NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety
Washington, DC 20594

October 1, 2001

Addenda to Group Chairman's Factual Report of Investigation

AIR TRAFFIC GROUP

A. ACCIDENT

Aircraft:	N303GA, Gulfstream Aerospace G III
Location:	Aspen, Colorado
Date:	March 29, 2001
Time:	1902 Mountain Standard Time (MST)
	0202, March 30, 2001, Coordinated Universal Time (UTC)[1]
NTSB No.:	DCA01MA034

B. AIR TRAFFIC GROUP

Chairman:	William English, National Transportation Safety Board
Member:	Dan Diggins, FAA, Office of Accident Investigation (Acting)
Member:	Darren Gaines, National Air Traffic Controller's Association
Member:	Brad Rush, FAA, Office of System Standards, AVN-160

C. SUMMARY

On March 29, 2001, at 19:02 Mountain Standard Time (MST) time, a Gulfstream III, registration number N303GA, operated by AVJET Corp., collided with terrain about 0.4 miles northwest of the Aspen-Pitkin County Airport, Aspen, Colorado. The airplane was destroyed and the flight crew of 2, one flight attendant, and all 15 passengers were fatally injured during impact with sloping terrain. The accident site was about 100 feet above the airport elevation of 7815 feet. The flight had arrived under Instrument Flight Rules and had reported the airport in sight. The flight was operating as an IFR flight under FAR Part 135 operations. The weather at 18:53 was wind 250 degrees at 3 knots, visibility 10 miles, light snow, few clouds at 1,500 feet, ceiling 2,500 feet broken, 5,000 feet broken. Approximately 10 minutes after the accident the visibility decreased to 1¾ miles in light snow.

[1] All times are Coordinated Universal Time unless otherwise noted

D. ADDENDA TO REPORT

1.0 Statement by William T. Butler, Air Traffic Manager, ASE ATCT, and Northwest Mountain Regional Office, retired.

Mr. Butler served as Air Traffic Manager of the Aspen Air Traffic Control Tower, and as a Specialist in the Northwest Mountain Regional Office. He provided the following historical background statement.

> To: Bill English
> From: William T. Butler

In accord with our earlier discussions, I've assembled my recollections of the events regarding night flights into/out of the Pitkin County Airport. I served as Manager of the Aspen Airport Traffic Control Tower from summer 1977 through the summer of 1979, and again from June 1981 through September of 1983. In addition, I was a System Management Specialist in the Northwest Mountain Region Air Traffic Division (ANM-530) from February 1987 through January 1989, at the time of the establishment of the Radar Approach Control at the Pitkin County Airport. My duties at ANM-530 were basically to serve as the Air Traffic Division Manager's primary advisor on all operational, procedural and airspace issues occurring at any facility within the Denver ARTCC area, the states of Colorado, Wyoming, and parts of New Mexico and Utah.

Throughout the time I was associated with the Pitkin County Airport, there was an unresolved dialogue between the airport sponsor, Pitkin County, and the FAA regarding night operations. For reasons of noise abatement and air safety, Pitkin County wanted to operate the airport as a daytime only facility, and for many years did so.

The two air carriers serving the airport and other segments of the resort business community pressed the County continually to extend the operating hours in order to move more passengers through the airport, particularly on days of peak demand, which could see as many as 450 aircraft operations in a day which might be as short as 10 hours.

The County enforced its curfew with a system of fines which were adjudicated in the local courts. Several users were fined over the years, and a number of frequent general aviation operators of high performance aircraft also lobbied both the County and the FAA to put an end to the curfew.

Eventually, in about 1978, as I recall, the County agreed to night operations for Aspen Airways and Rocky Mountain Airways, operating to 11 PM, and midnight under certain circumstances. Enforcement of the curfew against general aviation continued. The FAA, in particular, its Airports Division, repeatedly told the County that this was an illegal discrimination and was impermissible at a facility receiving Federal Airport Improvement Program (AIP) funding. While, I believe, the FAA threatened to terminate federal grants, this never occurred and several major construction projects received federal funding during this period.

Because of the short operating day, changeable mountain weather, lack of navaids and high traffic demand, operations at Aspen could be quite chaotic, with numerous diversions of arrivals and "stranding" of dozens of departures, particularly on days when weather disruptions created backlog which then encountered the curfew. Establishment of the Red Table VOR and the VOR Approach to Aspen actually exacerbated this situation because high performance aircraft which had previously been limited to making a fast pass over the area at 17,000' while deciding whether to cancel IFR or divert to another airport were now executing a lengthy non-radar procedure, sometimes multiple times. IFR capacity of the airport fell to 4 to 6 operations per hour while demand often reached 60.

