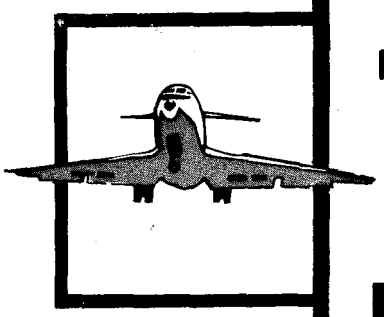

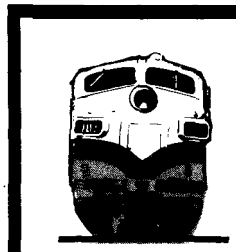

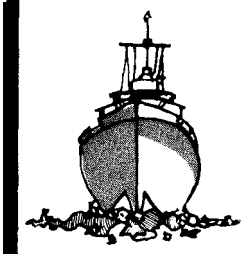

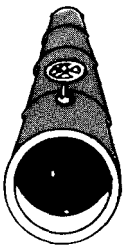

PB87-910403

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C. 20594

AIRCRAFT ACCIDENT REPORT

GRAND CANYON AIRLINES, INC., AND HELITECH, INC., MIDAIR COLLISION OVER GRAND CANYON NATIONAL PARK JUNE 18, 1986

NTSB/AAR-87/03

UNITED STATES GOVERNMENT

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15. Supplementary Notes

16. Abstract

On June 18, 1986, at 0855 mountain standard time 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 air tour of the Grand Canyon. It took off from its base at a heliport adjacent to State route 64 in Tusayan, Arizona, located about 5 miles south of the main entrance to the south rim of the park. Visual meteorological conditions prevailed. The two aircraft collided at an altitude of 6,500 feet msl in the area of the Tonto Plateau. There were 18 passengers and 2 flightcrew members on the DHC-6 and 4 passengers and 1 flightcrew member on the Bell 206B. All 25 passengers and crewmembers on both aircraft were killed as a result of the collision.

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the flightcrews of both aircraft to "see and avoid" each other for undetermined reasons. Contributing to the accident was the failure of the Federal Aviation Administration to exercise its oversight responsibility over flight operations in the Grand Canyon airspace and the actions of the National Park Service to influence the selection of routes by Grand Canyon scenic air tour operators. Also contributing to the accident was the modification and configuration of the routes of the rotary-wing operators resulting in their intersecting with the routes of Grand Canyon Airlines near Crystal Rapids.

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EXECUTIVE SUMMARY

On June 18, 1986, at 0855 mountain standard time, 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 2068 (Jet Ranger), N6TC, call sign Tech 2, began its approximate 30-minute, on-demand air tour of the Grand Canyon. It took off from its base at a heliport adjacent to State route 64 in Tusayan, Arizona, located 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 Tonto Plateau. There were 18 passengers and 2 flightcrew members on the DHC-6 and 4 passengers and 1 flightcrew member on the Bell 206B. All 25 passengers and crewmembers on both aircraft were killed as a result of the collision.

Because of the lack of cockpit voice recorders and flight data recorders in both aircraft, as well as the lack of radar data, no assessment of the flight path of either aircraft could be made. As a result, the reason for the failure of the pilots of each aircraft to "see and avoid" each other cannot be determined. Consequently, the issues highlighted in this report concern primarily the oversight of the Federal Aviation Administration (FAA) on Grand Canyon-based scenic air tours or sightseeing flights and the actions of the National Park Service to influence these operations. Because of an exemption to 14 Code of Federal Regulations (CFR) Part 135, local scenic air tours were conducted under 14 CFR Part 91. This investigation revealed that there was no FAA oversight on the routes and altitudes of Grand Canyon-based scenic air tour operators. This was contrary to the intent of Safety Recommendation A-84-52. Further, the National Park Service, through its authority under a 1975 law, was conducting a study to determine the effects of aircraft noise on the Grand Canyon and, at the same time, influencing the selection of air tour routes. The routes of the rotary-wing operators were moved as a noise conservation measure to where they converged with those of Grand Canyon Airlines at the location of the accident.

Other safety issues concern the lack of regulations to limit flight and duty times of pilots conducting scenic air tour flights, and the lack of a requirement for the pilots of such flights to use intercoms or public address systems when narrating during the flights.

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the flightcrews of both aircraft to "see and avoid" each other for undetermined reasons. Contributing to the accident was the failure of the Federal Aviation Administration to exercise its oversight responsibility over flight operations in the Grand Canyon airspace and the actions of the National Park Service to influence the selection of routes by Grand Canyon scenic air tour operators. Also contributing to the accident was the modification and configuration of the routes of the rotary-wing operators resulting in their intersecting with the routes of Grand Canyon Airlines near Crystal Rapids.

As a result of its investigation, the Safety Board issued recommendations to the FAA to apply 14 CFR Part 135 flight and duty time limitations on scenic air tour operations; require air tour pilots to use a public address system, intercom, or similar system while narrating air tour flights; and require all scenic air tour flights to operate under the provisions of 14 CFR Part 135 and not 14 CFR Part 91.

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594

AIRCRAFT ACCIDENT REPORT

Adopted: July 24, 1987

GRAND CANYON AIRLINES, INC., AND HELITECH INC., MIDAIR COLLISION OVER GRAND CANYON NATIONAL PARK JUNE 18, 1986

1. FACTUAL INFORMATION

1.1 History of the Flight

On June 18, 1986, at 0855 mountain standard time, 1/ a Grand Canyon Airlines DHC-6 (Twin Otter), N76GC, call sign Canyon 6, took off from runway 21 of the Grand Canyon Airport (GCN). The flight was a scheduled 50-minute air tour over Grand Canyon National Park. At 0913, a Helitech Bell 206B (Jet Ranger), N6TC, call sign Tech 2, began its approximate 30-minute, on-demand air tour of the Grand Canyon. It took off from a heliport adjacent to its base near State route 64 in Tusayan, Arizona, located about 3 miles south of the boundary of the park and 1 mile northeast of the approach end of runway 21 at GCN. There were 18 passengers and 2 flightcrew members aboard the DHC-6; there were 4 passengers and 1 flightcrew member aboard the Bell 206B.

The flights, scenic air tours over the Grand Canyon, were conducted in uncontrolled airspace under visual flight rules. The only air traffic control facility in the area, the control tower at GCN, controlled only departures and arrivals into the airport. At the time of the accident, most sightseeing flights were conducted under the requirements of 14 Code of Federal Regulations (CFR) Part 91, in accordance with the provisions of 14 CFR 135.1(b)(2). 2/

Both flights proceeded normally, making the customary voluntary position reports over frequency 122.75 MHz. (See Section 1.9. Communications for additional information.) A pilot who was flying south of Mencius Temple, a prominent landmark in the Grand Canyon, stated that about 0930, he saw the Bell 206B and heard "Tech 2" report "west of Mencius at 6400 feet, southbound." This pilot had previously heard "Canyon 6" report passing another landmark, Havasupai Point. (See appendix D.)

About the same time, a pilot who had just passed Havasupai Point eastbound at 7,100 feet believed that he saw a flash of light. Prom his position about halfway between Havasupai Point and the Scorpion, he saw a "mushroom-topped" column of smoke about 1,000 feet high rising from the Tonto Plateau. By the time he passed south of Scorpion he could identify another column of smoke and a smaller area of vaporous cloud between the two columns.

1/ All times herein are mountain standard time- based on the 24-hour clock, unless otherwise indicated.
2/ 14 CFR 135.1(b)(2) allows nonstop sightseeing flights that begin and end at the same airport, and are conducted within a 25-statute-mile radius of that airport to be conducted under 14 CFR Part 91.

A group of whitewater rafters had just passed the Boucher Rapids on the Colorado River inside the Grand Canyon about 3 miles from the accident site. Although none of the rafters saw either aircraft before they collided, several stated that they looked up in time to see both aircraft as they emerged from a small cloud of smoke or a vaporous cloud. They reported seeing the helicopter fall to the west and the DHC-6 fall to the east of the collision point. After the debris disappeared from view behind a plateau, they heard the sound of ground impact and saw black smoke rising from the impact sites.

About 0930, a Bell 206B, operated for the National Park Service (NPS), departed the South Rim Heliport on a medical evacuation flight to Phantom Ranch. The pilot subsequently overheard a radio report describing the accident which reported that survivors were walking about the wreckage site. He flew to the heliport to acquire needed medical equipment and returned immediately to the site. On arrival, he circled over the wreckage of the helicopter and then proceeded to the wreckage of the DHC-6. He was unable to locate survivors.

The accident was estimated to have occurred about 0933 during daylight hours at 36°10' N latitude and 112°15' W longitude.

1.2 **Injuries** to Persons

Injuries	Cockpit crew	Passengers	Other	Total
Fatal	3	22	0	25
Serious	0	0	0	0
Minor	0	0	0	0
None	0	0	0	0
Total	3	22	0	25

1.3 Damage to Aircraft

Both aircraft were destroyed by impact and the postimpact fire. The value of the Bell 206B was estimated at $300,000 while the value of the DHC-6 was placed at $750,000.

1.4 Other Damage

The vegetation in the immediate area of the DHC-6 was consumed by the postimpact fire.

1.5 **Personnel** Information

1.5.1 The DHC-6

The flightcrew of the DHC-6 was qualified in accordance with existing Federal aviation regulations. Both crewmembers were qualified to act as pilot-in-command of the DHC-6 in accordance with the requirements of 14 CFR Part 135. (See appendix B.)

The captain, 27, was employed by Grand Canyon Airlines in July 1982 and assigned to the position of pilot-in-command of the Cessna 207, a seven-passenger, single-engine airplane. He completed ground school and flight training in the airplane in

August 1982. In September 1983, he completed the transition training required to act as first officer of the DHC-6. In October of that year he also qualified as an instructor pilot in the Cessna 207. In March 1986 he upgraded to captain on the DHC-6. At the time of the accident, he had accrued 5,970 hours of flight time, about 5,000 of which were as pilot-in-command. He had accrued 1,556 hours in the DHC-6 airplane.

The captain had been scheduled to be off-duty on June 15 and 16. On June 15, however, he provided flight instruction to a friend, and on June 16, he flew two scenic air tour flights for Grand Canyon Airlines. Therefore, he was considered to have been on-duty for 2 hours on June 16. On June 17 he reported for duty at 0630 and went off-duty at 1930. He had dinner with a friend and retired at 2300. On the day of the accident he arose at 0600 and reported for work at 0630.

The first officer, 27, was employed by Grand Canyon Airlines in July 1980 and completed all ground and flight training for the Cessna 207 in that month. He flew as pilot-in-command of the Cessna 207 until 1984. In July 1984 he successfully transitioned to the first officer position on the DHC-6. He upgraded to captain on that airplane in April 1986. At the time of the accident, he had accrued of 4,450 hours of flight time, 3,500 of which were as pilot-in-command. His total flight time in the DHC-6 was 1,076 hours. Both pilots of the DHC-6 flew 9 hours on the day preceding the accident. In addition, the pilot-in-command flew 111 hours in the 30 days before the accident while the second-in-command had flown 160 hours during the same period.

The first officer was off-duty on June 16. On June 17 he reported for duty at 0630 and went off-duty at 1930. He retired at 2200 and on the day of the accident awoke around 0600. He reported for duty at 0630. Both the captain and first officer flew one Grand Canyon Airlines scenic air tour before the accident flight. The duty day for pilots at Grand Canyon Airlines was from 0630 to 1830. On a typical day pilots would accrue 8 to 9 hours of flight time.

Grand Canyon Airlines ground training incorporated instruction in the following general topics: general operating and flight rules, rules applicable to air taxi and commercial operators (operations conducted under 14 CFR Part 135), company operations, navigation and air traffic control procedures, company routes, meteorology, and emergency procedures. Flight instruction included training in takeoffs and landings, normal and emergency maneuvers, flight under simulated instrument conditions, climbs and climbing turns, engine failure, flight at minimum controllable airspeeds, and stalls. All training and certification met the requirements of 14 CFR Part 135.

1.5.2 The Bell 206B

The pilot-in-command of the Bell 206B was 39-years-old at the time of the accident. He was employed by Helitech on June 13, 1986. (See appendix B.) Since Helitech began operations on June 1, 1986, the pilot-in-command had previously received his training in the Bell 206B and in Grand Canyon flight operations when he was employed by other companies which operated in the Grand Canyon. He received his initial helicopter training and flight experience while he was in the U.S. Army. He was employed by Grand Canyon Helicopters in May 1978 where he flew the Bell 206 in flight tours over the Grand Canyon and in contract flights for the NPS. In August 1979, he was employed by a company performing mineral exploration activities in Utah. He returned to the Grand Canyon area in July 1981 and was employed by Madison Aviation to conduct air tours over the Grand Canyon in the Bell 206B and to perform the duties of chief pilot under the provisions of 14 CFR Part 135. At the time of the accident, he had accrued 6,953.6 flight hours, all of which were in rotary-wing aircraft.

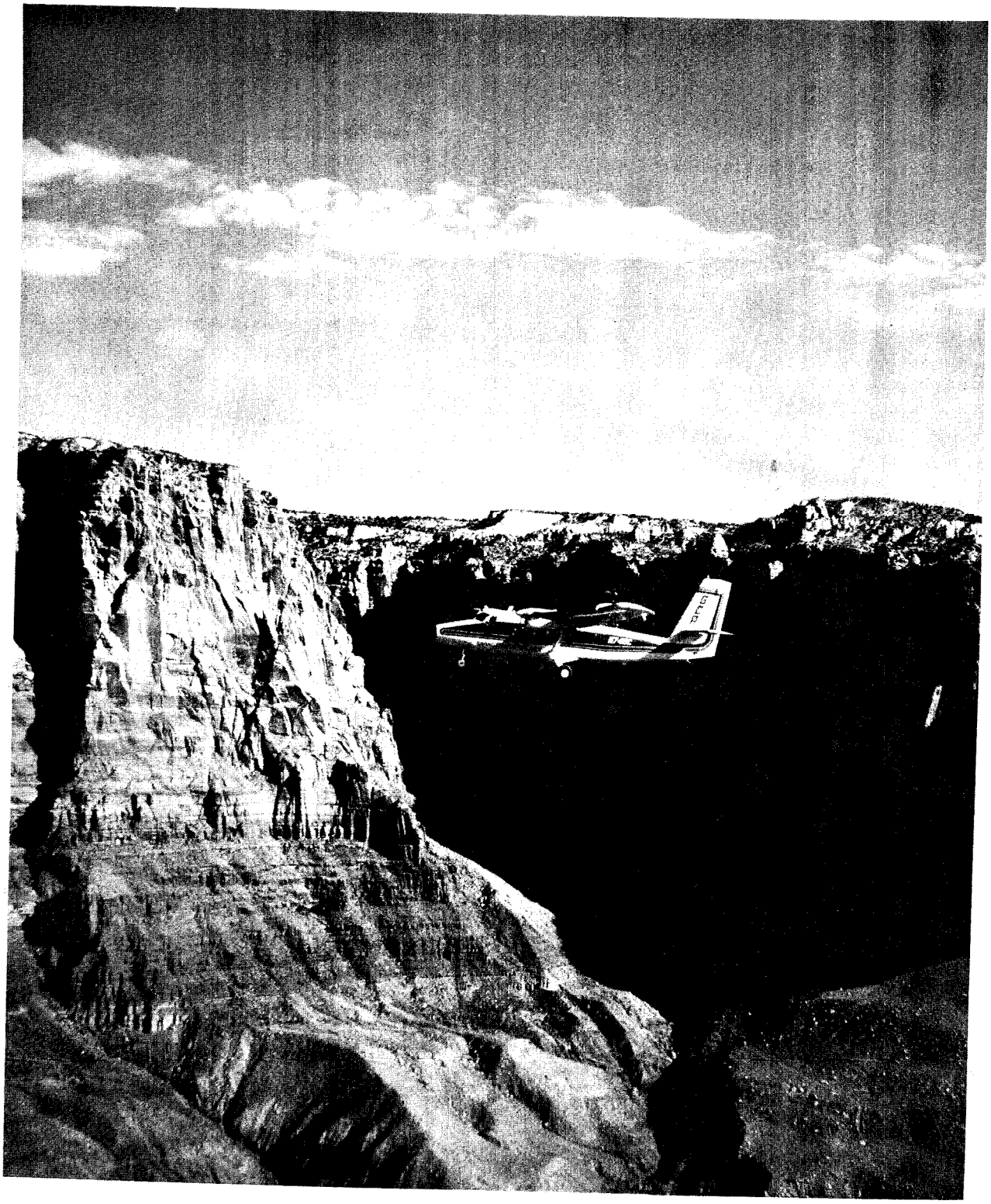


Figure 1.—Grand Canyon Airlines DHC-6.

The pilot had been off-duty from June 14 through June 17. He returned to the Grand Canyon on June 17 following a trip to the east on a commercial air carrier to attend personal business. On June 17 he retired about 2000 to 2030 and awoke at 0630 the following morning. He reported for work about 0800. The duty day at Helitech began about 0800 and continued until 1800.

1.6 Aircraft Information

1.6.1 The DHC-6

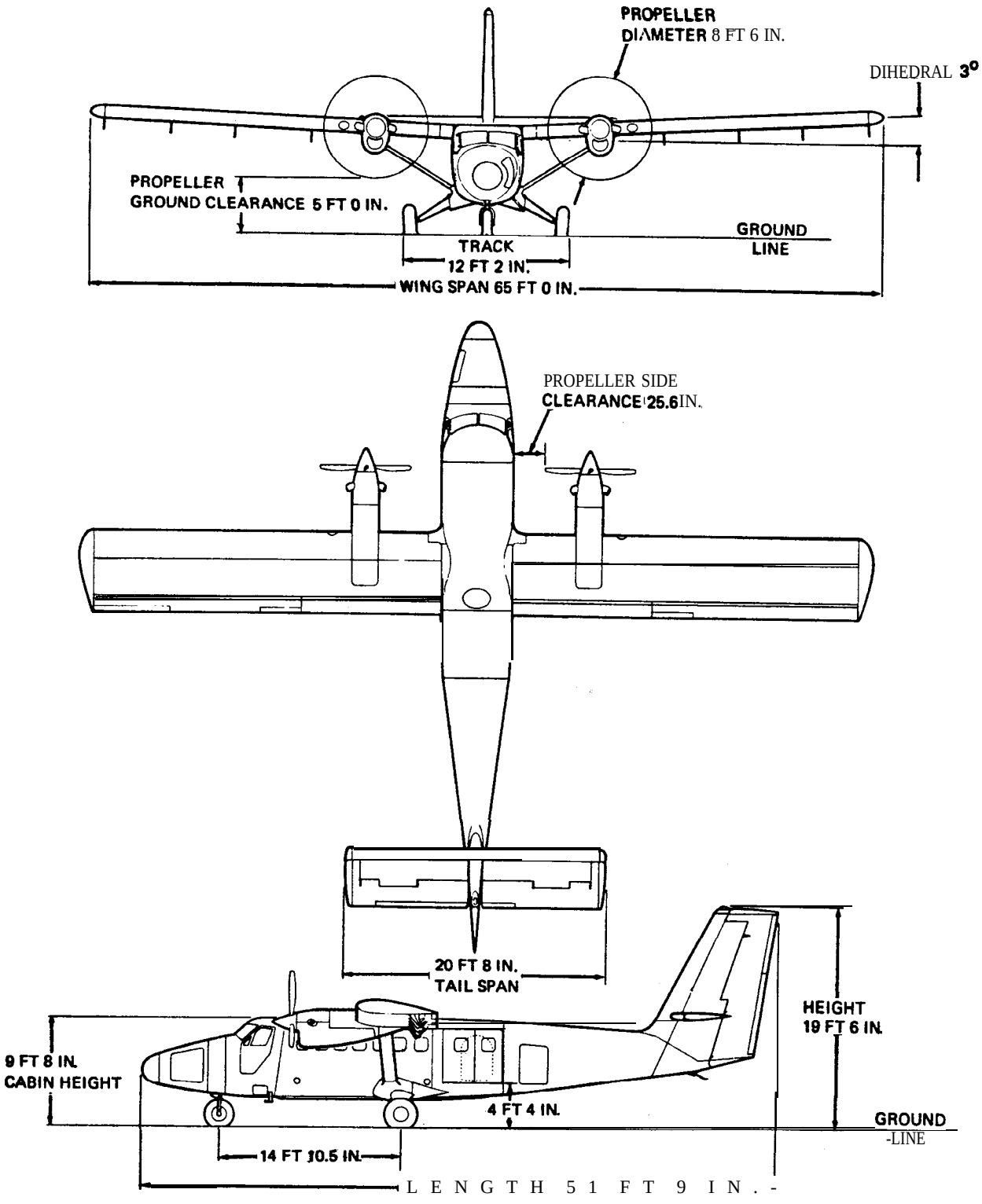
The DHC-6-300, Twin Otter, United States Registry N76GC, was operated by Grand Canyon Airlines and was configured for a flightcrew of 2 and 19 passengers. (See appendix C.) The airplane was modified in March 1982 with larger than standard windows in the passenger compartment under Federal Aviation Administration (FAA) approved Supplemental Type Certificate (STC) No. SA1814NM. The airplane was equipped with two Pratt and Whitney of Canada PT6A-27 powerplants, each with a three-blade, Hartzell, constant-speed propeller. The airplane was painted with an overall beige paint scheme with horizontal dark brown, gold, and blue stripes. (See figures 1 and 2.) The stripes were about the same width for the length of the fuselage. The brown was 24 inches wide, the gold was 6 inches wide, and the blue was 3 inches wide. The stripes tapered gradually along the rear fuselage and swept upward along the rudder and then forward near the top of the vertical stabilizer.

