Administrator considered the FAA's action to be complete on these safety

⁸Use of the word "remind" in MBB 92-01 carries no enforcement level; and compliance is not required.

recommendations and indicated that no further action was planned. The Safety Board responded on September 22, 1992, that accordingly, Safety Recommendation A-89-108 was classified as "Closed--Acceptable Alternate Action," and A-89-109 was classified as "Closed--Acceptable Action."

1.17.3 overview of Sightseeing/Tour Operators

Interviews with two fixed-wing and seven helicopter **tour** operators on Maui revealed that there are 120 aircraft on the island **servicing** approximately 250,000 tourist passengers annually. The interviews revealed that the tourist market generates about \$50,000,000 per year on Maui and that it still has the potential to **grow**.

The majority of the helicopter **tour** operators on Maui are members of the Hawaii Helicopter Operators Association (HHOA), a Statewide organization. Joining HHOA is **voluntary**; member compliance with the association rules is mandatory. Fines are levied by the association for infractions of the rules, and pilots who are repeat offenders are terminated by their employers. HHOA activities at the time of the accident were limited to lobbying efforts and the "Fly Neighborly" noise abatement program. A flight safety program is not part of the activity. There is no association for fixed-wing airplane **tour** operators in Hawaii.

The helicopter **tour** operators interviewed described their operations as "acceptably safe." Selection criteria for new helicopter pilots varied greatly among operators. One operator only hired well-qualified pilots with local experience whom he knew personally. All operators said that they contacted previous employers unless the new pilot was personally known to them. Three operators said that they checked the pilots' certificates through the FAA computer system. Two operators indicated that local flying experience in the Hawaiian environment was more important than extensive flight time in a different environment, such as flying between oil platforms in the Gulf of Mexico.

One fixed-wing operator hired pilots already qualified under 14 CFR Part 135 and only provided "differences" training. All operators provided IOE training on their respective **tour** routes, and on narration and orchestration of the **tours**. Emphasis was placed on avoiding noise-sensitive areas, radio communications procedures for tour conflict/collision avoidance and localized weather conditions. None of the helicopter **tour** operators provided IFR training, and none of the helicopters was equipped or certificated for IFR flight. A review of

the operator's accidents was provided during training, but information on the accidents of other operators was not provided. Further, **risk** assessment formal training was not provided.

The pilots stated that their workload included providing narration of the sights, coordinating audio recordings with **the** sights indicated along the route of flight, answering questions posed by passengers, and communicating by radio (air and ATC). These duties **are** accomplished during **flight** in mountainous terrain, frequently in marginal weather conditions and in **high** traffic areas in the vicinity of the visitor attractions.

The **majority** of the operators interviewed reported seeing FAA inspectors on an occasional basis, such as once or twice per month. The operators stated that an increased presence of qualified inspector personnel would greatly enhance **the** safety of all operations by reducing the likelihood of operators engaging in questionable practices. **The** operators noted that since air tour flights **can only** function in a VFR environment, the FAA does not participate in any tour route or altitude selection or conduct any special surveillance of the interaction of air traffic between the various operators and aircraft.

Several operators suggested that resumes of all accidents in Hawaii should be provided to tour operators for inclusion in their training program in order to "learn from the mistakes of others."

1.17.4 Honolulu FSDO Staffing

The investigation revealed that **staff** shortages existed within the FSDO. Five **POIs** and five principle maintenance inspectors are authorized each with a staff of five inspector subordinates. There were three operations and five maintenance inspector position vacancies. Of eight inspectors hired since the end of **FY90**, three had left, one had applied to leave, and three had applied for hardship transfers. **The** stated hardship was financial. Employees said that salary did not compensate for the local cost of living. The **FSDO** was restricted from hiring outside **the** FAA Western Pacific Region due to administrative constraints.

1.17.5 Previous Review of Air Tour Operations

In May **1986**, the FAA Flight Standards Division, Western Pacific Region, produced a "Final Report of Study of Helicopter Operations in the State of

Hawaii.” In addition to the helicopter-specific issues, this report dealt with FAA authority and responsibility to impose routes and altitudes applicable to sightseeing operations, and the possibility of imposing limitations on Part 135 operators through operations specifications requirements. A recommendation in the study also called for the sightseeing exclusion of FAR Part 135.1(b)(2) to be eliminated or amended by reducing the 25-mile operating radius from the departure airport. The evaluation team questioned whether a different level of safety should exist between Part 135 and Part 91 operations based only on the radius of flight operations.

Although records indicate that *the* recommendations were passed to the appropriate FAA Headquarters offices, there is no indication that any *of* the recommendations were adopted.

1.176 Other Air Tour Accidents

In a ten year period ending in 1992, the Safety Board investigated 12 fatal accidents involving fixed wing air tour operators, 8 of which were in or near the Grand Canyon National Park. The other four occurred in the State of Hawaii. There was one nonfatal airplane ditching in Hawaii. The 12 fatal accidents resulted in 96 fatalities. Six of these 12 fatal accidents occurred when a controllable aircraft was flown into terrain. (*See* appendix E). The Safety Board's Southwest Regional Office near Los Angeles responds to aviation accidents in Hawaii, California, Nevada and Arizona. A resume' of their air tour-related accident investigations is contained in appendix F.

As a result of these investigations, the Safety Board has expressed its concern about the safety and oversight of the air tour industry. Some of the recommendations issued by the Safety Board addressed problems specific to the Grand Canyon area and to the operators providing scenic flights over the Grand Canyon.

The FAA has taken several responsive actions, including the issuance of Special Federal Aviation Regulation (SFAR) 50-2 that became effective on May 27, 1988. It prescribed special flight rules for operation in the vicinity of the Grand Canyon National Park. The FAA Handbook 8400.10 Bulletin 92-10 sets guidelines for FAA Regional and Flight Standards District Office personnel on the rules established in SFAR 50-2 and the surveillance of air tour operators. The provisions of SFAR 50-2 are temporary because they must be renewed on a regular

basis and **affect** only the Grand Canyon air tour operations. The rule was extended in 1992 to remain in effect until June 15, 1995.

On June 18, 1986, at 0855 MST, a Grand Canyon Airlines DHC-6, N76GC (Twin Otter), call sign Canyon 6, took off from runway 21 of the Grand Canyon Airport. The flight, a scheduled air tour over Grand Canyon National **Park**, was **to be** about 50 minutes **in** duration. Shortly thereafter, at 0913, a Helitech Bell 206B (Jet Ranger), N6TC, call sign Tech 2, began its approximate 30 minute, on-demand tour of the Grand Canyon. It took off from its base at a **heliport** adjacent to State route **64** in Tusayan, Arizona, about 5 miles south of the main entrance to the South **rim** of the National **Park**. Visual meteorological conditions prevailed. **The** two aircraft collided at an altitude of 6,500 feet msl in the area of the Toronto Plateau. There were 18 passengers and 2 flight crewmembers **on** the DHC-6 and **4** passengers and 1 flight crewmember on the Bell 206B. All 25 passengers and crewmembers on both aircraft were killed as a result of the collision.

Although the investigation of the accident was focused primarily on the routes used and the measures necessary to reduce the **risk** of collision in the Grand Canyon, other safety issues peripheral **to** the investigation prompted the Safety Board to issue the following recommendations:

Apply to revenue air **tour** flights the same flight and duty time limitations that apply to operations conducted under **14** CFR 135.265. (Class II, Priority Action) (A-87-91)

Require pilots of revenue air tour flights to use a public address system, intercom, or **similar** system while **narrating** air tour flight. (Class II, Priority Action) (A-87-92)

Require **all** revenue air tour flights, regardless of the distance flown, to be subject to the regulatory provisions of **14** CFR **Part** 135, and not 14 CFR **Part** 91. (Class II, Priority Action) (A-87-93)

The FAA **first** responded to these safety recommendations in an October 13, 1987, letter in which they committed to include the issues described **in** the **Boards** recommendations in the ongoing Federal Aviation Administration review **of** the feasibility **of** amending 14 CFR 135.1(b)(2) and 14 CFR 135.265.