In 1987/88, intensive lobbying of the Administrator of the FAA by general aviation interests, The Aspen Skiing Corporation, and the Colorado Congressional Delegation caused a series of meetings in Washington and Seattle (ANM Regional Headquarters) in which it was made clear that the Administrator was acutely interested in the problem and willing to fund a solution.

The ANM Air Traffic Division presented a plan for establishment of a secondary-only RADAR system and approach control at the Aspen Tower. This plan also required modification of the VOR approach to its present configuration, with installation of the LOC/BC in order to rationalize the traffic flow to and from the airport. Conceptualization, funding and construction of this project occurred in what I regard as miraculous time.

At the time of the construction of the approach control facility, Pitkin County was told unequivocally that the Federal approach control facility would have to remain open during all hours of operation of the airport and that it would provide services to ***any*** aircraft which then, which would render enforcement of the County curfew difficult, if not impossible. The commissioners, after some argument, agreed, and the airport was made available to all users from 0700 to 2300 local time.

Some years later, Pitkin County set out to turn the airport into a "private" facility. The FAA advised them that they had the legal authority to do that, but only after refunding the considerable federal monies invested in the airport. The County declined to continue with the privatization action.

2.0 Interview Summary, Howard Swancey, AFS-3

Mr. Swancey was interviewed on July 6, 2001, at FAA Headquarters, Washington D.C. In attendance were William English, NTSB, Dan Diggins, FAA AAT-200, Victoria Anderson, FAA AAI-100, and Darren Gaines, NATCA. Mr. Rush was unable to attend the interview.

Mr. Swancey is the Technical Advisor to the Director of the FAA Flight Standards Service, routing symbol AFS-3. He has held this position for about 2 years. He has been with the FAA since 1997. Prior to FAA employment he worked for the Department of Defense on TERPS issues.

In response to NTSB request for an historical briefing, Mr. Swancey conducted research throughout the Flight Standards structure of FAA. He obtained what he believed to be all documentation on the events surrounding the removal of the night restriction on the Aspen VOR DME-C approach.

He began by advising the group that he believed he found a common theme of an interweaving of the groundside and airside initiatives going on at Aspen. First, an airport operations issue involving fair access and nighttime noise curfew, and secondly, FAA initiatives to support night and IFR operations for commercial operators.

He stated the community [Pitkin County] was mostly interested in limiting expansion and nighttime noise. Meanwhile, the FAA all-weather operations branch, a different organization than that dealing with airport funding and access, was in the process of developing special/private approach procedures in support of IFR and night operations for commercial operators. He stated that it is critical to understand that there was unintended confusion between a restrictive instrument approach procedure (IAP) and general operations at the airport itself.

Additionally, during the same time period, accidents in mountainous terrain were generally experiencing a higher level of interest. He stated that this was not confined to Aspen, but at mountain airports in general.

Mr. Swancey emphasized that a difference in philosophy between some of the parties involved led to some of the conflict. Not all parties agreed on whether there is a fundamental difference in the qualifications and capabilities of general aviation operators versus those of scheduled carrier flight crews. The FAA standpoint, from the view of flight standards in the 1989- 1990 timeframe, was that air carriers were considered, as a group, to hold to a higher standard of airmanship due to the nature of the Part 121 and 135 regulatory standards.

He said that in August of 1990, in response Senate direction, the FAA was preparing to strengthen the night restrictions. Two studies were initiated, the first on noise and environmental impacts of an expansion of service at ASE, the second dealing with safety. He said the studies were intended to be informational and non-binding in nature.

Mr. Swancey noted that a night VFR study existed in a few slightly different variants with different dates, but no substantial changes. He opined that it appears there were internal FAA

conflicts over the conclusions. As published in 1990, the studies determined that there was no unusual hazard in visual conditions. Congressional interest in 1994 was the impetus for changes. VFR flight itself was looked at closely, as evidenced by the notations published in the FAA Airport/Facility Directory.

During the early 1990's, the special approaches that were in place, in the eyes of NBAA[2] and AOPA[3], were not substantively different than the public approach. They interpreted the operation to indicate that if airplanes were allowed into the airspace "it must be OK" although different sets of criteria were applicable. AOPA complained that allowing airplanes access to the airspace should go hand in hand with airport access. He noted that the FAA did at least once respond to NBAA and AOPA that the restrictions on instrument approach procedures were due to safety concerns.