The cruise airspeed of the airplane with 10° of flaps extended, the configuration used by Grand Canyon Airlines, was 100 miles per hour. The maximum certificated takeoff weight of the airplane was 12,500 pounds. The takeoff gross weight of the DHC-6 before the accident was 11,934 pounds and its center of gravity (CG), expressed in percent of mean aerodynamic chord was 25.1 percent. Both the weight and CC were within allowable limits for the accident flight. The maintenance records of the airplane revealed that the only deferred minimum equipment list item at the time of the accident was a discrepancy in the first officer's attitude gyro. All maintenance had been performed according to an FAA-approved program. No discrepancy trends or repeated maintenance actions on major items were found.

1.6.2 The Bell 206B

The Bell 206B III, Jet Ranger, United States Registry N6TC, *was a* single-engine, utility-type helicopter. It was configured for a pilot and one passenger in the front seats and three passengers in a rear bench-type seat. It was equipped with an Allison 250-C20B powerplant, a two-blade main rotor and a two-blade tail rotor. (See figure 3.) The aircraft *was* painted white and yellow with yellow the predominant color of the passenger cabin. The main rotor color was gray and the tail rotor was mostly red.

The maximum takeoff weight of the aircraft was 3,200 pounds. Its weight and CG were within acceptable limits at the time of the accident. There were no discrepancy trends or repeated maintenance actions relating to the aircraft. Its maintenance and inspection activities were performed in accordance with applicable regulations.



Aircraft Dimensions

Figure 2.--Aircraft dimensions -- the DHC-6-300.

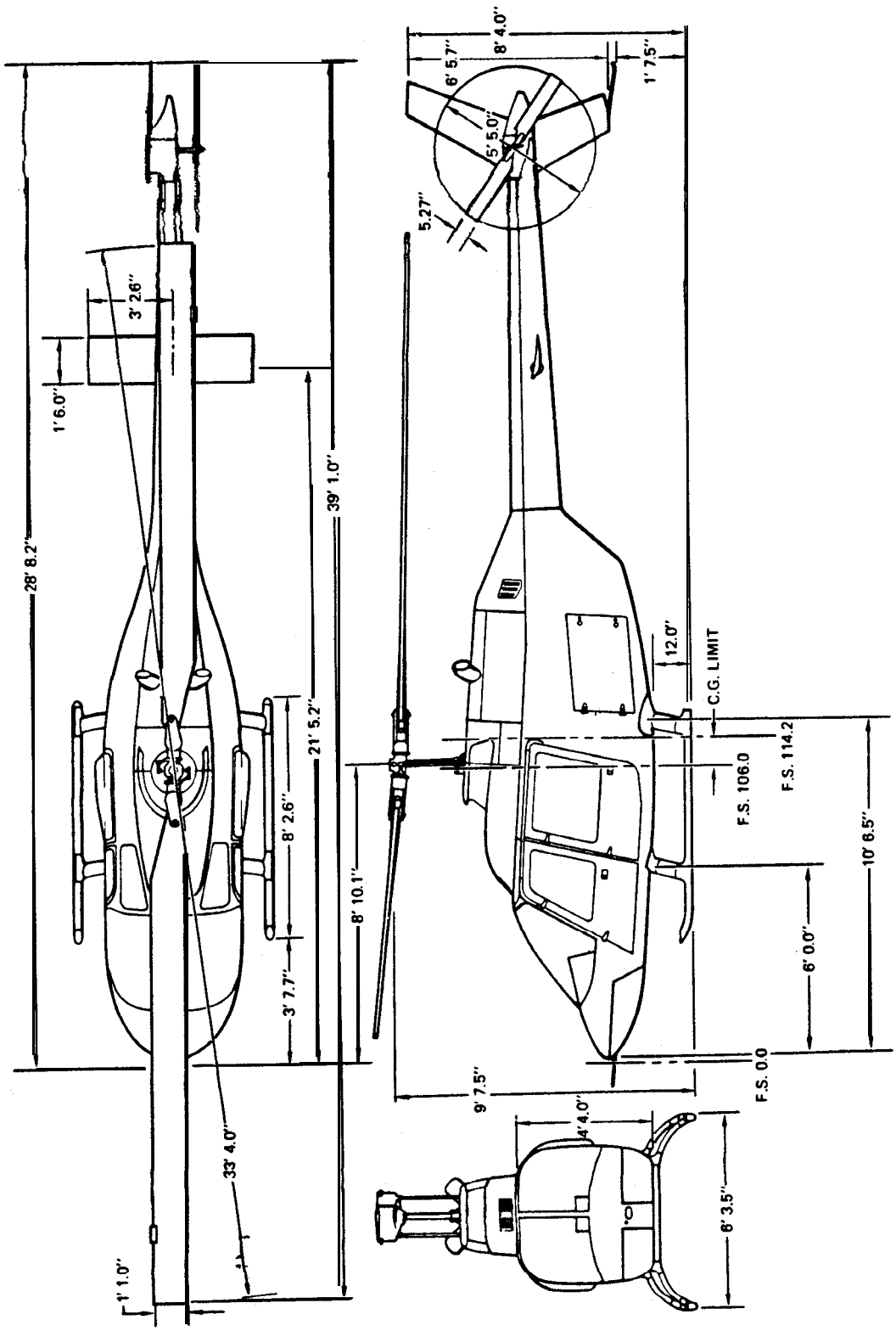


Figure 3. Aircraft dimensions--the Bell 206B.

1.7 Meteorological Information

At the time of the accident, visual meteorological conditions prevailed. The 0845 local observation taken at GCN was as follows:

> Sky-clear; visibility-50 miles; temperature--74° F; dew point--39° F; wind--200° F at 7 knots; and the altimeter-30.27 inches of mercury.

The 0958 local observation taken at GCN was:

> Sky-clear; visibility-50 miles; temperature--77° F; dew point--36° F; wind--200° F at 8 knots; and the altimeter-30.27 inches of mercury.

The clear conditions with a high degree of visibility were considered typical of meteorological conditions at the Grand Canyon at that time of year and that time of day. In addition, there was often low-level turbulence associated with the Grand Canyon in the late afternoon.

1.8 Aids to Navigation

There were no reported problems with aids to navigation.

1.9 Communications

There were no reported problems with communications between the DHC-6 and the GCN air traffic control tower or the Bell 206B and the GCN air traffic control tower. Air tour operators in the Grand Canyon had developed an informal, voluntary reporting system in which pilots gave position reports, altitudes, and flight directions over the common frequency, 122.75 MHz, when they passed prominent landmarks in the Grand Canyon. This system had been in use for several years.

Following the accident, several pilots of air tour aircraft told Safety Board investigators that in recent years there had been increasing congestion on the common frequency. One helicopter pilot stated that the congestion had been getting worse and that there had been excessive, nonpertinent "chatter" particularly when air tour traffic was light. The director of operations of Grand Canyon Airlines testified that although the frequency was congested at times, in his opinion it had "never been congested to the point where it became unsafe." In addition he noted that when air tour traffic was heavy, simultaneous transmissions from two flights might interfere with or block each other. He added that pilots of transient aircraft, both general aviation and military, would not be familiar with the position reporting system and, therefore, would not use it. When a transient aircraft was observed by an air tour pilot, the air tour pilot would typically broadcast position information on the nonreporting aircraft.

The former president of Helitech testified that the aircraft reporting system was an effective one. Moreover, when two or more transmissions interfered with each other, pilots would generally inform each other that the transmissions had been "stepped on" or interfered with.

On the day of the accident, there were no reported difficulties with the ability of either the DHC-6 or the Bell 206B to make position reports over the common frequency.

1.10 Aerodrome Information

The departure airport of the DHC-6 was located 7 miles south of the park headquarters and 3 miles south of the park boundary. The airport elevation was 6,606 feet above mean seal level (msl). The single runway, 03/21, was 8,999 feet long and 150 feet wide. The air traffic control tower operated from 0800 to 1800.

The heliport from which the Bell 206B departed was used by Helitech aircraft only. Clearance to traverse the GCN airport traffic area from the heliport was obtained from the GCN air traffic control tower.

1.11 Flight Recorders

Neither of the two aircraft was equipped with a cockpit voice recorder or a flight data recorder nor were such recorders required for the type of operations being conducted at the time of the accident.

1.12 Wreckage and Impact Information

1.12.1 The DHC-6

The wreckage of the two aircraft came to rest about 2,450 feet apart on the Tonto Plateau between Mencius Temple and Tuna Creek. The sites are about 1 1/2 statute miles north of the Crystal Rapids of the Colorado River.

Most of the wreckage of the DHC-6 was located on the western side of the base of Mencius Temple oriented to a magnetic heading of 150°. The rear fuselage and the empennage were positioned on a magnetic heading of 057° and were separated from the remainder of the airplane by 953 feet.

The left main landing *gear* leg with the wheel, tire, and brake missing, and a 4-inch portion of a blade tip of the left propeller were located between the rear fuselage and the main wreckage. The nose gear strut was found north of the wreckage site. Various pieces of both aircraft, including the baggage door and fuselage skin sections of the DHC-6 and sections of the main rotor mast including the boot, as well as engine cowl sections with particle separator components, were randomly scattered over a distance of 300 feet west of the tail section of the DHC-6. A 6-foot section of the main rotor blade spar of the Bell 206B was located 810 feet southwest of the DHC-6 tail section. The left main wheel of the DHC-6 was located 177 feet from the airplane% tail section. The main rotor mast of the Bell 206B was found about 150 feet farther to the east. The main rotor hub was located about 875 feet south of the main rotor mast.

Most of the DHC-6 fuselage from just aft of the wings forward came to rest in an inverted position. It was destroyed by impact and postimpact fire. The aft section of the fuselage below the floor line was relatively free of fire damage. There was a diagonal slash on the left side of this section from just aft of the baggage door forward angled aft about 24°. This section above the floor line was fragmented in a large area to the west of the location of the airplane% tail section. The ailerons and flaps, which were in the 10° position, were attached to the wing trailing edges. There was no evidence of the in-flight collision on the wings.

Nearly 18 inches of the red main rotor blade spar cap of the Bell 206B was found embedded in the left side of the rear fuselage of the DHC-6. There was a 5-inch chordwise penetration of the bottom surface of the left horizontal stabilizer and several other skin penetrations in this area, including one that severed the underlying stringers. There was aftward crushing of the leading edge of the right horizontal stabilizer, angled aft about 16°, as well as gray paint transfer on the deicer boot.

The nose gear was separated from the airplane at a distance of about 400 feet northwest of the main wreckage. The right side of the tire had been cut near the crown. There was a 21-inch by 28-inch portion of the fuselage structure attached to the strut. The left main landing gear, which also was separated from the fuselage, was 175 feet north-northeast of the tail section. There was a large dent in the leg tube about 11 inches above the brake flange near the 10:30 position when viewed from outboard. The axle was fractured 3 inches outboard of the bottom of the leg with the remaining portion displaced forward.

The wheel and tire assembly was separated from the gear leg, southeast of the tail section. The axle, bearings, and brake disc were missing. The inboard half of the wheel was broken on a line several inches wide through the hub and rim. The right main landing gear remained with the debris of the fuselage. There was no evidence of the collision on its components.

The right engine was severely damaged by impact and postimpact fire. Disassembly of the engine revealed no evidence of preexisting damage. The propeller blades were bent slightly opposite to the direction of normal rotation and were twisted toward low pitch.

The left engine was severely damaged by ground impact and the postimpact fire. Disassembly of the engine revealed no evidence of preexisting damage. The propeller blades were bent opposite to their direction of normal rotation and were twisted toward a low pitch position. All blades exhibited gouging along the leading edges.

1.12.2 The **Bell 206B**

Most of the wreckage of the helicopter was located near the edge of Tuna Creek, 2,450 feet from the main wreckage of the DHC-6. It was inverted and on a heading of 204°. Most of the forward part of the fuselage had been consumed by the postimpact fire. The tailboom was displaced to the left about 60° and was twisted clockwise. The top 40 inches of the vertical fin was located about 1,200 feet northeast of the main helicopter wreckage. There was a lateral indentation at the base of the leading edge of the vertical fin and red paint transfer on the left side of the fin.

Most of the engine and transmission cowlings were fragmented. The forward right transmission cowling was crushed inward and aft with evidence of rubber transfer on the surface. The forward edge of the right **access** door of the engine was crushed at an angle of 35° aft from the vertical. There was a light rubber transfer mark closely resembling the main gear tire tread of the DHC-6 on the aft cowl of **the** engine at an approximate 20° angle forward of vertical.

The main rotor hub and mast were separated and located apart from the aircraft. The entire mast, which had separated from the transmission, was located near the tail section of the DHC-6. It was bent forward about 45° near the top of the swashplate support. There were heavy contact marks on the vertical portion of **the**

swashplate support about 20° to 25° right of forward. The mast was fractured just below the static stop area. The main rotor hub was located about 1,300 feet northeast of the main wreckage of the Bell 206B. About 5 feet of each rotor blade remained with the hub. There was a 23-inch black rubber transfer mark across the top surface of one blade progressing outward from the root to a fracture of the trailing edge. Pieces of deicer boot material were found between the blade skin and honeycomb filler. In addition, there was a lo-inch-long patterned indentation, matching the splines of the brake discs of the DHC-6, on the bottom surface of the mating section. There was no rubber transfer on the top surface of the mating section.

The remainder of the rotor blade was found at a later date about 4,700 feet north of the' main wreckage of the Bell 206B. It was comprised of two sections which were close to each other--a 3-foot section from the blade tip inboard and an 8 1/2-foot section which mated with the blade root that remained with the hub.

The blade spar was deflected aftward from about midspan to the tip. The total deflection at the tip was about 1 inch. The top of the blade spar was broken out from the tip to about 4 1/2-inches inboard, and the tip block was broken out. There were approximate 1/4-inch deep gouges just outboard of the surface of the tip section that mated with the intermediate blade section. In addition, there were approximately 5-inch-long scratches in the spar which extended from the gouges inboard at a 350° angle.

There was a fracture that was deflected upward at an approximate 40° angle at the tip section of the main spar. There appeared to be compression-type bulking at the inboard fracture of the blade spar.

Across the lower surface of the blade were gold and brown paint transfer marks extending from the gouges as well as numerous parallel indentations in the intermediate section. There were several chordwise skin buckles in the intermediate section of the afterbody of the blade.

Two sections of the red blade spar were found in the wreckage area of the Bell 206B. The blade spar was fractured about 62 inches from the root. The outboard section was separated from the remainder of the blade. It was bent up at the inboard end and down at the outboard end. A section of sheet metal from the bulkhead/skin joint of the aft fuselage below the horizontal stabilizer of the DHC-6 was lodged in the inside radius of the blade spar. In addition, there were scoring marks in the counterweight and a red and white paint transfer on the bottom surface near the counterweight location.

The tail rotor and 90° gearbox had separated from the tailboom. There was a leading edge strike evident near the white stripe of one blade.

The engine of the Bell 206B was extensively damaged from impact and postimpact fire. There was no evidence of preexisting damage in the remaining portion of the engine and transmission.

1.13 Medical and Pathological Information

The three flightcrew members and the passengers onboard the two aircraft sustained fatal injuries as a result of the accident. Following the post mortem examination, the cause of death of the crewmembers and passengers was listed as "multiple severe crushing and thermal injuries, consistent with an airplane or helicopter crash." Toxicological analysis of the flightcrew members of both aircraft revealed no ethyl alcohol or illicit drugs.

1.14 Fire

There was no evidence of an in-flight fire on either of the two aircraft before the collision. Following the collision, the wreckage of both aircraft burned continuously for several hours. The fire consumed the cockpit, much of the fuselage, and most of the systems on the DHC-6. Similarly, the fire on the Bell 206B consumed most of the cabin, most of the systems of the aircraft, and all cockpit instruments except for one altimeter.

1.15 Survival Aspects

The accident was not survivable due to the severity of the ground impact and postcrash fire. Nevertheless, because of the remote location of the accident site, the Safety Board examined the potential ability of crash, fire, and rescue personnel to rescue survivors from the accident site had the accident been survivable.

The NPS informed the Safety Board that it operated a Bell 206B for its exclusive use. According to the NPS, this was used extensively in rescuing injured individuals from remote areas of the National Park. In addition, in an emergency, it could access both rotary-wing and fixed-wing aircraft from private and corporate operators in the area. These aircraft could have been used to reach and transport survivors to hospitals in Williams and Flagstaff, Arizona, if necessary. These hospitals, the closest to the Grand Canyon, are located about 50 and 70 miles, respectively, from the main entrance to the South Rim. The NPS maintains a clinic in the National Park to treat minor injuries.

1.16 Tests and Research

1.16.1 Photographic Reconstruction

Following the accident, the Safety Board performed a photographic reconstruction of the point of impact using a photograph of the postimpact vaporous cloud. The photograph had been taken by a passenger on board a raft near Boucher Rapids on the Colorado River. The photographer estimated that he took the photograph within seconds of the collision.

The technique employed in the reconstruction, known as photogrammetry, recreates a scene in three dimensions using terrain features in the photograph and in the topographic map of the area in the photograph as well as other data pertaining to the size of the negative, the camera lens, and the lens setting. To derive the altitude of the vaporous cloud, terrain features in the photograph and the topographic map were correlated with the location of the photographer, the impact site, and the elevation of the river at the point the photographer took the photograph. The resultant altitude was determined to have been 6,507 feet msl plus or minus 106 feet. (See appendix E.)