The Board replied on November 9, 1987, stating that positive action was expected on these issues. Based on the FAA's response, Safety Recommendations A-87-91, -92 and -93 were classified as "Open--Acceptable Action."

The FAA responded a second time on July 28, 1992, stating ~~for~~ Safety Recommendation A-87-91 that:

Concern over *air* safety and aircraft noise resulted in the enactment of Public Law 100-91 on August 1, 1987. The law imposed flight restrictions at Grand Canyon National Park in **Arizona**, Yosemite National Park in California, and Haleakala National Park in Hawaii. The Federal Aviation Administration established the "Grand Canyon National Park Special Flight Rules Area" (special Federal Aviation Regulation (SFAR) 50-2) to comply with a concern **for** controlling overflights. Special Federal Aviation Regulation 50-2 governs the airspace in and over Grand Canyon National Park. Under the SFAR, air tours and sightseeing flights conducted within the Grand Canyon National Park airspace now require operators *to* hold 14 CFR Part 135 certification with special authorizations on **their** operations specifications. The air tour operators are a **mix** of on-demand and commuter carriers. Special routes and procedures were developed to accommodate the high volumes of air traffic in Grand Canyon National Park. The designated routes and altitudes are intended to enhance collision avoidance procedures. Flight Standards inspectors also worked with **an** interagency cartographic committee to publish a special Grand Canyon visual flight rules aeronautical chart depicting the airspace, routes, and reporting points of the park.

Recently, the Western-Pacific Region Flight Standards Division established **a** designated surveillance unit within the Las Vegas Flight Standards District **office to** oversee the Grand Canyon National Park flight operations. The unit will enhance the visibility of the FAA in the Grand Canyon National Park operations arena and increase safety compliance. The FAA **is** presently working to procure automated weather reporting equipment for the Canyon route structure **to** relieve the present lack of available weather information for pilots.

As a part of the overall effort to address safety issues related to air tour operators, the FAA examined the issue of flight and rest limitations at an FAA/operator meeting in December 1991. The consensus of the operators was against additional flight and rest requirements as specified in 14 CFR 135-265. I believe that as a result of the measures taken to address this safety issue--SFAR 50-2, the requirement for all operators to hold 14 CFR Part 135 certificates and operations specifications, and the additional oversight by the Las Vegas Flight Standards District Office--further restrictions concerning flight and duty time limitations are no longer necessary as requested by this safety recommendation

The FAA letter then stated that no further action was planned on Safety Recommendation A-87-91.

For Safety Recommendation A-87-92, the FAA stated in the July 28, 1992, letter:

The FAA has surveyed the Grand Canyon air tour operators and has determined that almost all operators are using automated tour narration to accommodate the needs of both foreign and domestic customers. It was also determined that in smaller aircraft a pilot can easily talk to passengers without the aid of an electronic system. Based on the results of the survey, i do not believe that regulatory action is necessary.

For Safety Recommendation A-87-93, the FAA stated in the same letter:

The FAA is reviewing the possibility of regulatory action to bring all sightseeing operations, except gliders and balloons, under the requirements of 14 CFR Part 135.

The FAA promised to keep the Board apprised of the FAA's progress on Safety Recommendation A-87-93.

2. ANALYSIS

2.1 General

The investigation determined that the airplane was maintained in accordance with applicable Federal Aviation Regulations (FARs) and company operations specifications. There was no evidence of any preexisting airframe or engine discrepancy. Because SAT was approved by the FAA to operate VFR only, checks of airplane flight and navigation instruments to the standards required for instrument flight were not required. The operational status of the flight instruments and the radio and navigation equipment could not be ascertained from the wreckage. However, persons who flew the airplane in the days prior to the accident did not recall any aberrations in the flight or in the navigation equipment. There was no evidence of any preimpact failure of systems, structure or powerplants.

The investigation revealed that the captain was in good health and had proper FAA medical certification at the time of the accident. Examination of the toxicological specimen, obtained from the captain following the accident established that he was not under the influence of, or impaired by, drugs or alcohol at the time of the accident. The activities of the captain during the 72 hours prior to the accident were unremarkable. There was no evidence that physiological issues were a factor in the accident.

There were no reported navigation or communications facility anomalies or military activities that would have contributed to the accident.

Recorded radar tracking information indicated that, upon departing the north coast of Hawaii at Upolu Point, the accident airplane proceeded toward the Haleakala Volcano crater on Maui. The radar information also revealed that while proceeding toward the crash site, the airplane maintained a continuously climbing flight profile and crossed the shoreline of Maui at 8,100 feet ms.

The final minute of flight was not observed on radar due to terrain interference with the line of sight radar transmissions. The heading of the aircraft at the crash site of about 200 degrees is not consistent with the last recorded radar track between 300- and 320-degrees magnetic. The Safety Board believes that during the last few seconds of the 1-minute interval, the pilot attempted evasive maneuvers close to the ground surrounding the volcano crater to avoid striking the

terrain. The wreckage condition indicated a trajectory with little forward motion and high vertical impact forces.

The wreckage pattern is consistent with ground contact in a stalled condition. The Safety Board believes that maneuvering into such a flight attitude would not have been necessary or attempted if the flight had been conducted in visual meteorological conditions as required for VFR flight. VFR requires a minimum flight visibility of 3 statute miles and various distances⁹ from clouds. If these conditions had existed along the flightpath, the mountainous terrain leading to the crater would have been visible and avoided by the pilot during his climb toward Maui.

2.2 The Flight

The Safety Board tried to determine why the pilot, after passing Upolu Point, deviated from both his intended flight plan and his stated intention to overfly R-3104. Why he did not circumnavigate clouds that presented less than VMC over Maui is also unclear. The track that he was observed to fly, 300- to 321-degrees magnetic, lead directly toward the high terrain, which is one of the most prominent landmarks in the Hawaiian Islands. SAT pilots were well aware that they were authorized to conduct operations only in VMC and to deviate from designated routes only to the extent necessary to avoid weather.

Consideration was given to the possibility that the pilot intended to return to Kahului Airport (Maui) to board the SAT employee who was dropped off during the earlier morning flight. However, the captain's VFR flight plan direct to HNL and the clearance to overfly the Island of Kahoolawe (R-3104) at 6,500 feet indicate that he planned to proceed on a more westerly and direct course. The restricted area is south of Maui and the company-designated return route. The captain's intention to navigate well south of Maui seems reasonable considering the weather that was affecting the southeastern portion of the island. The Safety Board concluded that a return flight to Kahului Airport was not intended.

Another possibility considered was that the pilot diverted from the standard route of flight to show the Mount Haleakala volcano crater to his

⁹Basic VFR weather minimums are contained in FAR 91.155. The minimum distances from clouds for the accident flight were 500 feet below, 1,000 feet above and 2,000 feet horizontal.

passengers. Postaccident observations indicate that the weather along the southeastern slope and the summit of the crater was not suitable for visual sightseeing activity. The captain would have been aware of this fact upon departing Upou Point as he surveyed the horizon to the west and northwest. Consequently, this possibility was discounted because of the weather in the Haleakala area. Investigators also considered the possibility that passengers attempted to lure pilots with gratuities to deviate from their intended route; however, such a practice could not be substantiated.