He did not find any evidence of any lawsuits that actually were heard in court. He did find written complaints and letters indicating a letter writing campaign between Pitkin County and NBAA/AOPA to Congress and FAA, each espousing their positions.

Mr. Swancey emphasized that there **should** be a distinction between a VFR maneuver, an environmental and access issue, and an IFR safety concept. He noted that it appeared that something was lost in the communication between the FAA and NBAA/AOPA. He noted that it is conceivable that a night restriction on an IAP **could** be established due to noise abatement or other locally established criteria, having no relation to TERPS or other operational factors, as long as the procedure does not violate TERPS safety minima. Mr. Swancey repeated that two different efforts, for two different purposes, seemed to interrelate and overlap, but not all parties seemed to understand the differences, and confusion was created.

Mr. Swancey explained that in recent years, chains of command within the FAA have changed and a regional office would not have as much direct effect to apply criteria. FAA Flight Check personnel were probably not in the loop at all at the time of the removal of the restriction.

There was no specific study of IFR operations at Aspen.

Mr. Swancey added that the perception of pilot population ability is widely varied. Although a baseline Part 91 operator is considered "safe", there is a much higher oversight and administrative standard applied to Part 121 and 135 carriers. Whether or not the baseline bar is high enough must be judged in reference to the particular operation or application at hand.

Mr. Swancey said that safety criteria for instrument operations are built into the procedure of an IAP. IAPs should automatically have a safety cushion built in. For the portion of a flight which takes place below minimum descent altitude, flight inspection pilot judgment and additional enhancements create a level of safety for the baseline IFR operator.

Mr. Swancey added that not having an IAP into a certain area does provide a level of safety, "if you can't get in there [dangerous terrain area], it's safer." He agreed that a pilot does not "have"

[2] National Business Aircraft Association
[3] Aircraft Owners and Pilots Association

to go into a certain airport at any times.

He emphasized again that there didn't seem to be any one point that was made to remove the night restriction, he used the term "the fog of war" to characterize the confusion surrounding who was doing what, and why.

He said that language on such things as Notams or chart notes should be clearer, including the reason "why" a restriction or note is the way it is should be included. He used the example of a restriction in place for noise abatement shouldn't be something a pilot is concerned about if he has an operational limitation or difficulty.

He added that the concept of the balance between responsibility and authority was important to understand. When accepting the authority to operate as freely as pilots do when under VFR, they also accept more responsibility for determining their own safety. Conversely the FAA provides a somewhat higher level of safety in IFR operations, but retains the responsibility and authority to restrict procedures or set criteria for safety purposes.

3.0 Briefing Summary, U.S. NOTAM Office, Herndon Virginia

In response to a Group Chairman request, the FAA provided a comprehensive overview briefing on the Notice to Airman (NOTAM) system on July 9, 2001.

In attendance was William English, NTSB Group Chairman, Dan Diggins, FAA AAT-200, Victoria Anderson, FAA AAI-100, and Darren Gaines, NATCA. Mr. Rush was unable to attend. Hosting the briefing and visit was Mr. Dan Smiley, Manager of the U.S. NOTAM Office (USNOF), ATT-140. Assisting Mr. Smiley were representatives of the EDS Corporation, which provides contract support to the USNOF. From EDS were Mr. Mike Williams, Mr. Tom Kennedy, and Mr. Dan Reese. Also in attendance was Lt. Mike Stiers of the U.S. Air Force, who serves as the Department of Defense NOTAM coordinator.

Mr. Reese provided a briefing on the hardware and communications systems supporting the NOTAM Office. (See attachment A-1) He explained that EDS supports both civil and military, domestic and international (ICAO) format NOTAMs. Sources of information for Flight Data Center (FDC) NOTAMs, such as that in question in Aspen, may come from the FAA Office of System Standards, the National Flight Data Center, Air Traffic, or other outside sources.

The USNOF initially reviews such information for validity, i.e. if the source is reliable, but not for content. Later in the process NOTAM specialists review the information for content readability. Categorization of the NOTAM into Local, Distant or FDC, is decided prior to entry into the system.

The EDS representatives explained the civilian NADIN-II (National Data Interchange Network) system is a text-only network which works in conjunction with the Weather Message Switching Center Replacement (WMSCR) to create a combined message including weather and NOTAMs for distribution to Flight Service Station and ARTCC Flight Service Data Processing System Model 1 computers. From the Model 1, pilot briefings and controller information is distributed. The WMSCR is also accessed through normal telephone lines by hundreds of outside users, such as airlines and even limousine services. Two WMSCR centers are located at Salt Lake City and Atlanta. The military uses a different system based on World Wide Web distribution.