1.16.2 Plightpath

It was not possible to reconstruct the flightpath of either of the two aircraft before the collision due to the absence of flight recorders on either aircraft and the lack of radar data in the Grand Canyon airspace.

1.17 Additional Information

1.17.1 Operating Procedures of the DHC-6 and the Bell 206B

The DHC-6.-At the time of the accident, Grand Canyon Airlines operated two DHC-6 type airplanes and two C-207 type airplanes. According to its director of operations, 90 to 95 percent of its flights were air tours over the Grand Canyon, while the rest were either scheduled flights across the Grand Canyon or charter and special contract flights. The airline, which had been operating since 1926, employed 10 pilots at the time of the accident. During June, which was considered to be its "busy" season, flights in the DHC-6 were scheduled hourly and passengers could reserve their seats in advance. The director of operations stated that during the winter season, the airline reduced its operations and employed about "three or four" pilots.

Two pilots operated the DHC-6; one pilot performed the tour narration while the other controlled the airplane. The flying pilot scanned the outside area with the nonflying pilot and made the position reports. The pilots were taught to clear the area for other traffic on their side of the airplane when making a turn. Grand Canyon Airlines used a standard challenge and response checklist procedure in which the nonflying pilot would read the checklist and the flying pilot would then respond to each checklist item. The pilots wore headsets and communicated with each other through an interphone system. Cockpit communication over the headsets was carried out over an "open" or "hot" voice-activated microphone. The nonflying pilot, who performed the narration, would identify scenic points along the route. This was broadcast to the passengers over the cabin public address system in the airplane. Communication over the public address system was carried out through a control located in the yoke.

The tour route was flown in a counter-clockwise direction in the morning and in a clockwise direction in the afternoon to take advantage of the changes in the angle of the sun in the Grand Canyon during the day.

According to the director of operations of Grand Canyon Airlines, the planned route of the DHC-6 following its departure from the airport was to fly to Kachina Point at an altitude of about 7,700 feet msl. (See appendix D.) The airplane would then continue to the North Rim and follow the Colorado River at an altitude of 6,800 to 7,100 feet and continue to Vishnu Temple. It would then proceed to Angel's Gate, Brahma Temple to Zoroaster Temple, and then cross Bright Angel north of Phantom Ranch at about 7,000 feet msl. The airplane would pass Shiva Temple, make a slight left turn south of Dragon's Head, and turn north at Point Sublime; it would turn west around the Shinumo Amphitheater at 7,100 to 7,200 feet msl. The airplane would then pass the Holy Grail Temple, descend to about 6,500 feet, and proceed to Wheeler Point where it would turn east, parallel the river to Havasupai Point, and continue south of the Scorpion. The airplane would begin a shallow climb to about 7,000 feet msl cross the river on a northeasterly heading, and turn right to a southerly heading around Crystal Rapids. It would exit the Canyon at an altitude of 7,300 to 7,500 feet msl at Cocopa Point and proceed directly to the airport.

The director of operations stated that the following points were reporting points over the frequency 122.75 MHz: Kachina Point, Angel's Gate, Shiva Temple, Dragon's Head, Wheeler Point, Holy Grail, Havasupai Point, Scorpion, Crystal Rapids (optional reporting point), and Cocopa Point.

The Bell 206B.--Helitech, because it had been in business only about 2 weeks before the accident and because it was operating under 14 CFR Part 91, had no formal operations manual or training program. However, each of its pilots had flown rotary-wing air tours in the Grand Canyon for several years and accrued several thousands of hours of flying experience in such tours. At the time of the accident, Helitech had employed one full-time pilot and two part-time pilots who also performed the major administrative tasks. A fourth pilot, who had agreed to work for Helitech before the accident, began flying for them on June 23. The four pilots had previously been employed by two other rotary-wing air tour companies which shared aircraft types, routes, and altitudes. Helitech adopted these routes and altitudes when it commenced operations.

At the time of the accident Helitech operated two aircraft. A third, which had been scheduled to be placed into service in July, was never placed into service. 3/ Helitech's flights operated on an "on-demand"? basis, after at least three passengers purchased tickets for a flight.

According to the former president of Helitech, their aircraft would enter the Grand Canyon near Kachina Point at an altitude about 100 feet above ground level (agl) or about 7,300 feet msl at Kachina Point. It would proceed to Clear Creek, then turn west to Zoroaster Temple, continue to Phantom Creek, and on to Shiva Saddle. It would proceed westbound to The Dragon at 6,500 feet msl and continue to the Tuna Creek area. It would then begin a shallow climb to the Anasazi Indian ruins and descend to Sublime Point. From there the aircraft would proceed at about 6,500 feet southbound past Mencius Temple, continue directly to Crystal Rapids, and exit the park at Cocopa Point.

The former president of Helitech testified that its pilots would make the following position reports: Kachina Point, Phantom Creek, Shiva Saddle, the Dragon, the Anasazi Ruins, Mencius Temple, and Crystal Rapids.

He testified that in the beginning of April 1986, when he had been the director of operations of a large rotary-wing Grand Canyon air tour company, at the request of the Grand Canyon Plight Operators Association, the entry and exit points of the helicopters were changed from Shoshone to Kachina and from Pima to Cocopa Points, respectively. (See appendix F.) These changes, which placed the entry and exit points of the helicopters close to those of the Grand Canyon Airlines' airplanes, were implemented primarily as a noise conservation measure, by moving the helicopter operations away from popular tourist sites in the park. Helitech used the modified routes when they began operations. After the accident, Helitech and other helicopter air tour operations reverted to the previous routes.

Helitech pilots wore headsets which were used for communicating with air traffic control and other aircraft. There was no intercom or public address system used on Helitech aircraft and passengers did not wear headsets. Pilots communicated with passengers by speaking directly to them in a voice sufficiently loud to have been heard over the ambient engine and rotor noise. Since the majority of the passengers on the aircraft were seated in the rear bench seat, the pilot generally turned his head to the left when speaking to the passengers. According to the former president of Helitech, there were three points on the tour which the pilots identified to the passengers: the Colorado River, Phantom Creek, and the Indian Ruins. According to the former president, narration was kept to a minimum. Interphones between the pilot and passengers were not

3/ About 2 weeks after the accident, Helitech's insurance carrier terminated their insurance coverage and, as a result, Helitech ceased operations.

used since, according to his testimony,". . . installing headsets for the passengers, was going to, it would have a tendency for us to provide more narration, which we didn't want to do."

1.17.2 Grand Canyon Air Tours

According to information provided by the Grand Canyon Flight Operators Association, about 350,000 to 400,000 passengers flew over the Grand Canyon each year on scenic air tour aircraft. The association estimated that the Grand Canyon air tour industry generated about $50 to $80 million in revenue annually.

The former president of the Grand Canyon Flight Operators Association testified that the association included 32 of the 44 companies that operated air tour flights over the Grand Canyon. The operators were based in Arizona, California, Nevada, New Mexico, and Utah. The association began in 1970 as an informal alliance of operators. At the time of the accident, the association had as its four main goals ". . . to promote aviation safety, to promote aviation, to serve as a vehicle for communication among the operators, and to lobby governmental agencies on the members' behalf."

Membership in the association was voluntary. The association had no enforcement authority against operators who were considered to have been conducting flights in an unsafe manner. Operators generally developed their own routes and altitudes, or, like Helitech, used the routes and altitudes that had been developed by others. The FAA did not suggest routes or altitudes to operators. Those operating under 14 CFR Part 135 published their routes in operations manuals which were examined by the FAA in its routine surveillance of operators.

Following the accident, the association drafted a letter of agreement between themselves and the FAA regarding the conduct of air tour flights. (See appendix G.) The activities that the operators would perform, according to the letter, were voluntary. The letter had not been implemented at the time that the FAA proposed new rules regarding flights in the Grand Canyon airspace. Several points in the letter were included in the proposed FAA rules.

1.17.3 National Park Service Actions

The FAA possessed the statutory authority for the regulation of airspace in the NPS system, which included Grand Canyon National Park. This was recognized by the NPS which administers the National Park system. According to the chief of the Division of Resources Management Planning at the park, the NPS was directed to preserve the resources of the Park. He testified that this was "to be foremost in the minds of management of the units of the National Park Service."

In 1975 under provisions of the Grand Canyon National Park Enlargement Act, the NPS was directed to study the effects of aircraft activity in the Grand Canyon and, if "an injury to the health, welfare, or safety of visitors to the park" was perceived or if it was believed that aircraft noise would "cause a significant adverse effect on the natural quiet and experience of the park," the NPS was to recommend specific actions to the Secretary of the Interior. After reviewing the recommendations, the secretary would forward them to the relevant agency.

The study began in 1981 and was expected to continue for about 3 1/2 years. The process included meeting with representatives of the Grand Canyon air tour operators, environmental groups, and government agencies. According to the NPS, nine meetings were held from the winter of 1984 through the spring of 1586. However, according to the National Park Superintendent, in 1984, before the study was completed, the NPS identified "the effects of aircraft noise within and above the park . . . as the number one resource management issue in the GCNP [Grand Canyon National Park] National and Cultural Resource Management Plan."

The NPS held a public review period in the fall of 1985 to solicit comments on the information gathered. Following this period, the NPS examined and analyzed public comments and scheduled a second public review period from May 20 to August 1, 1986, to consider the information gathered and alternatives presented in the Aircraft Management Plan. This document, published in the spring of 1986 by the NPS, summarized much of the findings of the study and public comments on these findings. In addition, it proposed six alternatives to the operations of Grand Canyon scenic air tour flights. The alternatives consisted of a range of options from maintaining the existing system of routes and altitudes to establishing minimum altitudes and "flight free" zones in certain areas. (See appendix H.)

As part of the study, the NPS collected data on the extent of the perceived problem of aircraft noise. This included documenting instances of noncompliance with Advisory Circular (AC) 91-36C. (See appendix I.) The AC, effective October 19, 1984, requested pilots to fly at least 2,000 feet above the surface of a National Park area. (This was presented as alternative 2 of the six alternatives included within the Aircraft Management Plan.) However, since much of the South Rim of the Grand Canyon extends as high as 7,500 feet msl, complying with the provisions of the AC essentially would have prevented pilots from flying below 9,000 feet msl while over much of the Grand Canyon, an altitude considered impractical for conducting air tours over the Grand Canyon.

Although the NPS had no authority to regulate airspace in the Grand Canyon, the flight operators reacted to what they perceived as the ability of the NPS to influence the selection of their routes and the conduct of their flights through the study and potential subsequent legislation. If considered necessary, they would modify aspects of their operations, such as their routes in response to perceived NPS influence. According to the director of operations at Grand Canyon Airlines:

> The FAA has had minimal impact on the routes in the Canyon, from my experience here at Grand Canyon. The Park Service, on the other hand, has had not only in the 6 years that I've been here, 7 years, over the years, the Park Service has had considerable influence on where we flew our airplanes.

Similarly, the former president of the Grand Canyon Flight Operators Association testified that the NPS:

> . . . did not come out and" ask directly, please do this or please do that. Or you will do that or you will do this. And they have made it very clear that anything that we can do within reason, perhaps should be [done].

1.17.4 **Federal** Aviation Administration Actions

The Las Vegas Flight Standards District Office (FSDO) was responsible for performing surveillance of Grand Canyon scenic air tour operators who were based at the Grand Canyon. Surveillance **of** other Grand Canyon scenic air tour operators such as those based in Phoenix or Los Angeles was performed by the FSDO closest to their operations base.

The type and extent of surveillance that the FAA performed was determined by the regulation under which flight operations were being conducted, according to standard FAA policy, irrespective of the FSDO responsible for performing the surveillance. Operators that conformed to the provisions of 14 CFR Part 135, although they may have conducted air tours under 14 CFR Part 91, received surveillance appropriate to Part 135. For example, in 1985 Grand Canyon Airlines received three ramp inspections, two on the C-207 and one on the DHC-6. In the 90 days before the accident, the principal operations inspector (POI) performed one en route inspection of a scenic air tour flight. However, since the air tours were conducted under Part 91, the POI did not inspect the routes and altitudes published in the operating manual nor did the POI determine how closely the air tour route conformed to what had been published. Those operating under Part 91, such as Helitech, would not have received a comparable level of surveillance.

The airspace in the Grand Canyon was unrestricted and with the exception of the GCN airport traffic area was uncontrolled. As a result, most flights in the Grand Canyon were required only to maintain 1 mile visibility, clearance from clouds, and a minimum safe altitude above the surface. In addition, no air traffic control radar facilities were available in the airspace. Scenic air tour flights were operated under visual flight rules (VFR) and, as in all flight operations, the pilots were responsible to "see and avoid" other aircraft.

Grand Canyon Airlines performed some point-to-point scheduled flights during the summer season under the provisions of 14 CFR Part 135. As a result, Grand Canyon Airlines pilots were trained and certificated under 14 CFR Part 135, and the operator was required to comply with the provisions of those regulations for the scheduled flights. Since Helitech pilots had previously been employed by operators conducting flights similar to those at Grand Canyon Airlines, they also had met the training and certification provisions of 14 CFR Part 135.

Helitech did not obtain an operating certificate under 14 CFR Part 135 because it had been operating for only 2 weeks at the time of the accident and the certification process generally takes considerably more time than that to meet the requirements of 14 CFR Part 135. Shortly before Helitech began operations, the former president of Helitech asked an FAA POI at the Las Vegas FSDO about obtaining a Part 135 operating certificate. The POI informed him that the FAA "workload was such that . . . he [the POI] probably would not be able to even look at it [the Part 135 application] for 3 months." The chief of the FSDO testified that his interpretation of the conversation between the POI and the former president of Helitech was different. He believed that the former president of Helitech was familiar with the application process and, therefore, was aware of the steps involved and the time required to obtain certification under 14 CFR Part 135. As a result, since Helitech was scheduled to operate during the summer through early fall, the former president of Helitech decided to postpone applying for the Part 135 operating certificate until early 1987.

The POI of Grand Canyon Airlines had held that position since April 1, 1986. She was responsible for the surveillance of 15 operators who had been conducting operations under 14 CFR Part 135. She estimated that she spent about 20 percent of her time in surveillance activities. According to the chief of the Las Vegas FSDO, the POI "could use more time" for her surveillance activities, but he was reluctant to say that the amount of time she had available was "inadequate." The Las Vegas FSDO was responsible for the operating certificates of 31 air taxis operating under 14 CFR Part 135; 5 of these were commuter operators. In addition, they were responsible for the surveillance of three air carriers operating under 14 CFR Part 121 and four operators operating under 14 CFR Part 125. The former president of the Grand Canyon Flight Operators Association testified that the relationship between the Las Vegas FSDO and the scenic air tour operators was good. Moreover, he added that the FSDO has been "exceptionally responsive" to the requests of the air tour operators.

In 1984 the FAA, NPS, and the Fish and Wildlife Service (FWS), entered into a letter of agreement in which the FAA agreed to perform the following actions with regard to aircraft noise in the Grand Canyon: communicate to pilots the need to reduce aircraft noise in certain areas; investigate NPS and FWS reports of violations by pilots of minimum altitude recommendations; make available to NPS and FWS the status of those investigations; and participate with the NPS and FWS in meetings to assist in reducing aircraft noise. (See appendix J.)

Representatives of both the FAA and the NPS testified that each had complied with the terms of the letter of agreement. Moreover, both the FAA and the NPS met to discuss the environmental concerns of the NPS. The Manager of Quality Assurance Staff, Air Traffic Division at the FAA's Western Pacific Region, testified that meetings had been held regularly in the years preceding the accident. However, he testified that during those meetings:

> . . . we have told the Park Service people that our primary concern was for aviation safety, and the safe, expeditious movement of air traffic through the national air space system. While we commiserated with their environmental concerns, we would not take an arbitrary position to restrict air space over or in the canyon to deny sightseeing aircraft.

On August 17, 1983, a Piper PA-31-350 operating as Las Vegas Airlines flight 88, a scheduled sightseeing flight from Las Vegas to GCN, crashed in the Grand Canyon killing the pilot and all nine passengers onboard. 4/ As a result of this accident, on May 31, 1984, the Safety Board issued Safety Recommendation A-84-52 to the FAA:

> Examine the operating procedures used by Grand Canyon sightseeing tour operators and, if necessary, develop and publish standards for operating procedures, including route selection, flight scheduling, and altitude selection for sightseeing flights in the Canyon, and require that operators incorporate these standards in their operations specifications.

4/ For more detailed information, read Aircraft Accident Report-"Las Vegas Airlines, plight 88, Piper PA-31-350, Grand Canyon, Arizona, August 17, 1983" (NTSB/AAR-84/05).

In its response to the recommendation, dated August 14, 1984, the FAA promised to implement certain actions. However, none of these actions called for the development and publication of standards for route and altitude selection and flight scheduling for Grand Canyon scenic air tour flights as called for in the recommendation. Moreover, in the course of its investigation into the June 18, 1986, midair collision, the Safety Board was unable to determine that the FAA had ever planned or carried out such activities. Therefore, the Safety Board has classified this recommendation as "Closed--Unacceptable Action."

On December 4, 1986, the FAA issued Notice of Proposed Rulemaking (NPRM) 86-21 to modify the regulations governing flights over the Grand Canyon. (See appendix K.) The NPRM proposed promulgation of a temporary Special Federal Aviation Regulation (SFAR) to modify the regulation of the Grand Canyon airspace. Following the expiration of the SFAR on June 15, 1987, the NPRM would promulgate a final, permanent rule incorporating many of the provisions of the SFAR. The SFAR would accomplish the following:

1. Establish a Special Flight Rules area from the surface to 9,000 feet msl in the Grand Canyon airspace.

2. Prohibit aircraft that are not under 14 CFR Part 135 from operating in the Special Flight Rules area.

3. Require operators in the Special Flight Rules area to submit their routes and altitudes for review and approval by the Las Vegas FSDO and require operators to adhere to those routes and altitudes.

4. Require pilots in the Special Flight Rules area to monitor certain common radio frequencies and make position reports, over those frequencies, after passing over prominent landmarks, according to their operations specifications.

According to the NPRM:

> In effect, the rule would generally prohibit flight below the approximate rim level of the canyon except those flights necessary for operation of the park and for provision of emergency services. In addition, the rule would restrict aircraft operations in the airspace between the rim and 9,000 feet msl to aircraft with a park-related need to be in the area and to commercial tour aircraft which meet extensive equipment, experience, training, and operational requirements.

Because it required the Las Vegas FSDO to approve the routes and altitudes of all Grand Canyon scenic air tour operators, the NPRM would increase the workload of the Las Vegas FSDO. However, FAA personnel did not believe that the increased workload caused by the NPRM would hamper their ability to effectively implement the rules. FAA personnel testified that following the initial heavy workload caused by approving the routes and altitudes of all Grand Canyon scenic air tour operators, the FSDO workload would diminish and eventually become more routine.

1.17.5 Actions of the Department of the Interior

The Department of the Interior maintained a separate Office of Aircraft Services that was based in Boise, Idaho. In April 1985, in preparation for the public review of the NPS study of the aircraft noise issue at the Grand Canyon, a representative of that office rode on several sightseeing flights over the Grand Canyon. He payed the regular fare and did not identify himself to any of the operators as a Federal official.