Also at the time of his departure from Hilo the pilot was aware that upon deplaning his passengers in HNL, he was to fly to Maui to board additional tourists and return them to HNL. Consequently, the captain knew that adhering to his intended route schedule was a necessity. Investigators were told that SAT pilots were well aware that the expense and profit of each tour flight were predicated upon adhering to the designated flight route. The pilots knew that deviations from the route directly affected the profitability of the operation and could therefore adversely affect their job security.

After careful consideration, the Safety Board was unable to identify any reason why the captain would intentionally establish and maintain a direct course toward mountainous terrain. Because of the prevailing weather conditions, the mountains were neither visible to him nor scheduled to be over flown on the tour. For these reasons, the Safety Board considered whether the deviation was unintentional.

The difference in heading between the planned flight track and the actual flight tract was approximately 23 degrees. The disparity between the two headings should have been readily apparent to the captain. Reasonable explanations for his failure to recognize the difference include relying on his memory rather than using the VFR navigation sectional chart or another aid to verify the proper flight headings; failing to compare the inherent precession errors of the gyroscopic direction indicator with the magnetic compass to verify the actual heading; and reduced visibility from the usual weather pattern that normally allowed the captain to fly between the islands solely by use of outside references.

The captain may have failed to reset the directional gyro in a regular and timely manner to compensate for precession,¹⁰ making his heading indicator unreliable and contributing to a course error. N342E was not intended to be flown in instrument conditions; therefore, the reliability of its heading indicator, and its susceptibility to precession, was not known with any degree of accuracy; and destruction of the instrumentation at impact precluded a determination of its pre-accident condition. The pilot who flew the airplane the day before the accident found it necessary to reset the heading indicator every 10 to 20 minutes, indicating that precession effects were sufficient to require regular adjustments.

The Safety Board believes that the captain did not refer to an aeronautical chart or other references for navigation information while performing this flight. Evidence indicates that instead he relied on his memory to navigate.

Three Hawaiian island VFR sectional charts were discovered in the wreckage; all the charts were folded in the captain's bag. The captain had previously prepared a memory aid that displayed navigation information in a ready reference format. It was not in his possession at the time of the accident but was discovered at his home. No other navigation references were found in the wreckage.

However, the most plausible explanation for the unintentional routing is a failure of the captain to turn the omni bearing selector (OBS) to the desired course radial while tracking outbound on the UPP VOR. Radar data indicate that when the airplane was passing the UPP VOR, it turned from a westerly heading to a northwesterly heading toward Maui. The accident site is on the 310 radial of the UPP VOR at the 33 DME. The radial from the UPP VOR to R-3104, the captain's intended overflight point, is approximately 287, a difference of 23 degrees. The Safety Board tried to determine whether any similarities existed between the accident flight and the captain's previous flights. It was discovered that the bearing of the accident site from the UPP VOR (310 degrees) was identical to the radial that SAT pilots routinely follow when they are flying outbound from Hilo Airport. The 310 degree radial from the ITO VOR is customarily used for guidance by company pilots on flights departing Hilo for a popular scenic attraction on the north shore of the island. The same 310-degree radial also provides the initial flight track for the

¹⁰The resultant action or deflection of a spinning rotor when a deflective force is applied from a variety of sources including friction, centrifugal force from flight attitude maneuvering, and the Earth's rotation.

northern route to HNL via Hana. The captain was well acquainted with the routing to Hana and had used it four times in the 5-day period prior to the accident. It is quite possible that after the captain tuned in the frequency for the UPP VOR, he did not follow through with the course set procedure and use the OBS knob to select the appropriate 287-degree radial needed to navigate across the channel from the UPP VOR to R-3104.

Available weather data indicate that the velocity of the winds aloft was not appreciable (~~from 4 knots~~ to 14 knots) relative to the speed of the airplane during the climbout. Consequently, as the airplane continued toward Maui, a minimal wind correction angle would have existed between the magnetic compass and the course deviation indicator (CDI) centered on the UPP 310 radial due to wind drift.

The weather briefing that the HNL FSS provided to the captain was accurate. The briefing advised of marginal VFR conditions and that VFR flight was not recommended over the interior section of all islands. To a pilot knowledgeable about the characteristics of weather formation in the Hawaiian Islands, the briefing would have indicated that the IFR weather affecting the islands was predominantly land based.

The cloud cover that the captain encountered, and was apparently attempting to climb over as he proceeded in a northwesterly direction from Upolu Point, should have been an indication to him that he was heading toward Maui and Mt. Haleakala. Under the existing atmospheric conditions, no other land mass in the area could have generated the orographic lifting of clouds at the altitude in which he encountered them. However, haze and clouds between the airplane and Mount Haleakala could have obscured the observation of a distinctive cloud mass over the island.

As the pilot passed abeam Upolu Point, his next normal landfall would have been Kahoolawe, which underlies R-3104. The island was about 45 nmi west of his position. The terrain elevation is less than 2,000 feet msl. The Safety Board believes that the captain could not see the island because of haze and scattered clouds. Therefore, he would have had to rely on memory for the correct heading or have referenced the appropriate VFR navigation chart for the area. The Safety Board believes that given the weather conditions along the intended route of flight and the relative close proximity to mountainous terrain, the captain should have referred to the navigation chart to verify the appropriate navigation facility,

frequency and initial heading to be flown. The Safety Board did not find any evidence that such a navigational cross check took place.

The Safety Board believes that the captain's response to an inquiry from a following company flight using words to the effect. "I am 37 DME off Upolu, standby Lanai," indicates that the captain did not have a recognizable land mass in sight. The choice of words also indicates that the captain was navigating outbound off the UPP VOR. The location of the actual crash site (39 DME) indicates that the accident occurred a very short time after that radio transmission took place.

Although the Safety Board cannot positively determine which of these potential navigational errors may have occurred, the Board believes that the deviation was unintentional and that a combination of operational errors was responsible for the deviation from the established tour route by Scenic 22 while the flight was operating in IMC. The Safety Board believes that the captain's judgment was faulty when, in violation of FAR Part 91, he chose to continue VFR flight into IMC during climbout in an area of high terrain.

2.3 The Captain's Experience and Judgment

The captain was certificated and qualified in accordance with applicable FARs. The captain's log book was not available for verification of his aeronautical experience; however, a reconstruction of his flying experience from previous employers and FAA records indicated that he did not possess the experience required by the company operations manual.

It is common practice in the industry to use flight hours as an indicator of aeronautical skill. Pilot flight hours are a universal measure of pilot experience and competence, and they play a role in evaluating a pilot's ability to make sound aeronautical decisions.

The investigation disclosed that the captain had significantly misrepresented his professional credentials concerning his flight experience, training, and employment on resumes and employment applications. As a result, several employers dismissed or rejected the captain when his aeronautical skills failed to meet qualifications and/or performance standards for various pilot positions.

The Safety Board believes that the judgment of the captain to continue VFR flight into IMC rather than to practice appropriate weather avoidance techniques resulted in a collision with obscured mountainous terrain. This decision demonstrates a lack of appropriate aeronautical judgment skills and is a reflection of insufficient professional training and experience.

SAT used an employment application and a resume, which contained false information, to evaluate the captain's professional background and experience and did not attempt to verify the information provided. At the time the captain was employed, he did not meet SAT's criteria of 2,500 total hours and 1,000 multiengine hours of flight experience for a pilot position. Furthermore, the captain had not met these requirements at the time of the accident.

The circumstances of this accident and the Safety Board's previous accident investigation experience have demonstrated the consequences of poor judgment and poor decision making by pilots. The FAA and other aviation industry organizations have supported projects that have resulted in the development of Aeronautical Decision Making (ADM) training materials aimed at improving a pilot's ability to recognize and control hazardous thought processes and situations.