NOTAM information is originated at various FAA offices, such as AVN in Oklahoma, Air Traffic Procedures Branch in Washington, of the National Flight Data Center, also at FAA Headquarters. The NOTAM is written by the offices, then faxed to the USNOF, where a specialist retypes the NOTAM into the USNOF system. In a visit to the specialist station in the control room at the FAA Command Center, the group noted the computer workstations and fax machines nearby.

A NOTAM is not valid for use by aircrews until it is received at the USNOF and entered into the computer with an appropriate number. Mr. Smiley noted that over 15,000 NOTAMs are issued yearly, but the numbering system is limited to four digits, i.e. 9,999 discrete numbers.

The USNOF computer, known as the Consolidated NOTAM System, maintains a master database of all NOTAMs, assigns the numbers, and maintains the master distribution list. There

are terminal interfaces to the database termed a "beehive", similar to Model 1 computers, for authorized users to make entries. The military equivalent is called DINS/NIPRNET, which is a web-based model of the consolidated system. The FAA runs a duplicate of the military system which is accessible to the public (www.notams.faa.gov) but is not officially part of the civilian system. The FAA has been moving in the direction of a web-based distribution system for about three years. Lt. Stiers explained that the system used by the military has greatly streamlined the process of distributing NOTAM information. He gave the example of a forward aircrew discovering flight critical information on a deployment is able to enter NOTAM information into the system, through a portable computer, and the information is available to stateside crews in a matter of minutes.

Mr. Smiley noted the difficulty pilots encounter with "information overload" from NOTAM information which is not prioritized. When the NOTAM distribution system was originally designed, there was no concept of computerized databases, and all information was "pushed out" to users. Much of the concepts still in use today are based on the limitations of teletypewriters of the 1960s. Abbreviations, acronyms, and coding are legacy concepts left over from the need to deal with such limitations.

The representatives noted that a multi-path communication system grows geometrically in complexity. If only 3 users need to communicate, there are only three possible pathways for information to flow. However adding one more user to the system increases the possible pathways to 6. The intent is to move to a more open architecture which allows users to simply "dip into a pool" of information to get what they need, rather than have the system package information, one user at a time. Additionally, the present system has no way of representing "what changed?" in reference to certain procedures. It simply notes the change, or a wordless cancellation notice.

Mr. Smiley noted that there is no database of interconnected effects of navigation aids. For example, a VOR outage may effect many approach procedures, airways, and other procedures, yet there is no automated method to assure that all the affected procedures are appropriately noted. The burden is one a procedures specialist in AVN to ensure such notices are issued.

Mr. Reese emphasized that the FAA must migrate from the legacy system into a more modern method of distributing NOTAM information.

b.) Gene Donaldson AVN-50

Mr. Donaldson is the national liaison for the FAA Office of System Standards at the USNOF and FAA Air Traffic System Command Center. He serves as the focal point AVN-100, the National Flight Procedures Office, the National Aeronautical Charting Organization and Flight Inspection. His functions include coordinating flight inspection activity in the ATC system, and assuring NOTAM information flows between the NFPO and USNOF.

Mr. Donaldson explained that the guidance on the NOTAM writing process is contained in FAA Order 8260.19, which also provides for a quality assurance check review for flight safety correctness. Once a NOTAM is completed at the NFPO it is faxed to the USNOF for entry into

the consolidated system. Mr. Donaldson added that NOTAMs used to be routed through the National Flight Data Center at FAA headquarters, but that step has been removed, streamlining the process somewhat. The NFDC is still provided with a copy of all NOTAMs.

The USNOF looks for impact or affect on other NOTAMs, and checks for proper spelling and use of approved contractions. A computer format check is also done. The USNOF could perform a quality check for language and content, but would be unlikely to be able to perform an effective operational assessment check of a any particular NOTAM. Operational effects of content would be the responsibility of AVN-100 and –160.

Mr. Donaldson explained that occasionally an explanatory comment is included on the fax from NFPO as a courtesy, but that is not required. The group noted that a comment of "due to flight check determination" was included on the Aspen NOTAM. Mr. Donaldson also said that courtesy calls are sometimes exchanged between USNOF and NFPO to ensure the fax was received, but he explained it is ultimately the NFPO specialists responsibility to ensure the NOTAM is entered into the database.

Mr. Donaldson explained that the move to a web based system should provide a "receipt" capability, and eliminate the step of retyping NOTAMs into the database. He did state that the web system only affects the interchange between the USNOF and the NFPO (and/or NFDC), it does not have any effect on the user end. It is not intended to replace the Model 1 computers and NADIN-II system.