He found that the flights were conducted in accordance with existing FAA regulations. However, in his opinion, one flight, conducted by a helicopter operator that has since ceased operations in the Grand Canyon, was hazardous since it was conducted as low as 20 feet above the Colorado River. As a consequence, on May 7, 1985, the representative wrote to the NPS that:

> Existing Federal Aviation Regulations, when applied to the Grand Canyon flying environment, are quite liberal. This causes concern in the area of aviation safety when considering such potential risks as midair collisions and wire strike accidents. The commercial operators appear to be regulating themselves to a degree, but is it enough? It appears not. General Aviation and military aircraft minimua altitude restrictions are even more liberal than those for the commercial operators. It is felt an aviation safety problem exists in the Grand Canyon.

Moreover, he wrote several additional memos to his superiors and to the NPS in which he stated his belief that there was an aviation safety problem at the Grand Canyon. In particular, he believed that flights in the "inner gorge" of the canyon, the narrow inner canyon along the Colorado River extending upward several hundred feet from the surface, should be prohibited. He also expressed these views to the Grand Canyon Flight Operators Association and actively participated, as a member of a working group involved in the aircraft management planning process at Grand Canyon National Park, during meetings held by the NPS in 1985 and 1986.

1.17.6 Visibility and Conspicuity

Both the director of operations of Grand Canyon Airlines and the former president of Helitech testified that aircraft colors were not a factor influencing the ability of pilots to "see" or visually detect and perceive other aircraft. The director of operations testified that aircraft movement and size were significant factors in such detection, but color was not. The former president of Helitech testified that:

> . . . the Canyon is like a chameleon. It's alwavs changing. I've seen days out there when an orange helicopter disappears into an orange wall. When conditions, meteorological conditions in [different] times of year, various sun angles, diffusions by clouds and so forth, any aircraft at one time or another can blend in where it's almost invisible. Because the Canyon, like I say, has so many varied conditions of light and so forth. Generally speaking, I have never had any degree of difficulty in picking out the traffic out there.

He also testified that although witnesses reported that the pilot of the Bell 2065 generally wore a baseball cap while he flew, he had seen the pilot before the accident flight and the pilot was not wearing a cap at that time. Moreover, he had known that the pilot had worn such caps in flight and, after he joined Helitech, asked him not to wear them.

ANALYSIS

2.1 General

The flightcrew of the DHC-6 and the pilot of the Bell 206B were properly certificated and qualified in accordance with the applicable regulations for their respective, local sightseeing flights. There were no medical or behavioral factors identified which could have affected their ability to conduct the flights. Both aircraft were certificated and maintained in accordance with applicable regulations and established maintenance procedures. Examination of the wreckage of both aircraft revealed no evidence of precollision structural failure, malfunction, or other abnormality.

Visual meteorological conditions existed at the time of the accident and there were no adverse winds reported. No weather factors that could have limited the ability of each pilot to see the other aircraft or to control his aircraft and avoid the other were identified.

In view of these findings, the Safety Board examined the operational and human performance factors related to each flight to determine why the pilots of the two aircraft failed to "see and avoid" each other. The Safety Board also examined the surveillance that the FAA performed on Grand Canyon sightseeing flights and the actions of the NPS relative to such flights both independently and with the FAA to determine how these agencies influenced the conduct of sightseeing flight operations. The Safety Board also focused on the role of the Grand Canyon Flight Operators Association to determine their influence on sightseeing flight operations. Finally, the crash, fire, and rescue efforts in the Grand Canyon were examined for their effect on passenger survivability.

2.2 The Accident

The lack of data from cockpit voice recorders, flight data recorders, as well as the air traffic control radar recorders prevented the Safety Board from reconstructing the flightpaths of the two aircraft before the collision. Without these data the Safety Board was unable to definitively analyze the pilots' abilities to "see and avoid" each other. Based on an examination of the wreckage of the aircraft, the Safety Board believes that the following events occurred in the collision sequence:

- The left side of the DHC-6 and the right side of the Bell 206B sustained the initial impact.
- The main rotor blade of the Bell 206B struck and severed the nose gear of the DHC-6.
- The opposite blade of the Bell 206B struck the aft portion of the fuselage of the DHC-6.
- The fuel cell of the DHC-6 ruptured and created the vaporous cloud of fuel that the witnesses on the Colorado River most likely had observed.
- The rotor head of the Bell 206B separated, concurrent with disintegration of the rotor head and blades.

- Debris from the disintegrating rotor blade struck the left side and tail of the DHC-6.
- The tail of the DHC-6 separated creating a loss of control.
- The DHC-6 pitched over, rotated, and struck the ground in an inverted position.
- The Bell 206B free-fell to the ground following the rotor separation.

2.3 Human Performance

There were no obstructions to the vision of the pilots found inside either aircraft. Although it is not known whether the Bell 206B pilot wore a baseball-type cap at the time of the accident, had he been wearing such a hat, its bill would not necessarily have obscured his view of the airplane. This is because the airplane would have appeared to the helicopter pilot about level with the design eye reference point of the helicopter, a point in his vision unobstructed by the hat. At the same time, there is no evidence that the color of either aircraft limited the ability of the pilots to see the other. Thus, the pilots of both aircraft should have been able to "see and avoid" each other.

The evidence indicates that the pilots possessed considerable experience in the type of aircraft they were flying and in operating those aircraft on Grand Canyon sightseeing flights. Because of the level of their experience, the pilots should have anticipated and been prepared for the presence of other aircraft near Crystal Rapids even without a position report from another pilot over the voluntary reporting frequency since Crystal Rapids was a highlight of many of the Grand Canyon air tours,

Due to the lack of flightpath data, the Safety Board was unable to assess with certainty the visibility of each aircraft to the flightcrew of the other. Nevertheless, based on the sizes of the aircraft and their probable positions before the collision, the Safety Board believes that each aircraft should have been visible to the pilots of the other aircraft at least 60 seconds before the collision. At that point, the Bell 206B had reported west of Mencius Temple, while the DHC-6 would most likely have been in a northerly heading over the river. Also, at that point the aircraft were about 3 1/2 miles from each other and should have been large enough to have been visible to the crew of the other aircraft. This is particularly so since there were no obstructions to pilot visibility identified in the cockpit of either aircraft. Consequently, the Safety Board could not explain or determine why the pilots of both aircraft failed to see each other in time to avoid the accident.

Nevertheless, the Safety Board believes that certain aspects of the operation of both the DHC-6 and the Rell 206B were deficient. Specifically, the lack of limitations to the flight and duty times of the flightcrew members of the DHC-6, and the absence of an intercom or public address system on the Bell 206B detracted from the safety of both operations. Grand Canyon Airlines operated its scenic air tour flights under 14 CFR Part 91; therefore, it was not required to limit the flight and duty times of its pilots to that of others, operating point-to-point flights under 14 CFR 135.265. As a result, the second-in-command of the DHC-6 had accrued 160 hours of flight time in the 30 days before the accident. This exceeded the maximum number of flight time hours allowed in

14 CFR Part 121 and 14 CFR 135.265 by 40 hours. Although he was reported to be rested before the accident, without more information the Safety Board cannot determine the extent to which he may have been fatigued at the time of the accident.

Further, the Safety Board believes that the hours flown in scenic air tour flights can be especially tiring since the aircraft generally have no autopilots and they are flown predominantly at low altitudes, where there is often turbulence and the pilot must exercise vigilance at all times to "see and avoid" other aircraft. Simultaneously, they narrate highlights of the air tour. Conversely, in most Part 121 operations and in many of the Part 135 operations in which flight time maximums apply, autopilots generallv control much of the aircraft functions. At the same time, many of these flight regimes occur at high altitudes with little or no turbulence, little conflicting traffic and lower pilot workload. Despite the fact that those flights, in general, are less fatiguing to pilots than Grand Canyon scenic air tour flights are, flight and duty time maximums apply to those operations and not to the air tour flights. Therefore, the Safety Board concludes that to reduce the potential fatigue, the FAA should apply to revenue air tour operations the same flight and duty time limitations that apply to operations conducted under 14 CFR 135.265.

The Safety Board also believes that the practice of Helitech pilots turning their heads toward passengers to narrate tours compromised their abilitv to "see and avoid** other air traffic. Although the former president of Helitech testified that the collision occurred at a point where there would have been no narration, the Safety Board could not determine, due to the absence of cockpit voice recorders, whether the Bell 206B pilot had been turning his head to talk to passengers at the time of the collision. Regardless, the Safety Board believes that any unnecessary activity that detracts from the ability of pilots to "see and avoid" other aircraft should be prohibited. Therefore, the Safety Board urges the FAA to require that pilots of revenue and tour flights use a public address system, intercom, or similar system while narrating air tour flights.

2.4 Grand Canyon Flight Operations

The Safety Board believes that the Grand Canyon airspace, in general, presented few hazards to flight operations. Visual meteorological conditions existed throughout much of the year and there were no obstructions above the rims to endanger aircraft. In fact, despite the considerable volume of uncontrolled traffic in the Grand Canyon airspace, there had not been a midair collision there in almost 3 decades before the accident.

However, before the accident, the Office of Aircraft Services of the Department of the Interior identified two hazards to flight safety in the Grand Canyon airspace: the narrow area, just above the Colorado River, known as the inner gorge, where flying was considered to be dangerous due to the limited airspace available for aircraft maneuvering; and, the possibility of a midair collision over the Grand Canyon.

In addition, the Safety Board believes that several factors, together with those mentioned, further reduced the safety of flight operations in the Grand Canyon airspace, particularly those of scenic air tour operators. Perhaps most important of these factors was the limited number of scenic points and the similarity of routes, within the Grand Canyon airspace along which many of these operators flew. As a result, the Safety Board believes that the risk of midair collision was higher along the scenic points where air tour aircraft operated than elsewhere in the Grand Canyon airspace.

While some scenic air tour operators attempted to assign separate altitudes along the air tour routes according to aircraft type, the system was an informal one that was not followed by all flight operators. Therefore, pilots could not expect other aircraft to consistently maintain standardized altitudes, particularly since violators of the informal altitude separation system received no official warnings, reprimands, or enforcement actions.

Moreover, fixed-wing and rotary-wing aircraft, aircraft with substantially different flight characteristics, shared the same airspace. The mix of aircraft types created little risk to air safety as long as the aircraft were separated by altitude. However, with neither altitude nor route separation, the variety and number of aircraft types within a narrow corridor of airspace increased the risk of a collision. In addition, because there was no external air traffic facility to either monitor or control aircraft separation, the risk of a collision further increased. Consequently, pilots could not reliably anticipate the flightpaths or characteristics of the aircraft they might inadvertently encounter along the air tour routes;

The Safety Board believes that the danger of a midair collision was greatest in the area of the routes used by the scenic air tour operators. When the rotary-wing operators modified their entry and exit points on April 1, their routes were brought closer to those of Grand Canyon Airlines. The new route of the helicopter operators intersected with that of Grand Canyon Airlines in the vicinity of Crystal Rapids, the area in which the collision occurred, at a point where the DHC-6 would have been in a right bank and the Bell 206B in straight and level flight. Although Grand Canyon Airlines requested that their pilots fly at 7,000 feet msl, and the helicopter operators generally flew 500 feet below that, the collision indicated that altitude separation according to aircraft type was not consistently followed. The Safety Board believes that the modification of the entry and exit points of the rotary-wing operators placed their routes closer to those of Grand Canyon Airlines at a point where the Grand Canyon Airlines airplanes would be in a right turn. Therefore, the Safety Board believes that modification of the helicopter routes, and the lack of oversight on aircraft separation within the routes contributed to the accident.

2.4.1 FAA Oversight

Since many of the scenic air tour flights were carried out under 14 CFR Part 91, under existing rules the FAA was not required to perform routine surveillance on those operations. As a result, they did not examine the separation among the routes and the altitudes used by the local air tour operators, require adherence to those routes and altitudes or oversee changes to them. Consequently, when helicopter operators modified their routes, the FAA did not examine the new routes for their potential effect on aircraft separation and clearance.

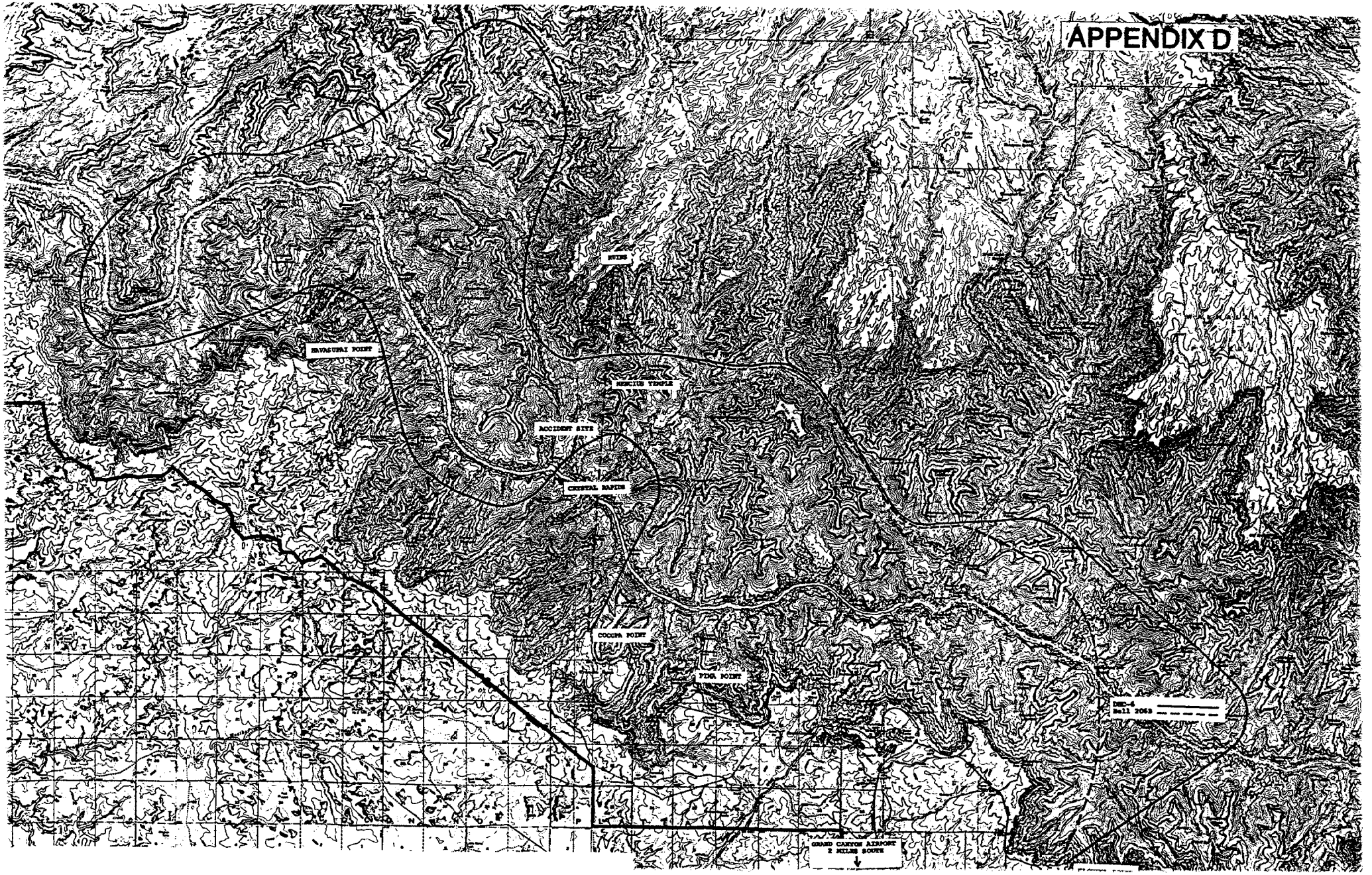
In 1984 the Safety Board recommended that the FAA examine the procedures, and, if necessary, develop and publish standards for route and altitude selection by Grand Canyon scenic air tour operators. This investigation revealed that this had not been done. The FAA inaction could have been due to the difficulty of requiring compliance of operators, flying under the provisions of 14 CFR Part 91, with published altitudes and routes. However, the Safety Board believes that if the FAA, through its rulemaking procedures, had modified the existing Federal aviation regulations to implement oversight of Grand Canyon scenic air tour flights, it likely would have recognized that the fixed-wing and rotary-wing scenic air tour routes intersected near Crystal Rapids and the risk of a midair collision could have been reduced had the operators been apprised of this.

Therefore, the Safety Board believes that the failure of the FAA to oversee and examine the routes and altitudes of Grand Canyon scenic air tour operators contributed to the accident.

However, Grand Canyon scenic air tour operators were based in a variety of locations including Phoenix, Los Angeles, and Salt Lake City. While the FAA's Las Vegas FSDO possessed the jurisdiction over Grand Canyon scenic air tour operators who were based at the Grand Canyon as well as those based in Las Vegas, the fact remains that had the FAA possessed the necessary jurisdiction, the surveillance of operators based elsewhere would have been carried out by the FSDOs that were closest to them. Those FSDO's could not have been as familiar with the special requirements of Grand Canyon scenic air tour operators as was the Las Vegas FSDO. Therefore, because of the geographic separation among the FSDO's and the unique requirements of each, surveillance of the scenic air tour operators would not have been as effective as it could have been had one FSDO overseen all operations traversing the Grand Canyon.

The Safety Board was pleased to learn that the FAA intends to address the deficiencies in oversight and surveillance that have been identified as a result of this accident. By initiating the process through NPRM 86-21 to modify the rules under which Grand Canyon scenic air tours are conducted, the exemption to 14 CFR Part 135 for Grand Canyon air tour operations will be removed. The NPRM will require those operators to develop an operations manual with specified routes and altitudes. The manuals will be subject to FAA approval, thereby requiring compliance with its contents, including routes and altitudes. Furthermore, by placing the approval authority for the manual with the office with the most experience in Grand Canyon sightseeing operations, the Las Vegas FSDO--the FAA will be able to examine the routes of those operators performing sightseeing flights over the Grand Canyon. In addition, according to the SFAR proposed in the NPRM, by restricting the accessability of the Grand Canyon airspace to transient general aviation and military aircraft, only air tour operators familiar with the particular demands of flight in the airspace encompassing the Grand Canyon will be permitted to fly there. The Safety Board believes that implementation of these procedures should enhance Grand Canyon flight safety by providing the FAA with the needed authorization to ensure compliance with its directives concerning the conduct of flight operations there.

At the same time, the Safety Board believes that in order for the FAA to exercise the oversight authority outlined in the rules proposed in the NPRM, the FAA must reduce the workload of the staff of the Las Vegas FSDO. The Safety Board is concerned about the potential implications of the response of the POI to the former president of Helitech when the latter sought 14 CFR Part 135 certification for the company. The POI, according to the former president, informed him that due to workload demands, the FSDO could take no action on the application for 3 months. Although the chief of the FSDO testified that the POI did not believe that the request of Helitech was a serious one, FAA personnel admitted that the FSDO workload was high. The Safety Board believes that the POI in the interest of promoting flight safety should have encouraged operators to seek the operating certificate requiring the highest possible standards of operations and maintenance. Therefore, the Safety Board concludes that the workload of personnel at the FSDO at the time of the accident was high and for the proposed rules to be effective that workload must be reduced.


APPENDIX D
HAVASUPAI POINT
RUINS
RESCUE TEMPLE
ACCIDENT SITE
CRYSTAL RAPIDS
COCOPA POINT
PIMA POINT
GRAND CANYON AIRPORT
2 MILES SOUTH
DHC-6
Bell 206B

APPENDIXE

PHOTOGRAMMETRYANALYSIS

3.0 Methodology

Several measurements and calculations were made to establish various parameters of the photograph.