Following its investigation of a midair collision in Menton, Pennsylvania, on April 4, 1991,¹¹ the Safety Board recommended that the FAA: Disseminate more aggressively available information and materials pertaining to Aeronautical Decision Making training and actively promote its implementation for all categories of pilots in the civil aviation community. (Class II, Priority Action) (A-91-93)

The recommendation was reiterated to the FAA following the Safety Board's investigation of the crash of L'Express flight 508 during an instrument approach at Birmingham, Alabama, on July 10, 1991.¹²

The FAA subsequently issued Advisory Circular (AC) 60-22 on the subject that provided a systematic approach to risk assessment and stress management in aviation, and illustrated how personal attitudes can influence decision making and how those attitudes can be modified to enhance safety in the

¹¹NTSB Aircraft Accident/Incident Summary Report, NTSB/AAR-91/01/SUM.
¹²NTSB Aircraft Accident Report, NTSB/AAR-92/01.

cockpit. In addition to the promotion efforts by accident prevention program managers, the **FAA** has added **ADM** publications to the reference list of publications in each edition of the Practical Test Standards.

As a result, on May 8, 1992, the Safety Board classified the recommendation "Closed--Acceptable Action," but requested in its **response** that the **FAA** consider the inclusion of such information in air carrier training programs, **Part** 141 pilot schools, flight instructor seminars, and discussions in biennial flight reviews.

The facts and circumstances of **this** accident raise the question of whether the issuance of **AC 60-22** is adequate. The **Safety** Board believes that the **FAA** should **aggressively** encourage all commercial operators to adopt comprehensive **ADM** training programs **through** the issuance of guidance to POIs. The guidance should require that the **POIs** encourage the development of **ADM** programs **for** commercial operators.

2.3.1 Scenic Air Tours Preemployment Check

The Safety Board believes that the captain's **strong** desire to advance to employment as a pilot with **an** air carrier motivated him to mislead prospective employers about his flight experience and employment record. As noted, **SAT** management did not conduct a substantive preemployment background check to verify **his** experience, training, and employment history. **SAT** did not have a background check policy, and such a policy was not required. **SAT** management did comply **with** an existing **FAA** requirement to conduct a background check solely **for** security purposes. **SAT's** failure to verify the previous employment experience contributed to the accident because it led to the employment of a pilot who was not **qualified, under SAT's** own employment criteria, for the position.

The Safety Board **has** previously addressed preemployment screening of pilots following the investigation of the crash of Continental **Airlines** flight 1713 (under **14 CFR Part 121**) at Denver, Colorado, on November 11, 1987,¹³ and following the crash of Aloha **IslandAir** flight 1712 (under **14 CFR Part 135**) at **Molokai**, Hawaii, on October 28, 1989.¹⁴ As a result of the Denver investigation, the Safety Board issued the following recommendation to the **FAA**:

¹³NTSB Aircraft Accident Report, NTSB/AAR-88/09.

¹⁴NTSB Aircraft Accident Report, NTSB/AAR-90-05.

Require commercial operators to conduct substantive background checks of pilot applicants, which include verification of **personal** flight records and examination of training, performance, and **disciplinary and other records of previous employers, the Federal Aviation Administration safety and enforcement records.** (Class II, Priority Action) (A-88-141)

The FAA agreed with the intent of the recommendation but did not believe that the benefits derived from such a regulatory change would outweigh the costs of promulgating and enforcing it, and placed the scope and standards for such screening entirely upon the voluntary efforts of operators. The Safety Board classified the recommendation as "Closed--Unacceptable Action/Superseded" and issued ~~the~~ following recommendation with additional language following the commuter accident in Hawaii:

Require commercial operators to conduct substantive background checks of pilot applicants, which include verification of **personal** flight records and examination of training, performance, and disciplinary and other records of previous employers, the Federal Aviation Administration safety and enforcement records, and ~~the~~ National Driver Register. (Class II, Priority Action) (A-90-141)

The FAA responded in February 1991, and stated that it did not yet believe that a requirement **for pilot** screening was necessary. It pointed out that the Secretary of Transportation, in a 1988 letter to the chief executive officers of all *air* carriers, **had** encouraged the use of FAA data bases to verify the validity of an applicant's certificate and safety history. The FAA said that it had **issued** FAA Action Notice 8430.26, which instructed principal operations inspectors **to** provide a copy of the notice to all carriers to remind them of **their** responsibilities in this **area** and to increase surveillance of pilot certification records during routine inspections. It issued an Air Carrier Operations Bulletin (ACOB) to reiterate the content of the Secretary's letter and the action notice and to include **information** on the availability and use of the National Driver Register. The Safety board classified the response as "Closed--Unacceptable Action in October 1992."

Following the investigation of the 1989 commuter accident in Hawaii,¹⁵ the Safety Board also issued a recommendation to the airline involved,

¹⁵NTSB Aircraft Accident Report, NTSB/AAR-90-05.

Aloha IslandAir, urging it to implement a substantive preemployment screening policy. The airline subsequently did so and, during the course of this accident investigation, the Safety Board learned that the captain of **SAT 22** had applied for a pilot position with **Aloha** IslandAir. His application was rejected, based upon preemployment screening by Aloha IslandAir, when it was discovered that the captain had misrepresented his employment history.

The Safety Board believes that this example underscores the importance of substantive preemployment screening practices and further demonstrates the **need for the FAA to** require commercial operators to implement such program. The Safety Board has urged the **FAA to do so** following three recent accident investigations involving a major airline, a scheduled commuter airline, and this accident involving a nonscheduled, on-demand operator

24 Search and Rescue Issue

When SAT flight 22 struck the terrain, the impact set off the ELT (emergency locator transmitter) aboard the airplane. A receiver site nearby detected the signal for about 7 minutes;¹⁶ however, this time interval was insufficient to determine the geographical position of the signal using existing surveillance satellite technology. More than an additional hour elapsed before the operator reported the airplane overdue.

The search and rescue operations for SAT flight 22 utilized both land and sea-based resources. The search was conducted over a large area of the State based on the last known position of the airplane, the route of flight, and its destination. Although the target was being recorded, the radar data were not used in the search because the track was not monitored.

The area of the islands that make up the State of Hawaii is small compared with the surrounding ocean area. Airplanes operating in the state fly over vast stretches of water while remaining within 50 miles of land. Air traffic radar coverage of Hawaii is extensive except for gaps that are attributed to the mountainous topography of the islands. The air traffic radar system can accommodate additional aircraft that have radar beacon transponders capable of discrete identification. The Safety Board believes that operators should operate

¹⁶A postimpact ground fire may have progressed at this point to have rendered the unit unserviceable.

with discrete radar identification and full-time radar surveillance whenever it is available. Such practice can lead to rapid and efficient recognition of lost or downed aircraft and enhance search and rescue efforts.

2.5 The Air Tour Industry In Hawaii

During the on-scene investigation, an attempt was made to quantify the size and scope of the air tour industry in Hawaii, as well as to develop an operational overview. Although definitive data were not available, Safety Board investigators were able to collect data that suggests that the air tour industry serves approximately 1,000,000 passengers within Hawaii annually. Sightseeing operations are conducted under both 14 CFR Parts 135 and 91 using fixed and rotary wing aircraft. The regulatory differences for the various operations generally pertain to required levels of pilot experience, minimum training requirements and standards for aircraft maintenance.

The Safety Board's inquiry established that the policies and practices of the air tour operators varied considerably and that the industry appears to lack structure. Although a professional association of helicopter operators exists in Hawaii, participation is voluntary. The Hawaii State Department of Aviation does not regulate or provide oversight of air tour operators. The FAA's oversight is conducted through its standard certification and inspection processes with no particular emphasis placed on air tour operators, regardless of the size, scope or nature of their operations. The extent of FAA surveillance of the operators also varies depending on the type of operation and the regulatory rules pertaining thereto.