Mr. Donaldson outlined the various different FAA offices that are responsible for at least some part of the NOTAM system, including AFS-420 for policy development, ATP-100 for Air Traffic operating procedures, ATT to operate the NOTAM database, the FAA Technical Center and AUS automation, Flight Service Stations, National Weather Service, etc. He noted that it is very difficult to modernize any one part of the system without having unintended effects on other branches which may be implementing their own projects.

4.0) Excerpts from The Aviation Safety Institute's 1998 Report on Airport Operations in Aspen, Colorado

Group Chairman's Note: *The following report is public domain information, published by the Aviation Safety Institute. All findings and conclusions are those of ASI and do not necessarily reflect the conclusions or opinions of the Air Traffic Group.*

Executive Summary

Pitkin County's Sardy Field is situated in a challenging flight environment which makes aircraft approach and departure inherently more hazardous in comparison to other U.S. airports. The surrounding high mountains concentrate aircraft approach and departure paths into a narrow cone which lies north of the runway end. Sardy Field's mix of high and low performance aircraft, itinerant pilots of varied knowledge of mountain flying hazards, high-altitude location, and frequent poor weather and visibility all contribute to a significantly higher-than-average aircraft accident rate given the airport's size and traffic. Fifty-seven-percent of all off-airport aircraft crashes which occurred within an 3-mile radius of Sardy Field over the past 10 years are clustered just north of the airport in the immediate vicinity of the proposed high-density residential development on portions of the W/J Ranch. (i)

Three recent crashes (two involving substantial post-crash fire damage) which occurred at the southwestern threshold of the W/J Ranch site affirm that the likelihood of an aircraft crash at this location is more than just probable. Current voluntary noise abatement procedures divert VFR air traffic departing the north end of Sardy Field directly over the W/J Ranch. It is anticipated that approval and completion of the proposed multi-family housing units would result in the loss of this noise abatement profile, further limiting available maneuvering airspace and resulting in increased hazards to pilots, passengers, and those on the ground.

The Aviation Safety Institute believes that placing residential dwellings in the primary approach/departure path to any airport presents a high level of risk. Positioning high-density, multi-family homes in the narrow approach/departure path to one of the most challenging mountain airports in the United States presents an unacceptably high risk.

1.0 Introduction

The Aviation Safety Institute (ASI) visited Pitkin County, Colorado during the period March 22-24 1998. In addition to two site visits to the W/J Ranch location, ASI also visited the Aspen control tower and participated in an area orientation flight.

The purpose of this visit was to assess the aircraft accident risk that might accompany the high-density, multi-family residential development proposed for construction on the W/J Ranch north of Aspen's Sardy Field as well as plans to place an *elementary school* in the same area. The center of that development is located approximately 4,000 feet from the departure end of the airport's Runway 33 on a magnetic heading of 354 degrees. This report will address issues specific to flight operations in the vicinity of the Aspen airport and their potential influence on the proposed development of the W/J Ranch.

2.0 Assessing the Risks Associated with Residential Development off a Runway End: Aviation Accident Hazards Specific to the Sardy Field Environment

Land use around all U.S. airports is subject to restrictions aimed at ensuring reasonable levels of safety for both airspace users and those on the ground. Sardy Field's high-altitude, mountainous location significantly increases demands placed on pilots and aircraft, which increases the probability of accidents with the following considerations:

2.0.1 Terrain

Sardy Field is surrounded by close-in steep terrain in all but the northern quadrant. In consideration of this circumstance, airport management has imposed a "prior permission" requirement on all aircraft proposing departure southeast on Runway 15. Operators are required to affirm their ability to safely execute the departure before a release will be granted. (ii) As a direct result, 95-97 percent of all arrivals and departures are conducted through a modified straight-in to Runway 15 or departure from Runway 33. Arrival and departure flexibility is further constrained between 320 and 360 degrees magnetic due to rapidly rising terrain northwest and northeast of the departure runways' extended centerline. The net result is the concentration of virtually all arrival and departure activity into a 40-degree-wide corridor whose centerline extends just west of the proposed W/J Ranch development.