1. *The lens was reported to be'a two position lens (35mm or 60mm) and was reported to be set on the 60mm position. It was a Minolta AF Tele 35-60 two position zoom lens mounted on a 35mm camera body. The data and photograph are consistent with a 60mm lens setting and are not consistent with a 35mm lens setting.*

2. *The negative size was measured at .94 X 1.42 inches.*

3. *The photograph size was measured at 6.63 X 9.88 inches.*

4. *The apparent focal length (af) of the photograph was calculated to be 417.5 mm or 16.44 inches.*

*af = lens focal length * photo size / negative size*

*af = 60mm * 9.88 in / 1.42 in = 417.5 mm*

5. *The horizon was established at the head height of the occupants in the boats farther down river.*

6. *The tilt angle was established at about 10.1 degrees by measuring the sighting angle from the horizon to the center of the photograph.*

7. *Four points are identified on the photograph and the four positions are numbered and identified as Xs on the topographic map.*

8. *The impact points of both airplanes are identified as circled dots on the topographic map.*

9. *Ballistic data indicate that the helicopter would travel about 2100 feet ground distance and fall about 2903 feet from the collision to ground impact. The airplane would travel about 1800 feet ground distance and fall about 2700 feet from the collision to ground impact. The*

distance traveled was based on the weights of the aircraft, the speed that each were traveling (100 knot true airspeed estimated), and CDS values of 5 square feet for the helicopter and 75 square feet for the airplane (CDS is the effective drag coefficient multiplied by the effective frontal area). Each of the parameters above was varied over a reasonable range and the range of change in the calculated distance traveled was less than +100 feet for the helicopter and less than +200 feet for fhe airplane.

10. *On the topographic map, the circled X represents the point of collision which is 2100 feet from the helicopter impact point, 1800 feet from the airplane impact point, and in line with the relative position of the vaporous cloud seen in the photograph (represented by a dashed line on topographic map).*

11. *The sighting angles from the horizon to the four points in the photograph were measured and then used in conjunction with the reported elevation of each point above the river to derive the distance from each point to the camera. The calculations are in the form of:*

range from camera to point =

$$\frac{(\text{point elevation} - \text{river elevation})}{\tan(\text{sighting angle})}$$

The river elevation was 2320 feet at the camera position.

POINT	*SIGHTING ANGLE*	*POINT ELEVATION*	*RANGE (FT)*
1			
2	10.3	2960	5780
3	14.0	3200	3525
4	18.8	3200	2820

12. *The range from each point to the camera position was plotted on the topographic map resulting in a camera position defined by the cross line near the letter "N" in the word "GRANITE".*

13. *The measure3 range from the camera position to the collision position is about 12,300 feet.*

APPENDIX E

14. The sighting angle from the horizon to the vapor cloud was measured at 18.8 degrees.

15. The altitude of the collision was calculated to be 6507 feet where:

*altitude = river elevation + range * tan (angle)*

*altitude = 2320 + 12,300 * tan (18.8)*

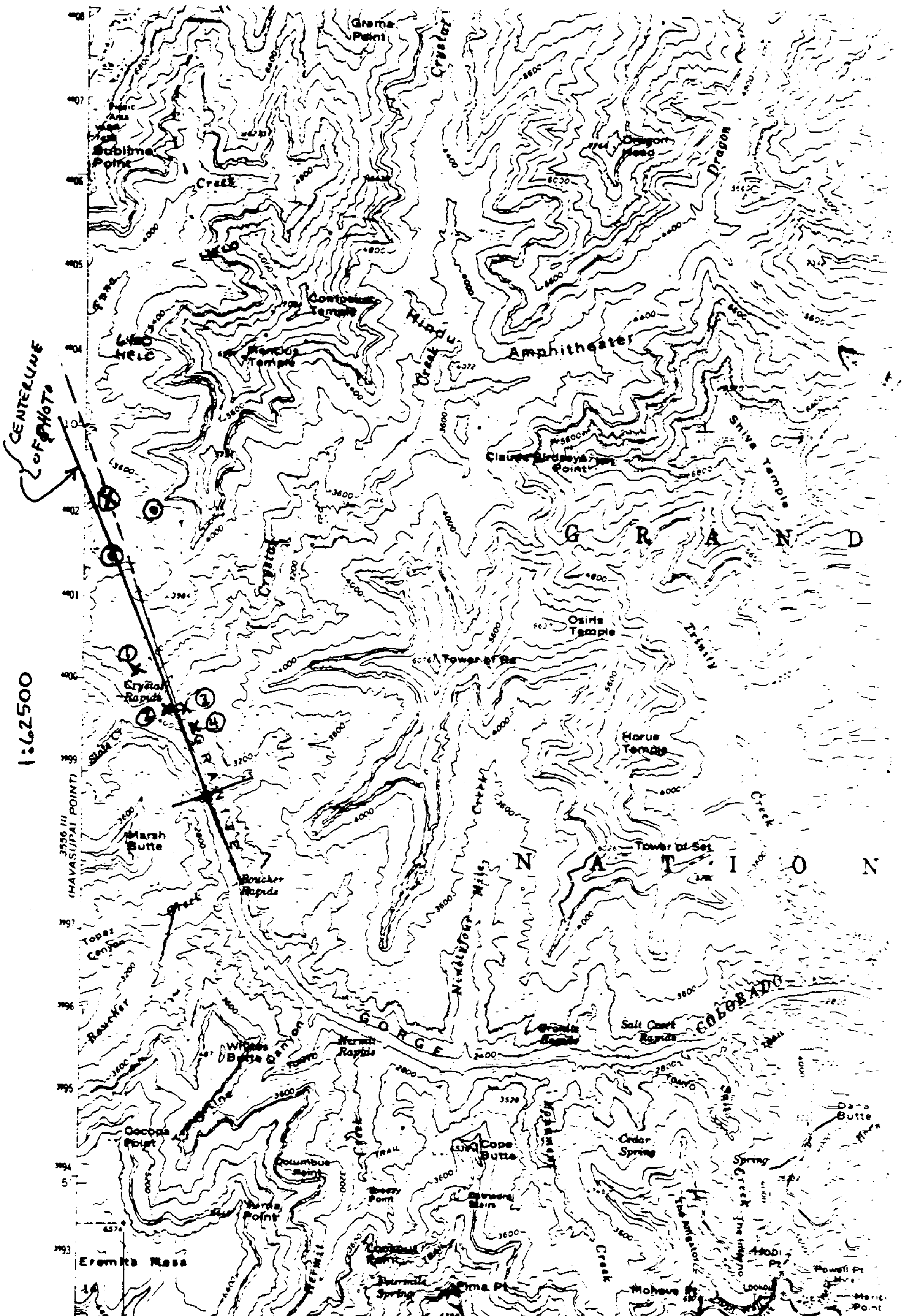
= 6507 feet

16. Possible errors in the reconstruction were considered and defined below:

SOURCE OF ERROR	*ERROR LIMIT*	*ALTITUDE ERROR*
1. Position on river	±100 *feet*	+34 *feet*
2. Position of collision	±200 *feet*	+68 *feet*
3. Sighting angle	+.2 *degrees*	+50 *feet*
4. Focal length of lens	+1mm	+54 *feet*

Combining the errors using RSS (root sum square of the errors) results in a ±106 *feet error limit.*

17. *The collision altitude is reconstructed to be at 6537* ± *106 feet* m.s.l.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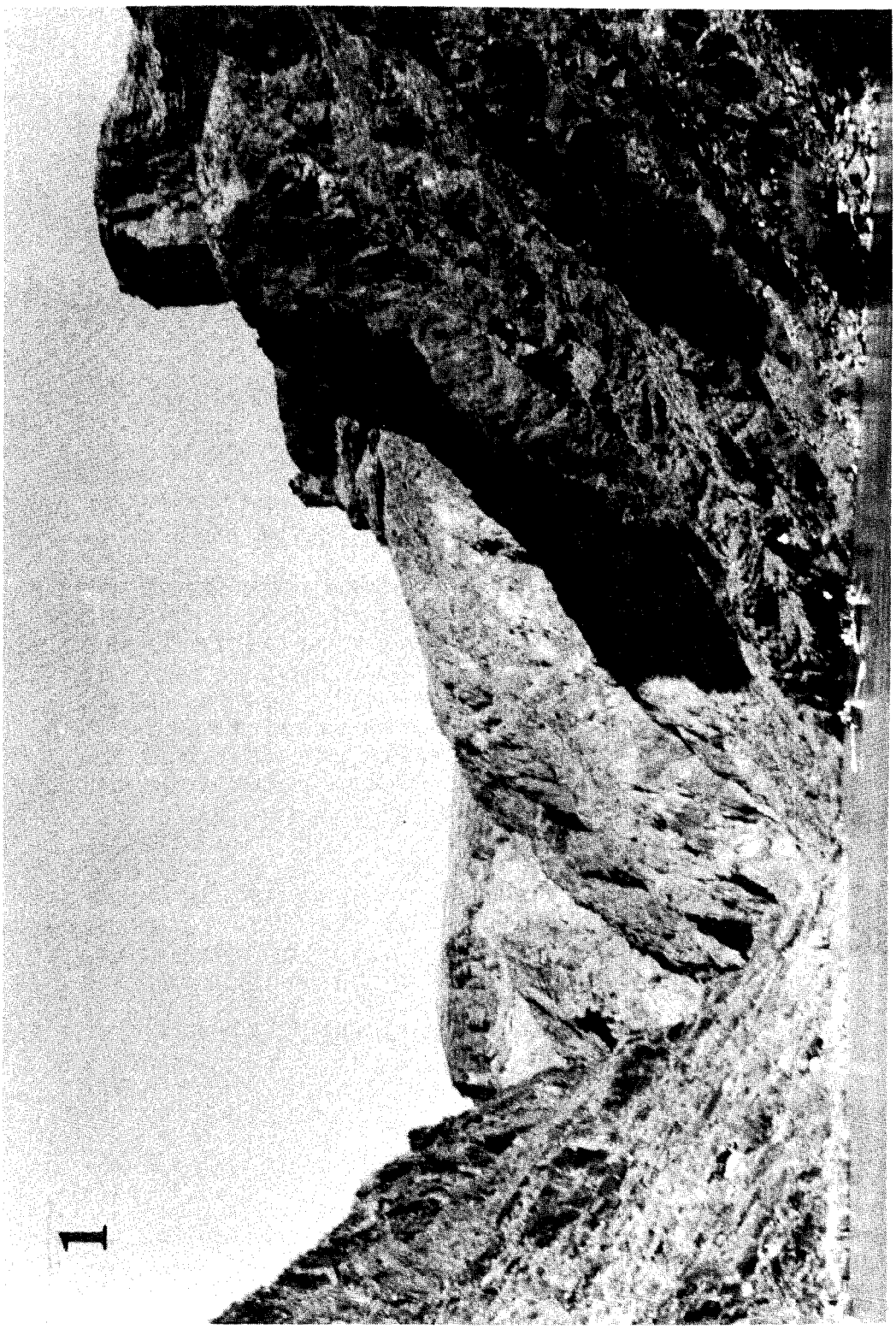
Crystal
Sublime Point
Creek
Dragon Head
Dragon
Confucius Temple
Mencius Temple
Hindu
Amphitheater
Claude Birdseye Point
Shiva Temple
G R A N D
Crystal
Osiris Temple
Tower of Ra
Trinity
Crystal Rapids
Horus Temple
Creek
Tower of Set
Marsh Butte
N A T I O N
Boucher Rapids
Topaz Canyon
Boucher
Creek
GORGE
COLORADO
Granite Rapids
Salt Creek Rapids
Hermit Rapids
Whites Butte
Cocopa Point
Columbus Point
Cope Butte
Cedar Spring
Dana Butte
Monument
Breezy Point
Yuma Point
Creek
Hermit
Lookout Point
Fourmile Spring
Pima Pt
Mohave Pt
Hopi Pt
Powell Pt
Eremita Mesa
(HAVASUPAI POINT)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APPENDIX F

LETTER FROM GRAND CANYON FLIGHT OPERATORS ASSOCIATION

GRAND CANYON FLIGHT OPERATORS ASSOCIATION
Post Office Box 3038
Grand Canyon, AZ 86023
(602) 638-2463

February 27, 1985

TO: ALL MEMBERS OF GRAND CANYON FLIGHT OPERATORS ASSOCIATION

Dear Sir,

This is an URGENT request to all flight tour operators to help alleviate the growing noise problem at Hermit's Rest.

Since early 1984 most flight tour operators have moved their Canyon exit point from Shoshone to Hermit's Rest. This has caused a large increase in the number of complaints from hikers on the Boucher and Hermit's trails because most pilots are flying (10 out of 12) DIRECTLY over Hermit's Rest complex. According to the agreement between the National Park Service, the FAA and the G.C.F.O.A., the aircrafts'are to avoid the entire Hermit's Basin as far west as Cocopa Point (see attached map and refer to the agreement, area 6).

With the advent of increased hiking during the spring months, the number and severity of complaints will certainly increase--much to the detriment of our status with the NPS. Therefore, please inform all of your pilots to be aware of this noise problem and to adjust their flight paths accordingly.

Thank you for your cooperation regarding this matter.

Sincerely,

Bob Donaldson
President

RJD/pdk

enclosure

APPENDIX G

LETTER OF AGREEMENT BETWEEN FEDERAL AVIATION ADMINISTRATION AND GRAND CANYON FLIGHT OPERATORS ASSOCIATION

Draft dated July 3, 1986

FEDERAL AVIATION ADMINISTRATION AND GRAND CANYON FLIGHT OPERATORS ASSOCIATION

LETTER OF AGREEMENT

EFFECTIVE DATE: July 31. 1986

SUBJECT: Recommended Aircraft Flight Procedures within Grand Canyon National Park for Members of the Association

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1. PURPOSE: This Letter of Agreement establishes procedures for aircraft operations by Association members within all areas of Grand Canyon National Park, It is the understanding of Association members that this will serve as the basis for issuance of Operations Specifications for commercial flight operations at Grand Canyon National Park in accordance with the provisions hereof. This Agreement further sets forth the areas over or within the Grand Canyon National Park in which the flight of aircraft shall be avoided below the altitudes specified herein, as well as appropriate safe separations of aircraft and apllicable noise abatement procedures.

(The Purpose Section hereof is subject to Revision for Final Form)

2. SCOPE OF AGREEMENT:

(Exact wording of this Section, SCOPE, has not been determined at time of this submission; however, it is contemplated that this Section shall apply to all commercial flight operations by Members of the Association)

3. NON-F.A.A. REGULATION:

[Wording of this Section not determined at time of this submission)

4. PRIMARY POINTS OF INTEREST: See Exhibit "A" attached hereto.

5. OPERATOR RESPONSIBILITIES: Members are agreeable to adoption of the following procedures into their Operations Specifications:

A. Use of Discreet Frequencies: Operators shall be responsible for monitoring published (on charts) position reporting frequencies while conducting Grand Canyon sightseeing operations; further, Operators shall position report as set forth in Exhibit "A" in accordance with the following:
   (1) Identification of type of Aircraft
   (2) Position (Point of Reference location)
   (3) Altitude
   (4) Direction

B. VHF Radios: Operators shall ensure that his/her aircraft has at least two (2) fully functional communication radios prior to entry of the Grand Canyon. Failure of a radio will consitute grounds for termination of the respective sightseeing flight.

C. Passenger Intercom or ICS System: Operators shall equip his/her aircraft with an intercom or passenger address system so that crew should never be required to take his/her eyes from outside the cockpit.

D. Aircraft Visibility: Operators shall comply with the following at the earliest practicable time:
   (1) All aircraft shall fly with all available lights on at all times in Grand Canyon, save and except, either taxi or landing lights may be used one at a time.

(2) All helicopters shall comply with O.A.S. (Office of Aircraft Services) high visibility paint on rotor blades.

E. Experience and Training Requirements: Operators shall require and adhere to the requirements set forth in FAR 135.244 and 135.299 pertaining to Operating Experience and Route/Line checks for Grand Canyon sightseeing irrespective of whether such Operator is within the definition of Commuter Air Carrier as defined in Part 298.

F. A.T.I.S. and V.O.R. Monitoring: Operators shall monitor any advisory service established for Grand Canyon sightseeing, including both ATIS and VOR frequencies.

G. Noise-Sensitive Areas: Operators acknowledge that the areas set forth below are noise-sensitive and that sightseeing flight operations shall not be conducted therein :

(1) The Inner Gorge which shall be further defined by Operator Agreement; and
(2) Thunder River/Deer Creek Falls area; and
(3) Toroweap; and
(4) Developed areas of the Rim of the Grand Canyon, including, but not limited to, the South Rim Village area of paved road.

H. Tour Operator Route Manual: Operators shall prepare and submit their routes and altitudes of sightseeing flights to the Association for the purpose of compiling an Official Tour Operator Manual for distribution to all Members. Information contained in such Manual shall not be changed by any Member without prior Notification to all other Association members and an opportunity to comment by them. It is intended that such Manual shall be used as a training tool for all new and/or existing Tour Operators.

I. Adopted Map: Operators shall use U.S. G. S. map N3600 for the Grand Canyon in all training and route preparation/presentations until such map is replaced by majority vote of the Members.

J. Flight Levels and Minimum Altitudes: Operators are in agreement to utilization of the following flight level ranges:

(1) FAR 135 & Commercial FAR 91 helicopter operators: Surface to 7500' msl West of Mooney Falls; 5000' to 7500' MSL while in Grand Canyon National Park.

(2) FAR 135 & Commercial FAR 91 Fixed Wing operators: 3500' to 8500' MSL in all quadrants of Grand Canyon National Park,

(3) Operators strongly recommend flight levels of other operators as follows:
(a) FAR 91 non-commercial operators: 8500' MSL in all quadrants of GCNP;
(b) Military/Commercial Jets: 18,500' MSL in all quadrants of GCNP;
(c) Military reciprocating aircraft and military helicopters: 8500' MSL in all quadrants of GCNP.

K. Routes: As set forth in Member Operator's individual submissions for the Route Manual (see "H" above).

6. CODE OF PROFESSIONAL RESPONSIBILITY: Members shall prepare and signify their adherence to by signing a Code of Professional Responsibility for Grand Canyon sightseeing operations. Failure to comply with such Code shall be ground for termination of Membership in the Association or denial of Membership.

7. ASSOCIATION RECOMMENDATIONS TO THE F.A.A. : Members recognize that this Agreement is being prepared in accordance with Federal Aviation Regulations (FAR's) in existence at time of preparation; it is specifically understood that this Agreement may be amended as such FARs change or flight safety conditions dictate.

It is specifically understood that this Agreement does not reflect all recommendations of the Association, some of which are currently without regulatory foundation. The Association reserves the right to submit further recommendations to the F.A.A. as deemed necessary by either the Association or its individual members.

AGREEMENT dated this _____ day of July, 1986, by and between the Federal Aviation Administration and the Grand Canyon Flight Operators Association.