The absence of specialized oversight of these air tour operators by the FAA is of concern to the Safety Board. Air tour route and altitude separation is neither monitored, nor required to be monitored, under current FAA regulations. Air traffic counts near the major tourist sights have not been undertaken. Although helicopter operators in Hawaii do broadcast some of their movements on a common frequency, fixed wing pilots do not participate in this program.

2.5.1 Honolulu FSDO Surveillance

The Honolulu FSDO surveillance of SAT was insufficient to discover deficiencies found by the FAA RASIP and the Safety Boards investigation. The surveillance activities appeared to be hampered by understaffing, a continuing

problem at the Honolulu FSDO. Following its investigation of Aloha Island Air flight 1712,¹⁷ the Safety Board recommended that the FAA:

Perform a special study of the adequacy of Flight Standards District Office staffing considering the availability of work hours, the geographic area of responsibility, and the size and complexity of the assigned operations. (Class II, Priority Action) (A-90-136)

This safety recommendation remains classified as "Open—Acceptable Response" as a result of a response from the FAA Acting Administrator dated February 11, 1992, which states, in part:

The contractor is currently tabulating the results of approximately 100 interviews with field aviation safety inspectors. When this effort is completed, the contractor will present the FAA with revised staffing standards.

Several inquiries were made by Safety Board staff regarding the results of the staffing study; however, the results were not available as of the end of 1992. The Safety Board continues to support the need for more stringent FSDO surveillance and reiterates a recommendation to the FAA to act promptly on this issue.

2.6 National Air Tour Industry Issues

The FAA does not possess nationwide statistical data revealing the specific flying activity of the air tour industry. Operators are not required to report flying hours, flight segments or passengers carried. Therefore, the Safety Board cannot compare the accident rates of the air tour operators with the rates of commuter and on-demand air taxi operators. However, the accident history in the State of Hawaii and the Grand Canyon, in addition to those air tour operator accidents identified earlier in this report, indicate that the air tour industry has a need for greater FAA attention than it now receives. This industry currently transports approximately 2,000,000 passengers annually according to estimates by air tour industry spokespersons.

¹⁷NTSB Aircraft Accident Report, NTSB/AAR-90/05.

Currently, many of these operations, such as scenic tours conducted within 25 nmi of the departure point, are conducted under the provisions of 14 CFR Part 91, which is less stringent than the rules governing commuter and on-demand air taxi operations. Although the differences in these operating rules were not a factor in this accident since SAT was required to meet the provisions of Part 135, the Safety Board has addressed the concern about the adequacy of the regulations pertaining to, and the FAA oversight of, the air tour industry. Following a midair collision over the Grand Canyon in 1986, the Safety Board issued 3 safety recommendations addressing air tour operations. See Section 1.17.6 for a full discussion of these recommendations and the FAA responses to the recommendations.

Based on the Board's findings in this recent accident in Hawaii, and on its review of the FAA's position as stated in its July 28, 1992, response to Safety Recommendations A-87-91, -92, and -93, the Board believes that the FAA should revise the FAR's to create a specific classification for, and operating rules governing, commercial air tour operations. Since the FAA has declined to act on the issues cited by the Board in Safety Recommendation A-87-91, and has not reported any progress on its review of Safety Recommendation A-87-93, the Board has classified these two recommendations as "Closed--Unacceptable Action/Superseded" by Safety Recommendations A-93-8 through A-12 issued with this report. We urge the FAA to act expeditiously to begin this rulemaking initiative.

Based on the FAA's findings related to the extensive voluntary use of automated tour narration devices, Safety Recommendation A-87-92 has been classified as "Closed--No Longer Applicable."

The Board believes that the FAA should review the nature and structure of the air tour industry and assess the risks posed by air tour operators based on geographical, environmental, operational, air traffic and passenger enplanement considerations. For example, many operators conduct relatively short flights and thus accrue an abnormal ratio of flight cycles to flight hours, necessitating special considerations in their aircraft maintenance programs. Weather conditions unique to the geographical area of operation should be considered when evaluating pilot and aircraft instrument flight capabilities. Further consideration should be given to the structured flow of traffic, flight following requirements and radar coverage in areas where high density air tour operations can result in potential collision situations. Air tour operators should have operations specifications and

manuals that address these concerns. Clearly, operators that carry high volumes of passengers on multiple daily flights or that have ground and flight operations that exhibit characteristics typically associated with Part 135 commuter operations, including daily flight frequency, advertised schedules, standard tour routes, formalized reservation or ticketing procedures, terminal buildings and passenger waiting areas, should be subject to a greater degree of regulation and oversight than that provided to more typical on-demand air taxi operations. However, the Safety Board also believes that the smaller air tour operators that fly only a few short routes and carry few passengers in noncomplex aircraft require greater FAA guidance, Standards, and surveillance than currently exists.

Staff discussions between Safety Board investigators and FAA night Standards and Air Traffic personnel have focused on the appropriateness of the existing federal regulations that govern these types of operators and the need to establish an increased level of safety through the application of specific standards that address the unique aspects of air tour operations. The Safety Board recognizes that the existing FAR 135 requirements and the FAA Air Transportation Inspector's Handbook 8400.10, in particular Handbook Bulletin 92-01 (see appendix D), provide standards and guidance for the operator and the Principal Operations Inspector. However, these regulations do not address many of the unique characteristics and safety needs of air tour operations. The Safety Board believes the FAA can enhance the level of safety of these operations either by expanding the existing regulatory framework (Part 135), or by creating a new part for commercial air tour flights.

The Safety Board believes that the FAA should identify airspace that is subject to commercial air tour activity and that may require special air traffic procedures for environmental protection or to reduce the potential for midair collision. The Grand Canyon SFAR area is an example of a VFR airspace that requires specific authorization in the operator's Part 135 operations specifications through the approval of the local FSDO. The Safety Board believes that the State of Hawaii qualifies for this action due to the unique geography, abundance of air tour attractions, presence of numerous airports, and the intermix of helicopter and fixed wing air traffic.

The Safety Board believes that the FAA must be prepared for this added regulatory role. It should ensure that the regulatory basis and surveillance resources are in place to regulate and oversee the operations, equipment, airmen, and airspace associated with the implementation of a "commercial air tour operator"

program. This should be accomplished by evaluating its management, staffing and enforcement effectiveness in those offices responsible for the oversight of commercial air tour operations.

3. CONCLUSIONS

3.1 Findings

1. **The** airplane was **certificated**, equipped, and maintained in accordance with **FAA** regulations and approved *Scenic Air* Tours procedures. The airplane was operated within **its** prescribed weight and center of gravity limitations.
2. There was **no** **preexisting** problems with the airplane, **its** systems, or **powerplants** that contributed to the accident.
3. The captain was certificated and medically **qualified** for the **flight**.
4. **The** pilot did **not** possess the minimum hours of experience stipulated in the company operations manual to qualify as a captain, either at **the time** he was hired by *Scenic Air* Tours, or at **the** time of the accident.
5. **The captain** falsified the employment application and resume when he applied for a pilot position at *Scenic Air* Tours. Company personnel were not aware of these falsifications because they did **not** pursue substantive preemployment background checks of **the aeronautical** experience of the pilot, nor were they **required** by *the FAA* to do **so**.
6. Although *Scenic Air* Tour flights were required to be conducted under VFR, the **captain** **continued** the flight into **instrument** meteorological conditions that prevailed **along** the eastern and southern slope **of** Mt. Haleakala **on** the Island of Maui.
7. The captain either did **not** see or did **not** evaluate **the** significance of an upsloping cloud **layer** **that** was produced by orographic lifting phenomenon **of** Mt. Haleakala.
8. The captain apparently did **not make** visual contact with the rising terrain on Mt. Haleakala **until** the final seconds **of** the flight because it was obscured by clouds.