2.0.2 Weather

Flight weather conditions in the Roaring Fork River Basin are Visual Flight Rules for 97 percent of the year. (iii) During the winter months when commercial air traffic and passenger enplanements rise dramatically, overcast weather and marginal-to-poor visibility cause flight conditions to deteriorate significantly, severely testing pilots and aircraft. Air crew and aircraft that are not properly equipped to encounter moderate-to-severe airframe and engine icing may encounter unexpected and severe flight conditions during this season. It should be noted that flight into unanticipated weather conditions has historically proven the most prevalent factor in pilot error accidents. (iv) While Category 1 approach minimums of 10,200 feet MSL (2,400 feet above the runway surface) offer some measure of altitude buffer relative to the surrounding terrain, the presence of 12,000-14,000-foot mountains in virtually all quadrants can severely test the pilot caught unprepared in instrument flight conditions. Mountain wind shear is a fact of life in mountain flying regardless of season, and poses one of the greatest dangers where aircraft are maneuvering at low speeds — as in the approach and departure phases of operations at mountain airports.

2.0.3 Elevation

Even on a "standard" day (sea level 29.92 inches of Hg and 59F), the 7,793-foot elevation of Sardy Field can tax the performance capabilities of heavily-loaded light single- or multi-engine aircraft. As temperatures rise to the mid-80s with the arrival of summer, the density altitude (pressure altitude modified by temperature variation) can easily exceed 11,000 feet, effectively negating the climb performance of any number of legally-loaded singles. This same performance penalty can apply as well to many light twin-engine aircraft upon encountering a single-engine emergency. It is this thinner air that diminishes both lift and thrust, thereby extending takeoff rolls and lowering climbout profiles — both circumstances which increase the risk of a takeoff

accident. As safety margins continue to shrink toward a given aircraft's design limitations, associated hazards for those below the departure corridor climb dramatically.

2.0.4 Pilot/Aircraft Capabilities

As with most small tower-controlled civil facilities, the Aspen airport regularly experiences a diverse mix of aircraft and pilot capabilities, from light General Aviation single-engine aircraft piloted by relatively inexperienced Visual Flight Rules-only pilots up to high-performance business and commercial aircraft operated by professional flight crews. ASI has learned that Part 91 (General Aviation) pilots operating in and out of Aspen are not required to take any mountain flying training, a course of study that would benefit the majority of visiting air traffic. While local air traffic control policies mitigate many of the dangers inherent in mixing such a wide variety of pilot/machine capabilities, history has repeatedly proven that mixing low and high performance aircraft is fraught with risk. A 1997 ASI study found that 35 percent of all near-mid-air collisions involved high-performance commercial/military and low-performance General Aviation piston-class aircraft — the most prevalent of all air traffic mixes in the near-collision scenarios studied. (v)

2.0.5 Night Operational Risks

The 1991 Night VFR Safety Study commissioned by the Board of Commissioners of Pitkin County concluded that the lifting of restrictions to night VFR operations of General Aviation-category aircraft at Sardy Field was "inappropriate." ASI agreed the safety study's findings and opinions in 1991 and believes the position taken by the Pitkin County Commissioners at that time remains valid today.

All considerations detailed above are negatively influenced by the onset of darkness. Cockpit workload increases; navigation becomes more difficult; aircraft maneuvering is more complex; and inflight anomalies/emergencies are far more likely to develop into accidents

2.0.6 Transient Traffic and Resort Destination

The wide range of aircraft and pilot capabilities that regularly transit Sardy Field exposes the local flight and ground environment to a heightened risk of pilot judgmental error, a causative element that contributes to over 75 percent of all civil aviation accidents. (vi) Aspen's resort destination character further contributes to high concentrations of transient traffic during some periods, especially on weekends during the ski season and summer. ASI's review of 1997 operations data for Sardy Field finds that over half of all aircraft traffic utilizing the Aspen airport involves transient operators. Where crew performance can be influenced by either externally or self-imposed pressure to satisfy the desire to arrive in Aspen at the earliest possible time and depart at the latest, the potential for pilot error founded in conscious deviation from accepted norms is magnified.

ASI studied 13 FAA-classed aviation accidents which occurred within an 15-mile radius of Sardy Field during the period January, 1988 to January, 1998, and determined that 93 percent had as a principal contributing factor pilot error. Nine of these accidents occurred during the ski season period extending from late Fall through early Spring, and 67 percent of reporting abstracts involved low-time (<1000-hour) pilots. Clearly Aspen's transient pleasure traffic,

clustered as it is during the winter ski season (vii) and frequently driven by weekend skiing opportunities, raises hazard levels at and around the airport substantially.