F.A.A. Grand Canyon Flight Operators Assoc.

by_____ by_____

Attachments/Exhibit "A"

The following locations are **primary points** of **interests and** possible route categories within the Grand Canyon. **Subject to the** actual route per each company ops. specs, the following locations of emphasis (*) will be mandatory reporting **points.**

QUADRANT ONE:

Official Name

Common Name (For reference only during Transition)

- * Shoshone Point
- * Angels Gate
- * Juno Temple
- * Nankoweap **Butte**
- * **Temple Butte**
- * Ochoa **Point**
- * Solomon Temple
- Newberry Butte
- * Lye11 Butte
- Grand Canyon **Airport**

QUADRANT TWO:

- * Zuni Point
- * Vishnu Temple
- * Angels **Gate**
- Zuroaster Temple
- * Shiva Temple
- Dragon Head
- * Sublime Point
- Crystal Rapids
- Colopa Point
- Hermits Rest

(option between Sublime Point and Pima Point)

- * Confucius Temple
- Osiris Temple
- Cope Butte
- * Pima Point

(option route between Zuroaster and Hermit& Rest)

- * Isis Temple
- * Tower of Set
- Cope Butte
- * Pima Point

QUADRANT THREE:

- * Cocopa Point
- * Crystal Rapids
- * Subl ime Point
- * Holy Trail Temple
- Fan Island
- * Wheeler **Point**
- * Fossil Bay
- Paya Point
- * Mount Sinyala
- Mooney Fa 11 s
- * Supai' Falls
- Mt . Wodo
- * Topacobn Hilltop
- * Apache Point
- Explorers Monument
- * Toltec Point
- Signal Hi 11
- * Castor Temple
- Mescalero Point
- * Grand Canyon Airport

EXHIBIT A

APPENDIXH

ALTERNATIVESPRESENTEDINGRANDCANYONNATIONALPARK
AIRCRAFT MANAGEMENT PLAN

AIRCRAFT MANAGEMENT PLAN

ENVIRONMENTAL ASSESSMENT

1986

GRAND CANYON NATIONAL PARK

ARIZONA

D. ALTERNATIVES

Alternative 1: NO ACTION

The No Action Alternative is defined to be the status quo as of May 1986. No Action is essentially defined by the Affected Environment Section of this Environmental Assessment with the addition of the Actions Common To All Alternatives Section described above.

Alternative 2: 2,000 FEET ABOVE THE RIM

Except as specifically authorized by the Superintendent, no flights would be allowed lower than 2,000 feet above rim level, as shown on Map 4.

Alternative 3: NO FLIGHTS IN INNER GORGE PLUS FLIGHT-FREE AREAS

Except as specifically authorized by the Superintendent, no flights would be allowed in the Inner Gorge, as shown on Map 5.

Flight-free areas would be established as follows (see Map 6):
- Thunder River/Deer Creek,
- Toroweap, and
- Developed Areas.

Alternative 4: NO FLIGHTS WITHIN 1,500 FEET OF LANDFORMS PLUS FLIGHT-FREE AREAS WITH QUIET AIRCRAFT INCENTIVES

Except as specifically authorized by the Superintendent, no flights would be allowed within 1,500 feet of all landforms and no flights would be allowed in the Inner Gorge. Landforms would include all land and water surfaces in the park whether horizontal or vertical.

Flight-free areas would include those areas described in Alternative 3, with the addition of Hermit Creek to Kaibab Trail to North Rim (see Map 7).

Aircraft certified as meeting Noise Level Standard #1 would be allowed to fly no lower than rim level in the following flight-free areas: Toroweap, Thunder River/Deer Creek, and that part of Hermit Creek to Kaibab Trail to North Rim which is greater than 1 mile north of the Colorado River from October 1 to April 30.

Aircraft certified as meeting Noise Level Standard #2 would be allowed to fly no lower than 1,000 feet below rim level year round in the following flight-free areas: Toroweap, Thunder River/Deer Creek, and that part of Hermit Creek to Kaibab Trail to North Rim which is greater than 1 mile north of the Colorado River.

Alternative 5: NO FLIGHTS BELOW RIM LEVEL PLUS FLIGHT-FREE AREAS WITH QUIET AIRCRAFT INCENTIVES

Except as specifically authorized by the Superintendent, no flights would be allowed below rim level, as shown on Map 3.

permanent flight-free areas would be established as follows (see Map 8):

- Thunder River/Deer Creek,
- Toroweap,
- Boucher to Red Canyon to North Rim (including Clear Creek and Shiva Saddle), and
- Developed areas.

Seasonal flight-free areas would be established as follows (see Map 8):

- Nankoweap to Red Canyon and South Bass to Boucher (no flights from October 1 to April 30), and
- Kanab Creek and Tuckup (no flights from October 1 to April 30).

Aircraft certified as meeting Noise Level Standard #1 would be allowed to fly no lower than 2,000 feet above rim level in the following flight-free areas: Thunder River/Deer Creek, Toroweap, Kanab Creek, and those parts of South Bass to Boucher and Nankoweap to Red Canyon which are north of the Colorado River from October 1 to April 30.

Aircraft which are certified as meeting Noise Level Standard #2 would be allowed to fly no lower than rim level in the following flight-free areas: Thunder River/Deer Creek, Toroweap, Kanab Creek, Tuckup, South Bass to Boucher, and Nankoweap to Red Canyon.

An ad hoc advisory group would be established to monitor plan implementation and identify potential changes which may be necessary or desirable. This advisory group would provide input to the Superintendent.

Alternative 6: 2,000 FEET ABOVE RIM LEVEL PLUS FLIGHT-FREE AREAS

Except as specifically authorized by the Superintendent, no flights would be allowed lower than 2,000 feet above rim level, as shown on Map 4.

Flight-free areas would be the same as in Alternative 5 (see Map 8).

An ad hoc advisory group would be established the same as in Alternative 5.

The NPS would request the FAA to shift East-West high altitude jet routes away from the park.

APPENDIX I

ADVISORY CIRCULAR 91-36C

U.S. Department of Transportation
Federal Aviation Administration

Advisory Circular

Subject: VISUAL FLIGHT RULES (VFR) FLIGHT NEAR NOISE-SENSITIVE AREAS

Date: 10/19/84 **Initiated by:** ATO-230

AC **No:** 9 I-36C **Change:**

1. PURPOSE. This advisory circular encourages pilot6 making VFR flights near noise-sensitive areas to fly at altitudes higher than the minimum permitted by regulation and on flight paths which will reduce aircraft noise in such areas.

2. CANCELLATION. Advisory Circular 91-36B, VFR Flight Near Noise-Sensitive Areas, dated March 19, 1982, is cancelled.

3. BACKGROUND.

a. The Federal Aviation Administration continually receives complaints concerning low flying aircraft over noise-sensitive areas. These complaints have prompted requests for regulatory action prohibiting low altitude flight over identified noise-sensitive locations. We believe that a satisfactory solution can be realized by means of a pilot/industry cooperative endeavor rather than through the regulatory process.

b. Increased emphasis on Improving the quality of the environment requires continued effort to provide relief and protection from aircraft noise.

c. Excessive aircraft noise can result in discomfort, inconvenience, or interference with the use and enjoyment of property, and can adversely affect wildlife. It is particularly undesirable near outdoor assemblies of persons, churches, hospitals, schools, nursing homes, noise-sensitive residential areas, and National Park Areas which should be preserved as important historic, cultural, and natural aspects of our national heritage.

d. Adherence to the pract'ces described below would be a practical indication of pilot concern for environmental improvement, would build support for aviation, and forestall possible regulatory action.

4. VOLUNTARY PRACTICES.

a. Avoidance of noise-sensitive areas, if practical, is preferable to overflight at reletively low altitudes.

b. Pilots operating fixed- and rotary-wing aircraft under VFR over noise-sensitive areas should make every effort to fly not less than 2,000 feet above the surface, weather permitting, even though flight at a lower level may be consistent with the provisions of Federal Aviation Regulations 91.79, Minimum Safe Altitudes.

A; 91-36C 10/19/84

Typical of noise-sensitive areas are: outdoor assemblies of persons, churches, hospitals, schools, nursing homes, residential areas designated as noise sensitive by airports or by an airport noise compatibility plan or program, and National Park Areas (including Parks, Forest, Primitive Areas, Wilderness Areas, Recreational Areas, National Seashores, National Monuments, National Lakeshores, and National Wildlife Refuge and Range Areas).

* For the purpose of this Advisory Circular, the surface of a National Park Area is defined as: the highest terrain within 2,000 feet laterally of the route of flight, or the upper-most rim of a canyon or valley.*

NOTE : The intent of the 2,000 feet recommendation is to reduce potential interference with wildlife, and complaints of noise disturbances from low-flying aircraft in canyons and valleys.

c. During departure or arrival from/to an airport, climb after takeoff and descent for landing should be made so as to avoid prolonged flight at low altitudes near noise-sensitive areas.

d. This procedure does not apply where it would conflict with air traffic control clearances or instructions or where an altitude of less than 2,000 feet is considered necessary by a pilot in order to adequately exercise his or her primary responsibility for safe flight.

5. COOPERATIVE ACTIONS. Aircraft operators, aviation associations, airport managers, and others are asked to assist in implementing the procedures contained herein by publicizing them and distributing information regarding known noise-sensitive areas.

R. J. Van Vuren
Associate Administrator for Air Traffic, AAT-1

APPENDIX J

INTERAGENCY LETTER OF AGREEMENT AMONG
FEDERAL AVIATION ADMINISTRATION, NATIONAL PARK SERVICE,
AND THE FISH AND WILDLIFE SERVICE

Interagency Agreement
between
National Park Service,
Fish and Wildlife Service
and
Federal **Aviation Administration**

This interagency agreement is among the National Park Service of the Department of the Interior, hereinafter referred to as the "NPS," the Fish and Wildlife Service of the Department of the Interior, hereinafter referred to 8s the "FWS," and the Fader81 Aviatioa Administratioa of the Department of Transportation, hereinafter referred *to* as the "FAA."

WHEREAS, it is the purpore of the NPS to administer Federal parks, monuments, and reservations, for the purpose of conserving the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations, as provided for in the Act of August 25, 1916, (16 U.S.C. Section 1 et. seq.).

WHEREAS, it is the purpose of the FWS to operate and maintain certain Federal lands for the bettermeat of fish and wildlife resources, and for fish and wildlife research end fish culture, as provided for in the National Wildlife Refuge System Administration Act (16 U.S.C. Section 668dd et. seq.) the Fish and Wildlife Coordination Act (16 U.S.C. Section 661 et. seq.) and the Fish and Wildlife Act of 1956 (16 U.S.C. 742a et. seq.).

WHEREAS, it is the function of the FM to manage the use of the navigable airspace of the United States, as provided for in the Federal Aviation Act of 1958 (49 U.S.C. Section 1301 et. seq.).

WHEREAS, the NPS and FWS manage lands for the purposes of protecting natural, cultural, and wildlife resources, and for promotion of the public enjoyment ● uduse ofthese resources.

WHEREAS, the FAA, recognizing the values for which NPS and FWS lands are managed, has tstoblished 2,000 feet above ground level (AGL) as the requested minimum altitude *for* aircraft *flying* in airspace over lands ● dntioistered ♌ the NPS and FWS.

WHEREAS, the auditory and visual intrusion of aircraft flying at low altitudes is the *source* of frequeot public complaint in certain areas administered by the NPS and FWS.

WHEREAS, aircraft flying at low altitudes may pose a potential hazard to vildlife in certain areas administered by the NPS 8nd FWS.

WHEREAS, the FAA, NPS, and FWS, while recognizing the public freedom *of* transit of the navigable airspace, desire to act in cooperation to reduce the incidence of low flying aircraft, including fixed-viog aircraft, helicopters, ultralight vehicles, balloons, and gliders over NPS and FWS administered lands by seeking voluntary cooperation with the established 2,000 feet minimum requested altitude.

NOW THEREFORE:

I. The NPS and FWS agree:

A. To identify specific field units where lov flying aircraft constitute 8 conflict with resource values, and to convey specific information to the FM for appropriate action as described in this agreement.

B. To develop and implement a standardized reporting system acceptable to the FAA to document incidents of low flying aircraft over NPS and FWS administered lands. This reporting system will provide for transmittal of such documentation in a timely manner to the appropriate FAA Flight Standards District Office.

C. To develop training programs and instructional materials for NPS and FWS field personnel to enable them to recognize and reporr instances of low flying aircraft in a competent and professional manner. The law enforcement training programs of the NPS and FWS will be expanded to incorporate this subject matter into mandatory annual in-service training requirements.

D.. To prepare public informational materials, including printed matter and audio visual programs, for communication to pilots, using existing FAA pilot contact meetings and programs, aviation periodicals, and other means of generating pilot understanding of NPS and FWS resource management objectives.

E. To make personnel available from the respective agencies to meet with the FAA and affected pilots to discuss resource management objectives and issues associated with low flying aircraft.

II. The FAA agrees:

A. To communicate to pilots concerns and objectives of the NPS and FWS about low flying aircraft in specified areas, using advisories, bulletins, the FAA publication General Aviation News, the ongoing "Accident Prevention Program" for routine pilot contact, and other means of communication with pilots.

B. To investigate instances of pilot deviations *from* FAA minimum altitude recommendations over areas administered by the NPS and FWS, and take action to discourage repeated deviations with the objective *of* reducing or eliminating such incidents in these areas. To impress upon pilots that even though participation in the progran is not mandatory, pilot participation is strongly encouraged.

C. To assist the NPS and FWS in communicating with the various agencies of the Department *of Defense* in regard to problems associated with military aircraft operations over NPS and FWS administered areas.

D. To make available to the NPS and FWS, on request, at the FAA Flight Standards District *Offices* the status and results of incidents reported by the NPS and FWS.

E. To enlist the support of all aviation groups and organizations by requesting they publicize problem being encountered within areas administered by the NPS and FWS.

F. To assist NPS and FWS personnel in combating problems associated with low flying aircraft by participating in appropriate meetings at field and regional levels.

III. The FAA, NPS, and FWS jointly agree:

A. To assess *severe* situations where impacts of aircraft operations upon human, cultural, or natural resources are sufficiently serious to warrant consideration of site-specific action by the FAA to minimize or eliminate the causes of such problems. Where appropriate, the FAA will advise the NPS and FWS on techniques of conducting scientific studies and data collection to facilitate understanding of the impacts of aircraft operations on affected resources.

IV. For purposes of facilitating communication in implementing this agreement, each party has identified the following key contact offices:

NPS	FWS	FAA
Visitor Services Division Branch of Ranger Activities 202-343-3227	Associate Director for Wildlife Resources 202-343-5333	Airspace and Air Traffic Rules Branch 202-426-8783

V. The term of this agreement is 5 years, commencing upon the date of signature of the final signatory party to the agreement. The parties to this agreement will jointly review the results hereof at the end of each calendar year. The agreement may be amended by the written mutual agreement of all parties.

VI. Any party to thir agreement may terminate involvement in the agreement by providing 60-days notice to the other parties.

Director, National Park Service — Date

Administrator, Federal Aviation Administration — SEP 6 1984 — Date

Director, Fish and Wildlife Service — 11/13/84 — Date

Assistant Secretary for Fish and Wildlife and Parks — Date

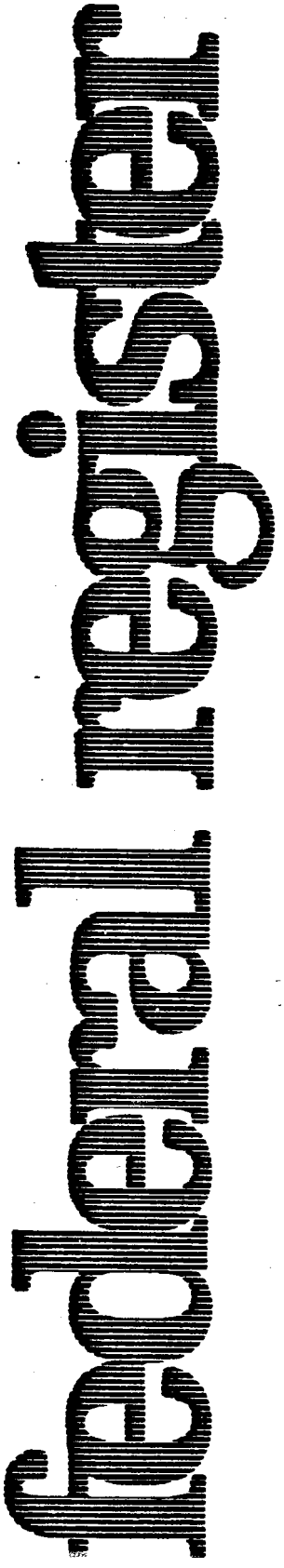
Assistant Secretary for Policy and International Affairs — SEP 19 1984 — Date

Secretary of the Interior — DEC 3 1984 — Date

Secretary of Transportation — OCT 1 1984 — Date

APPENDIX K

NOTICE OF PROPOSED RULEMAKING 86-21



Tuesday
December 9, 1986

Part V

Department of Transportation

federal Aviation Administration

14 CFR Parts 91 and 135

Special Flight Rules in the Vicinity of the Grand Canyon National Park; Notice of Proposed Rulemaking

Federal Register / Vol. 51, No. 236 / Tuesday, December 9, 1986 / Proposed Rules 44423

1958, as emended, to regulate and control the use of navigable airspace of the United States. Under section 307(a) of the FAAct (49 U.S.C. 1348(a)), the agency is authorized to develop plan5 for and to formulate policy with respect to the use of navigable airspace and to assign by rule. regulation, or order the use of navigable airspace under such terms, conditions, and limitation5 as may be deemed necessary in order to *ensure* the safety of aircraft and the efficient utilization of such ainpace. Under section 307(c) of the FAAct (49 USC. 1348(c)), the agency is further authorized and directed to prescribe air traffic rules and regulations governing the efficient utilization of the navigable airspace for purposes including the protection of person5 and properly on the surface, which the agency has interpreted to include protection from the environmental impacts of aircraft overflight.

The Grand Canyon, in Arizona, is a unique area of natural beauty which attracts nearly 3 million visitors each year. The canyon is approximately 275 miles in length and up to 22 miles in width between the north and south rims. A large portion of the canyon has been set aside a5 a National Park operated by the National Park Service (NPS) of the Department of the Interior. Other areas in and around the canyon include Indian reservations which are provided certain protection5 under Federal law.

Airspace above the surface of the Grand Canyon National Park (GCNP) is within the exclusive regulatory authority of the FAA. The park itself is operated by the NPS in accordance with specific Federal statutes. One such statute, the Grand Canyon National Park Enlargement Act of 1975, 16 U.S.C. 228g, provides that

> Whenever the Secretary [of the Interior] has reason to believe that any aircraft or helicopter activity or operation may be occurring or about to occur within the Grand Canyon National Park.. . including the airspace below the rims of the canyon, which is likely to cause an injury to the health, welfare. or safety of visitors to the park or to cause a significant adverse effect on the natural quiet and experience of the park, the Secretary shall submit to the Federal Aviation Administration, the Environmental Protection Agency.. . or other responsible agency or agencies such complaints. Information. or recommendations for rules and regulations or other actions as ha believes appropriate to protect the public health, welfare. and safety or the *natural* environment within the Park. After reviewing the submission of the Secretary, the responsible agency shall consider the matter, and after consultation with the Secretary shall take appropriate action to protect the park and visitors.

The Superintendent of the Park, in a memorandum dated March 10, 1986, issued a finding that the aircraft activity occurring over or within the park is currently causing a significant adverse effect on the natural quiet and experience of the park, and that aircraft activity may be likely to cause an injury to the health, welfare or safety of visitor5 to the park. The NPS has undertaken to develop recommendation5 for measures to mitigate such effects, following a series of public hearings in 1985 and 1986 and the solicitation of comments from the public, including environmental groups and air tour operators. On the basis of the above process, the Department of the Interior. in a letter from tbe Assistant Secretary for Fish and Wildlife and Parks, submitted recommendation5 to the FAA Administrator on November 17, 1986. In summary form, the Department of Interior recommended that tbe FAA:

(1) Adopt airspace/flight regulations which:

5—Provide for the reparation of aircraft, including helicopters;

—Prohibit Rights in Ye inner gorge of the canyon;

-Provide for some regulation of flights between the inner gorge and the upper rim of the canyon: and

-Establish flight paths over the canyon which avoid major visitor overlooks and peregrine nesting areas.