9. The captain mistakenly deviated from **his** intended **route** apparently because he **did** not **use his** navigation charts to confirm *the* correct **heading and radial outbound from Upolu Point**. His navigation error went undetected because he failed to adequately crosscheck progress of the flight using navigation aids available **to him**.
10. The work **of** the **Honolulu FSDO** was insufficient to discover deficiencies found by the **FAA Regional Aviation Safety Inspection Program** and **the** Safety Board's investigation of **this** accident.
11. It is difficult to calculate specific accident exposure data for air **tour operators**, and other industry comparisons **are not** possible, 'because **an FAA national data** base from which **to** evaluate the magnitude **of** air tour operations does not exist.
12. Regulations are needed for air tour operators that **will** enable **FAA inspectors to** require, rather than merely encourage, operators to adhere to procedures that offer the safety improvements **of SFAR 50-2** and **FAA Handbook 8400.10 Bulletin 92-01**.

3.2 Probable Cause

The National Transportation Safety Board determines that the probable cause **of** this accident was the captain's decision to continue visual flight into **instrument** meteorological conditions that obscured rising mountainous terrain and his **failure** to properly **use** available **navigational** information to remain clear of the **Island** of Maui.

Contributing to the accident was the failure **of** Scenic **Air Tours** to **conduct** substantive pilot preemployment background screening, and **the** failure of **the** Federal Aviation Administration to require commercial operators to conduct substantive pilot preemployment screening.

4. SAFETY RECOMMENDATIONS

As a result of its investigation of this accident, the National Transportation Safety Board makes the following recommendations:

--to the Federal Aviation Administration:

Revise the Federal Aviation Regulations as needed to create a **specific** classification for, and operating rules governing, commercial air tour operators based on the **complexity of flight operations, aircraft flown, flight frequency, number of passengers carried, air traffic densities in the areas of operation, and other relevant factors.** (Class **II, Priority** Action) (A-93-8)

Establish comprehensive Operations Specifications and operations Manual requirements for the certification of commercial air tour operators under a new or revised regulatory category. (Class **II, Priority** Action) (A-93-9)

Identify airspace **which** warrants special protection due to the **presence of commercial air tour operations.** **Create** special operating rules for such airspace to reduce the **potential for midair collisions and other accidents commensurate with meteorological and terrain considerations.** (Class **E, Priority** Action) (A-93-10]

Ensure *that* the regulatory basis and surveillance resources are in place to **oversee** the operations, equipment, airmen, and airspace associated with **any selective attention directed toward commercial air tour operations.** (Class **II, Priority** Action) (A-93-11)

Devise a method for collecting **data from air** tour operators regarding flight **hours, flight segments, and passengers carried** that can **be** included in civil aviation exposure information for aviation **industry** comparisons. (Class **E, Priority** Action) (A-93-12)

Issue an **Air Carrier Operations Bulletin** instructing all Principal Operations Inspectors to aggressively encourage **all** commercial operators to **incorporate** comprehensive Aeronautical Decision

Making (ADM) training in their pilot **training** programs. (Class II, Priority Action) (A-93-13)

Require commercial operators to conduct substantive **background** checks of pilot applicants, which include **verification of personal flight records and examination of training, performance, and disciplinary and other records** of previous employers, the Federal Aviation **Administration** safety and enforcement records, **and the National Driver Register**. (Class II, Priority Action) (A-93-14)

--to Tomy International, Incorporated, d/b/a Scenic **Air** Tours, Hawaii:

Conduct substantive background checks of pilot applicants, which include verification of personal flight records and examination of **training, performance, and disciplinary and other records of previous employers, the Federal Aviation Administration safety and enforcement records, and the National Driver Register**. (Class II, Priority Action) (A-93-15)

In addition, the National Transportation Safety Board reiterates the following **recommendation** to the Federal Aviation **Administration**:

Perform a special study of the adequacy of Flight Standards District Office staffing considering the availability of **work** hours, the geographic area **of responsibility, and the size and complexity of the assigned operations**. (Class II, Priority Action) (A-90-136)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

Carl W. Vogt
Chairman

Susan Coughlin
VICE Chairman

John Hammerschmidt
Member

Christopher A. Hart
Member

February 2, 1993

John K. Lauber, Member, filed the following dissenting statement:

I have long **been** on record that I believe our probable cause findings **are** primarily a vehicle for effecting positive changes, **and** not for placing blame. In accident investigation and prevention efforts, I don't believe that we **are** constrained to a narrow construct **of** causality. **By** embracing a "pilot error" probable cause, **as** it **has** in **this** case, **the** majority **has**, in my opinion, foregone an **important opportunity to leverage** meaningful changes that would be more helpful in **the** prevention of future accidents like **this** one.

The safety message in the probable cause as adopted by the majority **is minimal to nil**: Pilots should not make errors, especially grievous errors such as continuing **VFR** flight **into** instrument meteorological conditions. Because **this** pilot's **performance** was **so** egregious, I venture to say that few pilots will see any apparent relationship between what we believe **this** pilot did and **his** or her own piloting skills. Such denial is **an** especially potent force **among** those pilots whose character and judgment flaws would lead them to take **risks** similar to what **this** pilot did; **those** who need to hear **this** message the most are the least likely to **gain** any meaningful insight into **their** own behavior from the probable cause adopted by **the** majority.

It is a fact **that** among the population of pilots, there are some who do not **possess those** qualities of character and judgment so necessary to be a **safe** pilot. Even though they may **possess** the technical qualifications, i.e., the proper

certificates, **these are** not the people to whom **the flying** public should have to **entrust** their lives. Many times these flaws **are** very **difficult** to identify in a **timely fashion**. In this **case**, however, this pilot left a readily identifiable **trail** of information **that** indicated he was not likely to exercise **the degree of care** and caution we **demand of** professional pilots. **Our** investigation **revealed** that **this** pilot had been dismissed by five employers **for** misrepresentation **of qualifications and** experience, failure to **report for** duty, disciplinary action, **poor training performance**, and work **performance** that was **below** standards. Based on a background check, another operator rejected **his** application **for a pilot** position **for** failing to **disclose** information and **misrepresentation concerning** previous employment.

Scenic Air Tours apparently conducted no such extensive **background** check, and as a **result** eight paying passengers were entrusted to this pilot's **care**. It **is certainly true**, as the majority holds, that this pilot's actions were directly **causal** to this accident. It is also equally true, I believe, that the actions, **or** inaction, **of** Scenic **Air Tours** just as surely **cast the dice** that ultimately determined the tragic fate of these passengers.

I also agree with the majority that no single management action, no **screening** program, no **training** program **can** absolutely guarantee passengers **freedom** from risk. In **the real** world, one **can** realistically only alter probabilities; **failure** to take reasonable action to positively manage these **risks** also causes accidents.

Since every pilot hired by **an** operator **must** ultimately pass through a sieve whose mesh **size** is set by management policy and practice, **pilot** screening and training **programs** effect great leverage on system safety. In my opinion, **this Board** ought to take every opportunity to bring its considerable **moral** authority to bear on the operators **who are** responsible **for** the conduct of such **programs**. **I** believe that we have **missed** such an opportunity.

I would have the probable **cause read** "The National Transportation Safety Board determines **that** the probable causes **of** this accident were (1) the **failure of** Scenic Air Tours to conduct a substantive pilot preemployment background check that resulted in the placement of an inadequately qualified pilot in **command** of the accident flight; and (2) the pilot's **improper** navigation and **his** decision to continue VFR flight **into** Instrument Meteorological Conditions. Contributing to the accident was the failure **of** the **FAA** to require **commercial** operators to conduct substantive pilot preemployment screening."