FAA accident data support this observation. A 1991 study by Gellman Research Associates, Inc. compared accident rates for Sardy Field against the average accident rates for comparable non-mountain airports and found Aspen's accident rate to be higher by a factor of three. (viii) Even among other mountain airports, the Gellman analysis found Sardy Field's accident rate higher by a factor of two than the average for all mountain airports. (ix)

In the course of studying causes and locations of accidents which have occurred near Sardy Field recently, we note that:

> A. During the ten-year period between January 1, 1988 and January 1, 1998, 13 aircraft mishaps including five fatal crashes occurred in the Roaring Fork Basin near Sardy Field, with 11 crashes occurring within three miles of the airport. (x)
>
> B. Two of the above accidents occurred within 200 yards of the proposed development's south-southwestern boundary. Both involved gross pilot error, and in one case that error was committed by the professional crew of a multi-million-dollar business jet.
>
> C. Of the 13 crashes that have occurred in the Roaring Fork River Basin since 1988, 12 have had as their principal cause factor pilot error. (xi)

As a footnote to the above, ASI has learned that aircraft operations at and around the Aspen airport are increasing by a factor of 10 percent annually with an attendant increase in accident risks. (xii)

2.1 Crash Apron Considerations

To add perspective to the causative factors associated with a number of accidents documented in this report, we present three common approach/departure aircraft accident scenarios as they relate to potential risks to residents of the proposed W/J Ranch project, where appropriate noting accidents/incidents that have occurred in these categories in the vicinity of Sardy Field.

2.1.1 Takeoff, Low Performance

In this scenario the aircraft is unable to perform to design takeoff specifications due to mechanical malfunction, overloading, improper aircraft weight distribution, or other circumstance which would result in degradation of aircraft climb performance. As noted above, Sardy Field is situated at almost 8,000 feet above sea level, which would serve to exacerbate any such takeoff emergency.

During the initial stages of the departure maneuver, pilots do not normally have the option of turning back to the airport runway. Attempts to maneuver at low altitude and airspeed will in most cases result in an aerodynamic stall and subsequent uncontrolled collision with terrain, usually with fatal consequences. Lacking the altitude that might otherwise permit maneuvering/aerodynamic stall recovery, the only safe option is to land the aircraft essentially straight ahead off the runway end. While forced landing when reduced performance conditions

are identified during takeoff roll may in the case of most light aircraft involve touchdown on the runway or in close proximity to the runway end, many more such emergency landings occur beyond the runway threshold.

2.1.2 Approach, Pilot Task Saturation

Sardy Field's location in a valley surrounded by 12,000-14,000-foot mountains creates approach and departure profiles which require air traffic to make very precise ascents/descents to/from the north over both Woody Creek and the proposed W/J Ranch development. For the often relatively inexperienced transient flight crews identified elsewhere in this report, this requirement presents a challenge under even ideal conditions. Pilots approaching an airport may be involved in a variety of tasks related to clearing traffic and maneuvering for landing, and unfamiliarity with the complex airport/approach environment can rapidly progress any unexpected event to an emergency. Aircraft departing the airport can ill-afford any performance degradation in this environment, regardless of source, i.e. mechanical, payload, or atmospheric.

We note that in February of 1991 the professional crew of a Denver-based Learjet 35 lost situational awareness while circling the airport during a snow squall, resulting in the crew's failure to monitor airspeed and a subsequent stall and crash which occurred at the southwestern threshold of the proposed W/J ranch. This crash resulted in fatalities to all aboard; the destruction of the aircraft created a substantial post-crash fire.

Combinations of Aspen's natural hazards to aviation discussed in Sections 2.0.1 through 2.0.5 contribute to a high probability of task saturation during approach and departure at Sardy Field.

2.2.3 Approach, Fuel Exhaustion

Aspen's often rapidly changing weather and remote mountainous location serves in some instances to both place arriving aircraft in fuel jeopardy and limit safe alternate landing sites. While an aircraft flying on required fuel reserves should have safe margins for a weather hold/diversion in mountainous terrain, ASI has historically found that many General Aviation and some commercial operators routinely either ignore reserve requirements or when faced with a hold/diversion fail to monitor fuel use until a critical situation develops. (xiii)

3.0 Proposed Development of the W/J Ranch

ASI's visit, orientation flight, and review of documents including an application submitted for the W/J Ranch development establishes the center of the high-density multi-family residential development approximately 4,000 feet from the departure end of the airport's Runway 33 on a magnetic heading of 354 degrees. This site location lies north and east of the runway's extended centerline with its southwest corner lying in the legislatively-defined Airport High Hazard Area with all but its northeast corner enveloped in the Airport Medium Hazard area discussed in Section 3.1. (xiv) The proposed location is approximately bordered by the Aspen/Snowmass Wastewater Treatment sludge dump to the south; the Roaring Fork River to the west; the Woody Creek gravel pit and raceway to the north, and McClain Flats Road to the east.