(2) Install radar at the Grand Canyon National Park Airport to assist in aircraft separation;

(3) Undertake a join! Z-year rtudy, with the NPS, of the impacts of aircraft noise on the Park with the object of additional regulation to reduce those impacts.

Finally. the Department offered to consult and cooperate with the FAA in the implementation of these actions.

The FAA will fully and carefully consider the recommendation5 and continuing advice of the Department of the Interior in the development of aviation safety and environmental measures at GCNP. The Interior recommendations will not necessarily be reflected in the Drpwsed interim SFAR, in view of the complexity of the recommendations, although the SFAR does address the recommendations to *an extent. However, those* recommendations, and any subsequent information and comments offered by the Department of the Interior. will be fully considered in the promulgation of a permanent final rule a5 proposed in this notice.

FAA involvement with Grand Canyon overflights. An FAA airport traffic control tower at GCNP Airport *directs* air traffic arriving at or departing from that airport Several airways and jet routes pa55 near but no! over the park. ATC does not otherwise control traffic above the park below an altitude of 9,000 feet MSL, the lowert base of controlled airspace over most of the Grand Canyon.

FAA regulations applicable to VFR flight above the Grand Canyon are Federal Aviation Regulations (FAR) § 91.79, Minimum Safe Altitudes; § 135.203, VFR: Minimum Altitudes, which applies only to Part 135 operations; and § 91.109, VFR cruising altitude or flight level. Section 91.79(a) require5 that aircraft be operated at an altitude from which a safe landing can be made in the event of a power failure. Section 91.79(c) prohibits operation of fixed-wing aircraft in other than congested areas below 300 feet above the surface (AGL), except that in sparsely populated areas flight may be wnducted at any level but the aircraft must not be operated closer than 500 feet to my person, vessel, vehicle or structure. Section 135.203, in par!, prohibit5 operations during the day by fixed-wing aircraft below 500 feet above the surface or less than 500 feet horizontally from any obstacle. Section 91-109 requires that aircraft operating VFR in level cruising flight more than 3,000 feet above the surface must maintain "hemispheric" altitudes: an odd thousand plus 500-foot altitude (e.g. 7,500 feet MSL) *when* eastbound and *an* even thousand plus 500-foot altitude (e.g. 8,500 feet MSL) when westbound. The FAA, through FAA Advisory Circular 91-36C, VFR Flight Near Noise-Sensitive Areas, requests pilots operating under VFR to remain at least 2,000 feet above the surface of certain areas including national parks. The circular defines the surface of a national park a5 "the highest terrain within 2,000 *feet* laterally of the route of flight, or the upper-most rim of a canyon or valley."

The FAA ha5 taken several other non-' regulatory actions to promote safety and minimize aircraft noise impacts on the GCNP, including:

-Radio frequencies have been identified for wmmon use by air tour operator5 to report aircraft location to *other* aircraft *in the* area.

-The Las Vega5 Flight Standards District Office5 ha5 wnducted regular meeting5 with commercial air tour operators to establish safety and noise-abatement goal5 and update the standardized routes over the canyon used by the operators.

—Advisories concerning flight operations over the Grand Canyon are

DEPARTMENTOFTRANSPORTATION

Federal Aviation Administration

14CFRParts 91 • nd 135

[Docket No. 25149; Notice No. 86-21]

Proposed Special Flight Rules In the Vicinity of the Gmnd Canyon National Park

AGENCY: Federal Aviation Administration (FAA). DOT.

ACTION: Notice of Proposed Rulemaking (NPRM).

SUMMARY: This notice proposes a Special Federal Aviation Regulation (SFAR) to establish temporary procedures for the operation of all aircraft in the airspace above the Grand Canyon up to an altitude of 9,000 feet above mean rea level (MSL). The notice also proposes a follow-on final rule to take effect upon exqiration of the SFAR in June 1987. In recent years, the high volume of air traffic over the Grand Canyon National Park has increased the risk of midair collision. The overflights also generate noise impacts on park surface areas to a degree which may be inconsistent with Federal policies for operation of the park. The proposed SFAR would: (1) Establish a Special Flight Rules Area from the surface to 9,000 feet MSL in the area of the Grand Canyon: (2) prohibit flights in this area unless specifically authorized by the local FAA Flight Standards District Office: and (3) establish certain terrain avoidance and communications requirements for flights in the area. The proposed final rule would include, in addition to the general restrictions contained in the SFAR, (1) provisions to permit access to the special flight rules area by general aviation operators, and (2) if supported by evidence, provisions for avoidance of certain noise-critical sites in the park by low-flying aircraft. The proposed rules would reduce the risk of midair collision, reduce the risk of terrain contact accidents below the rim level, and reduce the impact of aircraft noise on the park environment.

DATES: *Comment dates:* Commente must be received on the SFAR on or before January 10, 1987. Comments must be received on the proposed final rule *on or* before March I, 1987.

Hearing date: A public hearing will be bald at 7:00 p.m. on December 16, 1986.

ADDRESSES: Comments on this proposal may be mailed in duplicate to:
Federal Aviation Administration. Office of the Chief Counsel, Attention: Rules Docket (AGC-204), Docket No. 25149, 800 Independence Avenue. SW.. Washington. DC 20591.
or delivered in duplicate to:
FAA Rules Docket, Room 916, 800 Independence Avenue SW., Washington, Dc.

Comments may be examined in the Rules Docket weekdays, except Federal holidays. between 8:30 a.m. and 5:00 p.m.

The public hearing will be held at the following location: Airport Conference Room, 5th Floor, Main Terminal Building McCarran International Airport, Las Vegas. Nevada.

FOR FURTHER INFORMATION CONTACT: David L. Bennett, Office of the Chief -Counsel, AGC-230, Federal Aviation Administration, 800 Independence Avenue SW., Washington, DC 20591, Telephone: (202) 267-3073. ,

SUPPLEMENTARY INFORMATION:

Comments Invited

Interested persons are invited to participate in this rulemaking by submitting such written data, views, or arguments as they may desire on any portion of the amendment. Comments that provide the factual basis supporting the views and suggestions presented are particularly helpful in developing reasoned regulatory decisions.

Communications should identify the regulatory docket number and be submitted in duplicate to the address listed above. Commenters wishing the FAA to acknowledge receipt of their comments must submit with those comments a self-addressed, stamped postcard on which the followinn statement is made: "Comments to Docket No. 25149." The postcard will be date/time stamped and returned to the commenter. The proposals contained in this notice may be changed in the light of comments received. AH comments submitted will be available for examination in the Rules Docket both before and after the closing date for comments.

In addition to seeking comments on this amendment, the FAA will hold a public hearing to allow additional public input. The hearing will be held on December 16, 1986, at McCarran International Airport. Las Vegas. Nevada.

Availability of Document

Any person may obtain a copy of this NPRM by submitting a request to the Federal Aviation Administration, Office of Public Affairs, Attention: Public lnformation Center. APA-430, 800 Independence Avenue. SW., Washington, DC 20591; or by calling (202) 267-3471. Communications must identify the notice number of the NPRM. Persons interested in being placed on a mailing list for future notices should also request a copy of Advisory Circular No. 11-2 which describes the application procedure.

Meeting Procedures

Persons wishing to make a presentation at the meeting may contact William Patterson at (213) 297-1658.

persons who plan to attend the meeting should be aware of the following procedures to be followed:

(a) The bearing will be informal in nature and will be conducted by the designated representative of the Administrator under 14 CFR 11.33. Each participant will be given an opportunity to make a presentation. Questions may be asked of each presenter by other participants or by representatives of the Administrator.

(b) The hearing will begin at 7:00 p.m. (local time). There will be no admission fee or other charge to attend and participate. AH sessions will be open to all persons on a space available basis. The presiding officer may accelerate the meeting if it is more expeditious than planned.

(c) All meeting sessions will be recorded by a court reporter. Anyone interested in purchasing the transcript should contact the court reporter directly. A copy of the court reporter's transcript will be filed in the docket.

(d) Position papers or other handout material relating to the substance of the meeting may be distributed. Participants submitting handout materials should present an original and two copies to the presiding officer. There should be an adequate number of copies provided-for *further* distribution to all-participants.

(e) Statements made by FAA participants at the hearing should not be taken as expressing a final FAA position.

Public Hearing Schedule

The schedule for the meeting is as follows:

Date: December 16, 1986, 7:00 p.m.
Place: Airport Conference Room. 5th Floor, Main Terminal Building. McCarran International Airport. Las Vegas, Nevada

Agenda

7:00 to 7:15—Presentation of meeting procedures.
7:15 to 8:00—FAA presentation of proposal.
8:15 to finish-Public presentations and discussion.

Background

The FAA has broad authority under the Federal Aviation Act (FAAct) of

there had been no midair collisions of two air tour aircraft since such operations began in the 1920's. The FAA attributes this record in large part to the voluntary use by the commercial tour operators, whose flights represent approximately 87 percent of the lower-altitude traffic in the area, of standard route, altitude, and communications procedures. Because each tour operator flies a standard route over the canyon and Periodically announces its location and altitude on a common radio frequency at designated reporting points, the pilot of each such aircraft is aware of the location of all other tour aircraft in the area. In addition to the contribution of pilot experience and the voluntary standardized procedures, the relatively slow speed and high pilot visibility characteristic of most air tour aircraft enhance the *effectiveness* of ree-and-avoid separation.

Notwithstanding this past record. however, the FM believes that there are two general reasons why some degree of additional regulation of canyon overflights is necessary. First, the existing procedures used by the air tour operators are voluntary. There is no obligation for an operator to participate and no sanction against a pilot who ignores the procedures. While compliance with the procedures has been high in the past, safe operations in the future are not assured, and even a small degree of non-standard operation can reduce the level of safety. While some degree of control over Part 135 commercial operators can be exercised through the operations specifications of each operator, commercial air tours may be conducted under Part 91 by virtue of an exception to the applicability of Part 135. Section 135.1(b)(2) provides that a person conducting nonstop sightseeing flights within 25 miles of the airport at which the aircraft takes off and lands is not covered by Part 135.

Second, the voluntary procedures do not apply to general aviation and military flights. General aviation and military pilots on a one-time sightseeing flight over the canyon have no practical means of learning the standard radio frequencies and procedures used by the tour operators and no requirement or incentive to do so. Also, the inexperience of these pilots with operation over the canyon increases the risk of impact with the walls or surface of the canyon. Because of the unusual terrain and strong air currents, a pilot inexperienced with the Grand Canyon can get into a situation from which the aircraft may be incapable of flying out. Several accidents in the canyon apparently resulted from these factors.

The voluntary procedures, therefore, have substantially contributed to the aafe operation of commercial tour operators but have little safety benefit with respect to general aviation, military, and nonparticipating air tour operators. The FAA believes that there is a need to require that commercial operators use the standard procedures and to separate transient general aviation traffic from the regular tour operations until permanent procedures for all operators can be developed.

Noise impact on the surface. In addition to operational air safety and efficiency considerations, the FAA is cognizant of a degree of public interest in preserving a quiet environment in the canyon and minimizing the intrusion of aircraft noise on this environment. Congress, in the Grand Canyon National Park Enlargement Act of of 1975, expressly provided for protection of the natural quiet of the park. As discussed earlier in this preamble, if the Secretary of the Interior finds that aircraft or helicopter activity within the park is likely to cause a significant adverse effect on the "natural quiet and experience of the Park." he is required to submit recommendations to the Administrator of the FAA for measures to mitigate that impact.

In March 1986, the Superintendant of the GCNP issued a finding of significant noise impact on the park from &craft overflight. On November 17, 1986, the Department of the Interior submitted recommendations for action on this issue which include additional airspace regulation by the FAA. The FAA is in the process of evaluating the recommendations at this time.

Also, FAA personnel attended the public hearings held by the NPS, and the agency received the various materials prepared by the NPS and submitted by commenters. A summary of these comments has been placed in the public docket for this rulemaking. The agency is, therefore, aware of the opinions and information offered to support the existence of an excessive noise impact on the canyon environment. Information received by the FAA on the noise impact issue to date is almost entirely subjective in nature. For example, to the FAA's knowledge, neither the NPS nor any other party has conducted a technical study which would determine the actual degree of sound energy from overflying aircraft which impacts the surface in the GCNP. Such a study would establish the actual level of noise experienced, without regard to opinions as to relative loudness or annoyance. This information would be necessary to determine certain effects of noise, such as the potential impact on wildlife, and would be useful for other purposes.

With respect to the human environment and the impact of aircraft noise on park visitors. however, noise measurements may not be as significant as a reliable indicator of public opinion, in that the issue is what level of noise the public expects and desires to experience on a visit to GCNP. Some environmental groups have expressed the opinion that the sound or even sight of any aircraft is inconsistent with the experience of the Grand Canyon intended by establishing it es a national park. A more common view expressed by environment-oriented commenters was that aircraft flight should be prohibited in the airspace above certain areas of the canyon, up to a certain altitude. A comprehensive, statistically meaningful survey of public opinion on the issue apparently has not been done.

In light of the congressional policy statement that a quiet environment be preserved at the GCNP, with specific reference to aircraft noise, the FAA is sensitive to the opinions expressed by environmental organizations and others in the NPS Aircraft Management Plan proceedings. There is no doubt that unnecessary flights by aircraft at low levels within the canyon can be extemely intrusive on the park environment and annoying to park visitors. The information available to the FAA at this time, however, does not permit the agency to determine if any actions other than those proposed herein are necessary to limit the impact of aircraft overflight of the park to the extent desired by the public and by Congress, consistent with safety and other public policy objectives. In order to minimize those operations having the greatest impact on park activities until further information can be obtained. the FAA believes that aircraft flight in the canyon at low altitude should be restricted to necessary flights. This temporary restriction can be achieved by the same mechanism proposed to regulate Part 135 and genera! aviation operations for safety and efficiency purposes.

The Proposed Special Fedeml Aviotion Regulation

For the reasons discussed above, the FAA is proposing to adopt a Special Federal Aviation Regulation. which would be published and take effect within a short time after the agency analyzes and responds to the comments received and would expire on June 15. 1987. The proposed SFAR would do the following:

-broadcast on the voice signals of two local navigation facilities.
-Pilot weather briefings by the local flight service stations include information and advisories on flight over the Grand Canyon.

Aircraft operations over the Grand Canyon. The FAA estimates that there are approximately 90,000 flights over the GCNP each year at altitudes low enough to have an impact on park visitors. (Air carrier jet aircraft frequently pass near the canyon on established airways but are high enough that they do not mix with VFR traffic or generate significant noise levels at the surface.) Overflights of GCNP involve several different categories of operators.

Air tour operators. Approximately 87 percent of the flights are by commercial tour operators who conduct sightseeing flights from McCarran International Airport in Las Vegas. NV, GCNP Airport near the south rim of the canyon, or one of several other smaller airports in the region. Air tour flights may be conducted between airports such as Las Vegas and Grand Canyon, with a routing over the canyon, or may be round trip flights returning to the same airport. It is estimated that 300,000 to 400,000 passengers are carried on air tours over the canyon each year.

About 18 operators offer air tours on a regular basis although as many as 40 may operate some level of tour flights. The majority of flights are by fixed-wing aircraft although frequent helicopter tours are also conducted. Most tour operators hold Part 135 operating certificates for commercial operations. However, under FAR § 135.1(b)(2), Part 135 does not apply to nonstop sightseeing flights that begin and end at the same airport and are conducted within 25 miles of that airport. Such flights may be conducted on a commercial basis under Part 91 general flight rules.

In 1972, the Grand Canyon tour operators active at that time entered into an agreement with the FAA and the NPS on the routes and altitudes for air tour flights over the park. The agreement remains in effect. although the procedures have been amended. Under the voluntary procedures, tour flights generally operate in a west-to-east direction at specified altitudes. with special routes designated for certain features or areas of the canyon. Helicopters generally operate at 500 feet lower than fixed-wing aircraft to maintain separation. The tour flights operate below the rim elevation of the canyon in some areas but do not descend to the inner gorge along the Colorado River in their regular operations.

Geneml aviation and military. Noncommercial general aviation flights and flights by military aircraft for sightseeing purposes are also conducted over the canyon, occasionally at very low altitudes. These aircraft must bs operated in compliance with FAR § 91.79 altitude limitations, but their operations are otherwise not restricted. While sightseeing flights by general aviation aircraft are fewer in number than commercial tour operations, they present additional safety considerations which generally do not apply to the tour flights. A transient general aviation pilot on a one-time flight over the canyon will be unfamiliar with canyon terrain, air currents, and weather patterns, all of which are unique and demand special skills. In spite of this, some transient pilots fly at low altitudes in the canyon. Finally. many general aviation aircraft are smaller single engine aircraft with relatively low performance at the altitudes necessary for canyon overflights.

Military aircraft operate under FAR Part 91 general flight rules. Flights by military aircraft through the Grand Canyon are unrelated to any military purpose but do not violate existing FM regulations. Because military aircraft are generally larger and faster than general aviation or tour aircraft, overflights by military aircraft may generate adverse operational effects and noise impacts on the surface disproportionate to the relatively small percentage of flights which militarv aircraft represent of total park overflights.

NPS Aircmft. Operation of the GCNP by the NPS requires frequent aircraft flights in the airspace below the rim of the canyon. Most such operations are conducted by a helicopter under contract to the NPS. Purposes of such flights range from emergencies, such as evacuation of injured hikers from the canyon floor. to routine support of park operations. As a practical matter these operations have not added to the mix of aircraft in the canyon because the flights, for the past 10 vears have been operated by a company which also provides helicopter tour flights. While the flights apparently do generate noise impact on the surface because of the low-altitude operations involved, the FAA assumes that the NPS balances this impact with its need for the operations in determinin the number of flights by NPS aircraft.

Related Actions

As discussed above, the NPS recently has submitted recommendations to the FAA on the management of aircraft overflights of the park, pursuant to the provisions of the Grand Canyon National Park Enlargement Act of 1975.

In May 1985, the Sierra Club Legal Defense Fund and the Wilderness Society filed suit against the Departments of the Interior and Transportation in the U.S. District Court for the District of Arizona. The plaintiffs bave requested the Court to mandate a timetable for regulation of aircraft flight over the park, primarily on the basis of the GCNP Enlargement Act of 1975.

On September 17, the House of Representatives passed House Bill 4430, which would require the NPS to study the impacts of aircraft overflight on several national parka and would impose specific flight restrictions at GCNP, Yosemite National Park in California, and Haleakala National Park in Hawaii. The bill would have prohibited moat flights below the rim of the Grand Canyon. Although a companion bill was introduced in the Senate, the legislation did not pass in 1986.

The Need for Regulatory Action

Safety and efficiency. The size and natural beauty of the Grand Canyon constitute an attraction to sightseers, from the air as well as the ground, which results in an unusual level of air traffic in the airspace above the canyon. While the concentration of traffic is lower than that nesr most urban airports, the sightseeing traffic over the Grand Canyon is different in that is is not controlled by FM air traffic control. The result is a situation in which a substantial number of aircraft (more than 350 a day in July and August) operate in the same general airspace over the canyon under the flight rules that apply to sparsely populated areas and low traffic volume airspace. Separation of aircraft in this airspace is accomplished by the see-and-avoid responsibility of each pilot and, above 3,000 feet AGL, the 1,000-foot separation of eastbound and westbound traffic under 14 CFR 91.109.