5. APPENDIXES

APPENDIX A

INVESTIGATION AND HEARING

1. Investigation

The Safety Board ~~was~~ notified of this accident about 2125 Pacific Daylight ~~Time~~ on the day of occurrence by the Federal Aviation Administration. Upon discovery of the *crash* site on the morning, an investigator-in-charge was immediately dispatched ~~from~~ the Southwest Regional Office in Los Angeles. He was joined in Maui by a Washington-based team OR April 24, 1992. The team consisted of investigative groups in the areas of operations, human performance, airworthiness, and aircraft performance.

Parties to the investigation were the Federal Aviation Administration and the Beech Aircraft Corporation.

2. Public Hearing

A public hearing was not conducted for this accident.

APPENDIX B**PERSONNEL INFORMATION****The Captain**

Captain Brett W. Jones, age 26, held Airline Transport Certificate No. 455713673 issued January 14, 1991 without type ratings. He held a current FAA Class I Medical Certificate dated February 11, 1992 with no limitations or waivers noted. He was hired by Scenic Air Tours as a Beech Model 18 captain in August 1991. His last proficiency check was completed on February 20, 1992. At the time of the accident, company records indicate that he had accumulated 464.7 hours in the BE-18.

APPENDIX C**AIRPLANE INFORMATION**

N342E, serial number BA-308, a Beech model E18S, was manufactured in 1957. It was owned and operated by Tomy International, Inc., d/b/a Scenic Air Tours. At the end of the day preceding the accident, April 21, 1992, records indicated that the airplane had accumulated 15,925 hours. The airplane received an annual inspection on February 2, 1992, with the total time recorded as 15,780.1 hours. The airplane underwent a 100-hour inspection on March 29, 1992, with total time logged as 15,876 hours.

The airplane was operated at a gross weight of 10,100, in accordance with STC SA 572WE, and with 9 high density passenger seats, in accordance with STC SA 19250.

APPENDIX D

FAA 8490.10 HANDBOOK BULLETIN 92-01

AIR TOUR/SIGHTSEEING OPERATIONS

A. Background. On June 18, 1986, a de Havilland DHC-6, Twin Otter, operated by Grand Canyon Airlines, Inc., under Part 135, collided in mid-air with a Bell Helicopter Jet Ranger helicopter operated under Part 91 by Helitech, Inc. Twenty-five lives were lost in this mid-air collision accident. Aviation accidents within and around the Grand Canyon and other prominent attractions have heightened public interest in safety of sightseeing and air tour operations.

1. Other patrons of the Grand Canyon and other National Parks have expressed concerns over noise generated by overflying aircraft to their congressional representatives. Environmental lobby organizations have also expressed their concerns for potential environmental damage and harm to natural inhabitants of these areas. Overuse of these areas would not bolster preservation of the area for future generations.

2. Congressional concerns over air safety and aircraft noise resulted in the enactment of Public Law 100-91 on August 13, 1987. This law required a study of aircraft noise effect at a number of national parks. The law also imposed flight restrictions at the following three parks: Grand Canyon National Park in Arizona, Yosemite National Park in California, and Haleakala National Park in Hawaii.

3. To comply with a congressional concern for controlling overflights, the Federal Aviation Administration (FAA) established the "Grand Canyon National Park Special Flight Rules Area." Special Federal Aviation Regulation (SFAR) 50-2 presently governs the airspace in and over the Grand Canyon National Park. SFAR 50-2 expires June 15, 1992.

B. General. Presently the Grand Canyon is the only national park with special operating rules governing aircraft overflights and requirements for operators conducting sightseeing flights to have Part 135 certification. The special rule, SFAR 50-2, was developed to preserve a fragile natural environment experiencing heavy visitation of many users. The concerns of the National Park Service were to preserve a noise free, safe, and natural environment for the public.

1. The successful development of SFAR 50-2, as an effective enhancement to noise control and safety of air tour/sightseeing operations, came about with cooperation of the FAA, the Park Service, industry, user's groups and local communities. There are other scenic areas that may require special consideration of Part 135 operators to alleviate concerns similar to the Grand Canyon.

2. This handbook bulletin presents guidance for POI's when working with Part 135 operators conducting air-tour operations under SFAR 50-2 and with other operators conducting sightseeing operations in other areas under Part 91 and Part 135.

C. Identification of Other Scenic Areas. Acknowledgment and identification of scenic areas attracting air tours and sightseeing flights in each FAA region is the responsibility of the FAA Regional Flight Standards Division and district offices. The offices should encourage joint users meetings to develop acceptable flight programs. The FAA Regional Environmental Office and Air Traffic Control Service should be included in meetings involving planning special use airspace. Principal operations inspectors (POI) should encourage all assigned operators, including non-certificated commercial sightseeing and Part 135 operators to cooperate in complying with procedures established for each scenic flight area. Information regarding special routes should be extensively distributed to avoid conflict with other airspace users. The POI's are responsible for:

Identifying scenic areas subject to air tour/sightseeing operations

Identifying actual and potential air tour/sightseeing operators

Coordinating with Air Traffic Control, when appropriate, and with airspace users in cooperatively establishing recommended routes, entry/exit points, altitudes, direction of flight, and reporting points, when appropriate

Encouraging participation of non-certificated sightseeing operators

NOTE: An environmental impact study may be required for any routes developed below 3,000 feet above ground level.

D. Operations Specifications (OpSpecs).

1. Air tours and sightseeing flights, conducted Within the Grand Canyon National Park Special Flight Rules Area identified by SFAR 50-2, require Part 135 operators to hold special OpSpec authorization. Inspectors with operators aspiring to conduct Grand Canyon operations should coordinate with the Western-Pacific Regional Office Flight Standards Division.

2. Special regulations that may be developed in the future for another area, park, or prominent attraction, would be identified and any special operational authority would be listed as a note in paragraph 8 of the OpSpecs. The suggested wording for such an entry would ~~be~~

"Special Requirements: Note 1. Air tour/sightseeing operations are authorized to be conducted over "list appropriate area, river or prominent point of interest" in accordance with procedures outlined within the operators operation manual."

3. The routes and altitudes depicted in the operator's OpSpecs should enhance collision avoidance procedures and aircraft noise abatement. The identification of sightseeing areas and routes does not relieve the pilot-in-command from the responsibility to see and avoid other aircraft.

E. Operations Manual.

1. Coordination through Western-Pacific Regional flight Standards with the Las Vegas flight Standards District Office (FSDO) is required for approval to conduct sightseeing and/or air-tours in the Grand Canyon. Special programs developed through the Las Vegas FSW are required of the operator to hold opssecs granting flight authority in SFAR 50-2 airspace.

2. For attractions and areas other than the Grand Canyon, POI's should recommend to operators that they have a chapter within their operations manual containing an outline of procedures for conducting air tour/sightseeing operations, This chapter should contain the following:

Air tour/sightseeing area clearly depicted on a chart and explained in words to ensure the reader's comprehension of the tour area.

All tour area entry/exit points should also be points for radio reports on a common-use air-to-air frequency.

A clear description of tour routes, altitudes, and reporting points.

Procedures for obtaining current weather information and weather deviations. (Higher visual flight rules weather minimums should be considered for flight operations in high density traffic where air tour/sightseeing operators enter and depart special airspace.)

Collateral duties such as the pilot narrating a tour or operating tape players for passengers. (These shall only be performed when the pilot's workload permits; compliance with Section 135.100(b) of the Federal Aviation Regulations is still required.)

Provision for additional crewmember training if necessary. Ground and flight training may be required for each additional air tour/sightseeing operation.