National Transportation Safety Board records show 51 accidents in the vicinity of the canyon since 1975, of which 11 can be considered to have occurred within the canyon itself. Many of the accidents involved landing or other factors unrelated to the unique characteristics of the Grand Canyon environment. Overall, the safety record in the vicinity of the canyon compares favorably with the general accident rates for-general aviation and air taxi operators. For example, until June 1986, when an air tour airplane and a tour helicopter collided over the canyon,

(1) Establish a Grand Canyon National Park Special Flight Rules Area from the surface to 9,000 feet MSL. The area would be marked on aeronautical charts and described in other pilot information publications.

(2) Prohibit operation by any aircraft in the defined area unless (a) the operator holds a Part 135 certificate and bas express authorization in its Part 135 operations specifications to operate in the airspace, (b) the operator is authorized in writing by the FAA Las Vegas Flight Standards District Office to operate in the airspace, or(c) the aircraft is on an official search and rescue mission. In either of the first two oases (which would include virtually all Rights within the area) the authorization would contain specific limitations on the operation, including minimum altitudes. Minimum allowable flight altitudes would be approximately the rim level of the canyon unless there is an operational need for flight below that level (such as landing at one of the reservations]. The terms "rim" or "rim level" are not used in the proposed rule or authorizations because the north and south rims are at different levels and because the rim is too variable in elevation to constitute a practical flight reference for pilots.

(3) Prohibit commercial tour operations below 9,000 feet MSL by Part 91 operators unless they obtain a Part 135 certificate and operations specifications which authorize operation in the Grand Canyon National Park Special Flight Rules Area.

(4) Prohibit, except when necessary or when specifically authorized for certain purposes, flight closer than 500 feet to any terrain or structure in the canyon.

(5) Require pilots to monitor certain common frequencies and make position reports as specified in their authorization to enter the airspace.

In effect, the rule would generally prohibit flight below the approximate rim level of the canyon except those flights necessary for operation of the park and for provision of emergency services. In addition, the rule would restrict aircraft operations in the airspace between the rim and 9,000 feet MSL to aircraft with a park-related need to be in the area and to commercial tour aircraft which meet extensive equipment. experience, training, and operational requirements. The restrictions which would apply to transient aircraft between the rim and 9,000 feet MSL would remain in effect only until procedures for transient operation8 could be integrated with the standard procedures used by the regular commercial operators over the canyon. The rule would impose no new restrictions on flight above the canyon above 9,000 feet M S L

Analysis of the Proposed SFAR by Section

Section 1 provides that the proposed SFAR applies to all persons operating under VFR in certain airspace from the surface to 9.000 feet MSL an defines the boundaries of that airspace Applying the rule to all persons would have the effect of applying the rule to military as well as civil pilots. Aircraft operating under IFR would not be operating at the altitudes or in the area covered by the rule. (With the exception of a small portion of VOR airway in the northeast corner of the area, the base of controlled airspace within the designated area is at 9,000 feet MSL or higher:]

Airspace up to 9,000 feet MSL is restricted to hclude a sufficient number of Section 91.109 hemispheric altitudes for nonconflicting eastbound and westbound operations by authorized operators, e.g., 5,500 and 7,500 feet MSL eastbound and 6,500 and 8,500 feet MSL westbound. Capping the special area at 9,000 feet MSL permits overflight of the canyon by general aviation &craft eastbound at 9,500 feet, which is within the capability of even *small* single-engine aircraft.

The lateral boundaries of the proposed area extend beyond the limits of the park itself to include all of the areas which are commonly subject to canyon sightseeing overflights, including certain Indian reservation land, and to provide simplified boundaries for practical compliance by pilots. Where possible, the proposed boundaries have been established coincident with VOR radials to enable pilots to use aircraft navigation equipment to locate their position in relation to a boundary line. A cutout from the area has been provided for the GCNP Airport control zone, in recognition of the need for aircraft to descend to and climb out from the airport. The two published instrument approaches to the GCNP Airport are from the southwest and would not be affected by procedures proposed.

Section 2 of the proposed SFAR defines the term "Park" as the Grand Canyon National Park.

Section 3 of the proposed rule sets forth the requirement for authorization for aircraft to operate in the Special Flight Rules Area. An exception to the general requirements is made for emergencies, to clarify that a bona fide emergency landing in the canyon would not violate this rule. Also, authority is reserved for the Administrator to authorize flights in the area in the infrequent case in which the normal authorization process would not apply. The agency doer not anticipate the use of this provision during the duration of the special rule.

Section 3 would prohibit flight in the Grand Canyon National Park Special Flight Rules Area unless authorization to operate in the designated area is obtained fmm the Las Vegas Flight Standards District Office or unless the aircraft is on an Air Force-directed search and rescue mission. Paragraph (a) provides that specific authorization may be incorporated in the operations specifications issued to a Part 135 operator. Operations specifications are detailed rule8 and conditions for commerical operation which are issued to each holder of a Part 135 certificate. To FAA's knowledge all of the operators currently conducting commercial air tours of the Grand Canvon hold Part 135 certificates. The Las Vegas Flight Standard8 District Office (FSDO), in cooperation with the active tour operators, has developed specific conditions and limitations on the Grand Canyon operation of each such operator. Those conditions and limitations will be included in the operations specifications of each tour operator and will be enforced by the FM. The provisions will include detailed requirements for routes, altitudes, communications and other procedures, and for pilot experience and equipment.

Authorization through operations specifications would permit continuation of the air tour industry at the Grand Canyon without significant change fmm present procedures. The industry successfully serves a certain segment of the demand for tourist access to the Grand Canyon and has done so with an impressive safety record over the year. The restriction8 proposed would, however, make the procedures now voluntarily used by most operators mandatory and enforceable. Second, the prescription of certain minimum altitudes would require some operators to fly at higher altitudes on their tours, in some areas, than they have in the past. The minimum altitudes specified in the operations specifications would in most cases be an MSL altitute near to the approximate elevation of the rim in each sector of the canyon.

Paragraph (a) would also permit continuation of commercial operations to Indian reservations within the Special Flight Rules Area. Such flights are routinely conducted for tourism at the reservations. for pick-up of river rafters. and far serial supply and transportation services to the reservations. Operators conducting these flights must hold Part 135 certificates and operations

specifications and would be subject to the same general restrictions as the tour operators consistent with the nature of their operations.

Paragraph (b) provides that operation in the area is not prohibited if authorized in writing by Las Vegas FSDO and conducted in accordance with the conditions of that authorization. The proposed rule states that authorization will normally be provided only for operations of aircraft necessary for law enforcement firefighting, emergency medical treatment or evacuation of person8 in or near the park, or for support of park maintenance or activities. As mentioned earlier, the NPS has a continuing need for aircraft access to the canyon surface by NPS and contractor aircraft for a wide range of purposes related to operation of the park. FAA. through the Las Vegas FSDO. would authorize such operationa by written certificate of authorization upon confirmation from the Superintendent of the GCNP that he requests the authorization for that operation- The written authorization would contain conditions similar to those included in the air tour operators' operations specifications. This will ensure that operations in the Special Flight Rules Area are using common procedures and radio frequencies and that the incidence of low altitude aircraft flights is kept to the minimum necessary for operation of the park.

St is not the FAA's intent to deny air awes8 to any surface point within the Special Flight Rules Area. Flights requested by the NPS or by representatives of the Indian reservation landing areas would be authorized subject to the standard conditions Imposed on all operators within the area.

Other requests for flight through the area below 9,999 feet MSL, including general aviation and military sightseeing flights, would normally be denied during the duration of the SFAR.

Paragraph (c) permits search and rescue (SAR) aircraft under the direction of the U.S. Air Force Rescue Coordination Center to enter the area without pdor coordination with the Las Vegas FSDO. SAR missions over the canyon are very infrequent-and are not expected to occur during the period of the proposed special rule.

Section 4 requires all commercial sightseeing operations to be conducted under a Part 135 certificate, notwithstanding the exception to Part 135 applicability contained in § 135.1(b)(2). This provision would prohibit tour operations by Part 91 operators. under § 135.1(b)(2), over the canyon below 8,000 feet MSL. To the agency's knowledge all operators currently providing commercial rightseeing flights over the Grand Canyon hold Part 135 certificates. although operations by Part 91 operators have been-common in-the past.

Section 5 would prohibit operation within 500 feet of terrain in the canyon unless necessary for takeoff or landing unless authorized by the Las Vegas FSDO for one of the park operation purposes listed in Section 3, or except in an emergency. This provision applies the Part 135 restriction8 of § 135.203(a)(1) to all operators. The restriction would provide certain minimum protections to unique park terrain, wildlife. and archaeological sites until the effect of low altitude aircraft flight can be determined.

Section 6 would require that pilots operating in the area monitor certain frequencies and make radio position reports at the points specified in their authorization. The FM believes that the use of common frequencies and periodic reporting of aircraft location, similar to the procedure for a Common Traffic Advisory Frequency at uncontrolled aiports, significantly reduces the risk of midair collision. Therefore, this procedure would be made mandatory for the duration of the special rule. Exceptions are incorporation for aircraft required to be in contact with the GCNP control tower or on a USAF-directed search a rescue mission.

The Special Federal Aviation Regulation, when issued, would contain an additional section providing that it would expire on June 15, 1987. The FAA is also proposing to issue permanent rule, to become effective on or before June 15, to incorporate the comments received and reflect the results of experience under the SFAR. If development of the rule is delayed and cannot be completed by June 15, the SFAR could be extended to provide the necessary additional time.

Effective Date of the Proposed SFAR

The comment period on the proposed Interim special rule closes *on* January 10, 1987. It is the agency's intention that. if tha proposed SFAR is adopted, it would take effect less than 30 daye after publication in the Federal Register. The agency believes that circumstances warrant the prompt regulation of aircraft operations over the Grand Canyon. While the past statistical safety record has been satisfactory. the voluntary measures which contributed to that record may be insufficient to ensure an adequate level of safety in the future, as indicated by the recent midair collieion of two tour operators. (One of those operators was operating under Part 91, under the Part 135 exception for local sightseeing flights in § 135.1(b)(2)). On this basis the agency believes that there is a need (1) to require frequent canyon operators to comply with the basic features of the standard procedures now in use, and (3) to exclude the occasional and less experienced sightseeing pilot from the low-altitude airspace until a system of appropriate routes and procedures for that kind of operation can be developed. By prohibiting uncontrolled sightseeing flights and prescribing minimum altitudes for authorized flights. the proposed SFAR would also provide immediate mitigation of the environmental impacts of unnecessarily low aircraft flights over the park surface.

The agency specifically solicits comments on the impactbf making the SFAR effective immediately upon publication. or within some alternative period of less than 30 days of publication.

The Proposed Permanent Regulation

The proposed SFAR, if adopted, would include an expiration date of June 15, 1987. The FAA proposes to issue a permanent final rule effective on or before that date. In addition to comments requested earlier in this preamble on the adoption of the SFAR. the agency solicits comments *on* the need for permanent measures to regulate the flight of aircraft above the Grand Canyon, for safety and environmental reasons, and on what those measures should be. *Commenters should clearly indicate which comments are directed toward the SFAR and which comments are directed toward the permanent final rule.*

The FAA proposes a final rule which would contain the following provisions:

1. The rule would take effect upon expiration of the SFAR, if the SFAR is adopted.

2. The rule would incorporate the provisions of the SFAR as proposed in this document, subject to the additions and revisions listed below.

3. The rule would provide means by which general aviation operators could operate within the Special Flight Rules Area, subject to certain limitations and preconditions. Such provisions could include, for example:

—A requirement for a briefing from a Plight Standards district office in the region before entering the area. The briefing could include required procedures (such as reporting points). environmentally sensitive areas which should be avoided, and information

on the activities of other operators in the area.

-preferred or required routes and altitudes for general aviation transit over tbe canyon.

4. The rule would identify any parts of the canyon which the FM finds, on the basis of comments received and the recommendations of the Department of the Interior, are unusually sensitive to low-altitude aircraft overflight. These areas could be the subject of voluntary or mandatory limits on overflight below certain minimum altitudes.

The agency specifically requests comments on the following issues:

1. The need for or adequacy of the specific measures proposed.

2. Minimum altitudes for air tour onerations and general aviation sightseeing flights above the canyon, including *whether different* altitudes should be specified in different areas of the canyon.

3. The appropriate lateral boundaries of the proposed Special Flight Rules Area.

4. Procedures for permitting general aviation flights above the canyon at altitudes comparable to those at which the commercial tour operators fly. Such procedures could include specific routes, altitudes, prerequisite briefings or training, etc.

5. Identification of wildlife, archaeological sites, and other natural and historical values in the Park which might be impacted by aircraft overflight.

6. Identification of the areas of the canyon which are most sensitive and least sensitive to aircraft overflight.

Economic Impact

The economic impact of the proposed temporary SFAR and permanent regulation are expected to be minimal. The restrictions which both rules impose on commercial tour operators would not require any substantial changes in their operations. Other commercial flights, such as air transportation to Indian reservations, would be authorized without substantial change from present operation. Transient general aviation traffic, which constitutes a minority of canyon overflights, would be restricted only from operating at low altitude. The WOO-foot MSL restriction would apply only until provisions for general aviation traffic are adopted, which would be prior to the summer season when most of this traffic occurs. Prior to that time pilots may still overfly the canyon above 9,000 feet MSL, which at some points is less than 1,000 feet above the north rim of the canyon. En mute traffic would not be affected because the special Flight Rules Area is below the floor of controlled airspace in the area. There would be no economic impact on the Department of Defense because there is no official reason for military aircraft to operate over the canyon below 9,000 feet MSL. Because the proposed regulations would have no substantial economic impact on any category of operator, the FM has determined that the expected impact of the rule is so minimal that it does not warrant further regulatory evaluation. For the same reasons, this proposed rule (1) is not a major rule under Executive Order 12291, and (2) is not considered significant under Department of Transportation Regulatory Policies and Procedures (44 FR 11034: February 25.1979).

Regulatory Flexibility Determination

The Regulatory Fledbility Act of 1980 (RFA) was enacted by Congress in order to insure, among other things, that small entities are not disproportionately affected by Government regulations. The RFA requires agencies to review rules which may have a "significant impact on a substantial number of small entities." For purposes of the RFA, small entities are considered to include small businesses, non-profit organizations, and municipalities but not private individuals. Small entities affected by the proposed rules are limited to the approximately 40 Part 135 air tour and air taxi operators operating in the canyon area. As discussed under "Economic impact" above, neither the SFAR nor the permanent rule would require any significant change in the operations of these firms as currently conducted. As a result, the impact on the affected small entities, if any, would be substantially less than the threshold for significant impact under agency guidelines. Therefore, I certify that under the criteria of the Regulatory Flexibility Act these rules. if promulgated, will not have a significant impact on a substantial number of small entities.

List of Subjects in 14 CFR Parts 91 and 135

Aircraft, Aviation safety, Air taxi and commercial operators, Grand Canyon.

The Proposed Special Federal Aviation Regulation

For the reasons set out above, the FAA is proposing to amend 14 CFR Parts 91 and 135 as follows:

PART 91—[AMENDED]

1. The authority citation for Part 91 continues to read as follows:

Authority. 49 U.S.C. 1301(7). 1303.1344. 1346.1352 through 1355, 1401, 1421 through 1431, 1471, 1472, 1502, 1510, 1522, and 2121 through 2125; Articles 12. 29. 31. and 32(a) of the Convention on International Civil Aviation (61 Stat. 1180); 42 USC. 4321 et seq.; E.O. 11514; 49 U.S.C. 106(g) (Revised pub. L 97-449, January 12, 1983).

2. Part 91 is amended by adding a new Special Federal Aviation Regulation NO. 50 to read as follows:

Special Federal Aviation **Regula tion** No. **50 Special Flight** Rules **in the Vicinity of the Grand Canyon** National Park, AZ

Section 1. *Applicability.* This rule prescribes special operating rules for all persona operating aircraft under VFR in the following airspace. designated a6 the Grand Canyon National Park Special Flight Rules Area:

That airspace extending upward from the surface to and including 9,000 feet MSL within an area bounded by a line beginning at lat. 36°09'30" N., long. 114°03'00" W.; southwest to lat. 36°14'00" N., long. 113°12'00" W.. to lat. 36°30'00" N.. long. 112°36'00" W.; to ht. 36 30 00" N.. long. 111 42 00" W.; to tat. 35°59'30" N.. long. 111'42'00" W.; to lat. 35°57'30" N.. long. 112°03'20" W.; thence via the 5 statute mile radius of the Grand Canyon Airport airport reference point (lat. 35°57'09" N., long. 112°08'4.7" W.); to (at. 35'57'30" N., long. 112"14'00" W.: to lat. 35°58'00" N.. long. 113°11'00" W.; to 35°42'30" 27'30" W.; thence via the 5-statute-mile radius of the Peach Springs VORTAC to ht. 35°41'20" N., long. 113°36'00" W.; thence to lb6 point of beginning.

Section 2 *Definition.* For the purposes of this special regulation. "Park" means the Grand Canyon Na tional Park.

Section 3. *Aircraft operations: general.* Except in an emergency or unless otherwise authorized by the Administrator, no person may operate an aircraft in the airspace described in Section 1 unless the operation-

(a) Is conducted in accordance with a specific authorization to operate in that ● trspace incorporated in the operator's Part 135 operation6 specifications and approved by the Las Vegas Flight Standards District Office;

(b) Is authorized in writing by the Las Vegas Flight Standards District Office and is conducted in compliance with the conditions contained in that authorization. Normally authorization will be graded only for operation6 of aircraft necessary for law enforcement, firefighting, emergency medical treatment/evacation of persons in the vicinity of the Park, or for support of Park maintenance or ● ctivtties. Authorization may be issued OA a continuing basis; or

(c) Is a search and rescue mission directed by the U.S. Air Force Rescue Coordination Center.

Section 4. *Commercial sightseeing flights.* (a) Notwithstanding the provisions of Federal Aviation Regulations § 135.1(b)(2), nonstop sightseeing flights that begin and end at lbe same airport, are conducted within a 25 statute mile radius of that airport, end operate in or through the airspace described in Section 1 during any portion of the flight ● legovemedby&eptvvi6kul6afPart135.

(b) No person holding or required to hold on operating certificate under Part 135 may operate an aircraft in the airspace described in Section 1 except as authorized by operations specifications issued under that Part.

Section 5. *Minimum terrain clearance.* Except in an emergency. when necessary for takeoff or landing. or unless authorized by the Las Vegas Flight Standards District Office for a purpose listed in Section 2(b), no person may operate an aircraft within 500 feet of any terrain or ● tnrcture located between the north and south rims of the Grand Canyon.

Section 6. Communications. Except when in contact with the Grand Canyon National Park Airport Traffic Control Tower during arrival or departure or on a search and rescue mission directed by the U.S. Air Force Rescue Coordination Center, no *person* may operate an aircraft in the ah-apace described in Section 1 unless he-

(a) Transmits a position report on the appropriate frequency at each reporting point designated in the operator's Part 135 operations specifications or in A written authorization to operate in that airspace issued under Section 3, and

(b) Monitors the appropriate frequency continuously while in that airspace.

PART 135—[AMENDED]

3. Pert **135 is amended by adding a reference to SFAR No. 50.**

Issued in Washington. DC, on December 4. 1986.

John R. Ryan.

Director, Air Traffic Operations Service.

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