F. Program Tracking Reporting Subsystem (PTRS) Input. POI's must record all relevant dialogue with operators regarding air tour/sightseeing operations into the PTRS system. The POI should enter activity code number 1260 in section I and code A 603 in the primary/key column in section IV. The inspector should enter a special entry "AIRTOUR" in the national tracking block.

G. Location in Handbook. The material covered in this handbook bulletin will be incorporated by AFS-552 in future revisions of the Air Transportation Operations Inspector's Handbook 8400.10. Until the new material is incorporated in the handbook inspectors should refer to this handbook bulletin.

H. Inquiries. Any questions regarding this handbook bulletin should be directed to AFS-510 at FTS 698-0366.

APPENDIX E

**MAJOR AIR TOUR ACCIDENTS
FIXED WING, 10 YEAR HISTORY**

Date	Operator/CFR Part	Event/General Location	On Board/ Fatalities
Aug. 17,1983	Las Vegas Airlines/91	Collision with Terrain/ Grand Canyon	10/10
Jan. 1,1986	Ai Merrill/135	Collision with terrain/ Hamuela, Hawaii	5/1
June 18,1986	Grand Canyon Airlines and Helitech, Inc./91	Midair collision/ Grand Canyon	25/25
April 24,1987	Blue Sky Aviation/91	Collision with terrain/ Kauai, Hawaii	4/4
June 11,1989	Scenic Air Tours, Hawaii/135	Collision with terrain/ Waipio Valley, Hilo, Hawaii	11/11
Sep. 27,1989	Grand Canyon Airlines/135	Crashed on landing Grand Canyon airport	21/10
May 13,1991	Ai- Grand Canyon/135	Engine loss of power/ Temple Bar, Arizona	7/7
Nov. 10, 1991	Scenic Air Tours, Hawaii/135	Ditched in sea/near Hilo, Hawaii	11/0
Dec. 10,1991	Las Vegas Airlines/135	Collision with terrain/ Temple Bar, Arizona	5/5

Jan. 13, 1992	AirVegas, Inc./135	Attempted single engine landing/ Temple Bar, Arizona	5/2
April 22, 1992	Scenic Air Tours, Hawaii/135	Collision with terrain/Mt. Haleakala, Maui, Hawaii	9/9
June 23, 1992	Out of Arizona Bi-plane Tours/91	Fuel exhaustion, Sedona, Arizona	3/2
June 19, 1992	Adventure Airlines/135	Crashed on takeoff/ Grand Canyon West Airport	10/10

APPENDIX F

**RESUME' OF RECENT AIR TOUR ACCIDENT INVESTIGATIONS
IN THE NTSB SOUTHWEST REGION
FY 1989 TO FEBRUARY 1993**

<u>Date</u>	<u>Location</u>	<u>Type of Operation</u>	<u>Aircraft Type</u>	<u>Aircraft Damage</u>	<u>Degree of Injury</u>	<u>First Occurrence</u>
---- 1988 ----						
10/16	SEDONA, AZ	Passenger	PIPER PA-32-300	Destroyed	Fatal (5)	Loss of power(total) - mech failure/malfunction
11/17	MILPITAS, CA	Not Reported	BEECH 95	Destroyed	Fatal (1)	Loss of control - in flight
12/12	HANAIEI, HI	Not Reported	HUGHES 369E	Substantial	None	Loss of power(partial) - mech failure/malfunction
---- 1989 ----						
05/20	WAIALAE FALLS, HI	Passenger	AEROSPATIALE AS350D	Substantial	Minor	Loss of power(partial) - mech failure/malfunction
07/24	KALAPANA, HI	Not Reported	HUGHES 249C	Substantial	Serious	Loss of power(total) - mech failure/malfunction
08/19	VOLCANO, HI	Pax and Cargo	AEROSPATIALE AS350D	Destroyed	Serious	Loss of power(total) - mech failure/malfunction
10/10	GRAND CANYON, AZ	Passenger	CESSNA T207A	Destroyed	Serious	Loss of power
---- 1990 ----						
05/03	KAHULUI, HI	Not Reported	HUGHES 369C	Substantial	None	In flight collision with object
06/05	MARBLE CANYON, AZ	Passenger	CESSNA T210L	Substantial	Serious	Overrun
06/17	GRAND CANYON, AZ	Passenger	CESSNA T207A	Substantial	None	On ground collision with object
06/23	HANAPEPE, HI	Not Reported	HUGHES 369D	Substantial	None	Midair collision
06/23	HANAPEPE, HI	Not Reported	HUGHES 369D	Minor	None	Midair collision
12/18	KEANAE, HI	Not Reported	MCDONNELL DOUGLAS 369D	Substantial	Minor	Loss of power(partial) - non-mechanical
---- 1991 ----						
03/16	LAS VEGAS, NV	Passenger	CESSNA T207A	Substantial	None	Loss of power(total) - non-mechanical
05/05	KEANAE, HI	Passenger	HUGHES 369HS	Substantial	Minor	Loss of power
05/13	GRAND CANYON, AZ	Passenger	CESSNA T207A	Destroyed	Fatal (7)	Loss of power(total) - mech failure/malfunction
06/06	LIHUE, HI	Not Reported	BELL 206B	Substantial	Serious	Loss of power(total) - non-mechanical
07/24	KAHULUI, HI	Passenger	AEROSPATIALE AS350B	Substantial	None	Loss of power(total) - non-mechanical
08/08	GRAND CANYON, AZ	Passenger	CESSNA 402C	Substantial	None	On ground collision with object
08/23	FREDONIA, AZ	Passenger	CESSNA R182	Substantial	None	Loss of power(total) - mech failure/malfunction
10/14	HILO, HI	Passenger	AEROSPATIALE AS 350D	Substantial	None	Not reported
11/09	HILO, HI	Passenger	BELL 206L3	Substantial	Serious	Not reported
11/10	HILO, HI	Passenger	BEECH D18S	Substantial	None	Loss of power(total) - mech failure/malfunction
12/10	TEMPLE BAR, AZ	Pax and Cargo	PIPER PA31-350	Destroyed	Fatal (5)	Not reported
---- 1992 ----						
01/13	TEMPLE BAR, AZ	Passenger	CESSNA T210L	Destroyed	Fatal (2)	Not reported
04/22	MAKAWAO, HI	Passenger	BEECH E-18S	Destroyed	Fatal (9)	Not reported
05/30	VOLCANO NAT. PK. HI	Passenger	MCDONNELL DOUGLAS 369D	Substantial	None	Airframe/component/system failure/malfunction
06/09	BIG SUR, CA	Not Reported	CESSNA 172P	Destroyed	Fatal (3)	Undetermined
06/19	MAIKOLOA, HI	Not Reported	BELL 206L3	Substantial	Minor	Main gear collapsed
06/23	SEDONA, AZ	Not Reported	WACO CPF-7	Destroyed	Fatal (2)	Loss of power(total) - non-mechanical
09/16	HANA, HI	Passenger	AEROSPATIALE AS-350B	Destroyed	Fatal (7)	In flight encounter with weather
09/21	VOLCANO, HI	Not Reported	BELL 47-G4A	Substantial	Minor	Loss of control - in flight
12/04	KAMUELA, HI	Passenger	HUGHES 369C	Substantial	Minor	Loss of power(total) - mech failure/malfunction
12/07	KAHULUI, HI	Not Reported	HUGHES 269B	Destroyed	None	Not reported
12/21	HILO, HI	Passenger	HUGHES 369D	Substantial	Minor	Not reported
---- 1993 ----						
01/25	VOLCANO NAT PK, HI	Not Reported	FAIRCHILD HILLER FH-1100	Destroyed	Fatal (4)	Not reported