The location's proximity to Aspen's heavily-traveled aircraft arrival and departure routes clearly exposes the proposed development's ultimate residents to a high level of personal risk. Approaching and departing aircraft would pass approximately 1,000 feet above and 1,000 feet to

the west of the proposed development site, however it must also be noted that both distances are maximum separations. Significantly smaller clearance margins can readily be expected given variations in aircraft and pilot performance.

ASI has also been informed of and observed in use a recently-established Visual Flight Rules (VFR) noise abatement flight profile that places aircraft departing Runway 33 directly over the W/J Ranch within 30 seconds after liftoff to avoid noise impacts on established communities.

3.1 W/J Ranch's Location in the High and Medium Airport Hazard Zones as defined in House Bill 1041

In an attempt to analyze past governmental attempts to address and regulate land use in areas adjacent to airport operations, ASI reviewed the text and legislative history of Pitkin County's land use regulations concerning development around airports. In its earliest form (circa 1974), Section 3-100 "Areas Around Key Facilities," incorporated a geographical overlay of designated "High" and "Medium" aircraft crash hazard areas that surround Sardy Field. (xv) ASI finds that the proposed W/J Ranch development as plotted on this topographical chart is situated in the northeastern-most corner of the previously defined High Hazard Area, spilling over into the previously defined Medium Hazard Area as the geographical definition of the project progresses northward. (xvi)

While ASI is not aware of the safety parameters employed in designating these hazard areas, the current language in Section 3-100 of the Pitkin County Land Use Code clearly demonstrates both the drafters' concern and the course of action they felt to be necessary and appropriate under subsection 3-100-030 "Standards for Areas Around Airports." In addition, Section 3-100-030 D.4a. specifically prohibits schools, churches, hospitals and libraries from areas subject to flight hazards. The thrust of this regulatory approach is directed at analyzing "the frequency of flights and the elevation and convergence of flight patterns in relation to the proposed use ..." The standard to be satisfied requires that the oversight agency do the following:

"1. Regulate land use to protect residential and other noise-sensitive uses from airport noise."

and

"2. Avoid danger to public health and safety or property due to aircraft crashes."

ASI believes that both of the above priorities as they relate to the proposed development of the W/J Ranch support further discussion here.

3.1.1 Noise Abatement

As noted in Section 3.0, a current airport noise abatement procedure directs VFR departures immediately over the proposed W/J Ranch development site to avoid existing developed areas in and around Woody Creek. This departure profile would no doubt change should the W/J Ranch property be developed for residential use, and we may reasonably speculate that the change would result in either a modified abatement procedure further compromising the protection of existing residential developments or worse would dictate new noise abatement procedures that would further contort Aspen's challenging approach and departure paths.

While all classes of aircraft generate some level of measurable engine-related noise during both approach and departure, the most significant noise nuisance is generated by the business jets (used for both corporate and personal transportation) that provide essential air-taxi services to and from Aspen. These characteristically Stage II (a measure of engine noise emission) turbojets often drive the generally tolerable aircraft noise environment north of Sardy Field to an unacceptable level. While ASI was unable to independently obtain any meaningful data to establish the arrival/departure frequency of Stage II jet aircraft, we did review in detail the June, 1996 "Analysis of the Existing Noise Environment" prepared for the Aspen/Pitkin County Airport. Not only did this survey find that excessive and intrusive Single Event Noise Levels (SEL) were essentially unchanged since a 1990-91 study, it also provided graphic proof of the impact such an ambient noise environment would have on the proposed development. It is noteworthy that one of the noise monitoring stations employed in this survey was located near the trailer park some 1,500 feet north of the project's northern boundary, approximately 7500 feet north of Runway 33.

The 1996 report presented ambient noise levels in terms of both average daily and single-event decibel profiles. While the proposed development fell within the 60-65 average dB contours that render residential housing marginally acceptable (See Section 3-100 of the Pitkin County Land Use Code), the recorded single-event decibel levels for loud Stage II turbojets peaked at over 100 dB, a noise level approaching that generated by a rock band. While the peak dB persisted for only a few seconds, decibel levels in excess of 70 dB were evident for in excess of 30 seconds. The report also summarized single-event frequencies for the time period sampled. (xvii) It should be noted that the aircraft passage rates presented are not spread over a 24-hour period but rather the 18-hour period that the Aspen control tower is open and operational.

In April of this year noise measurements were made by Engineering Dynamics of Englewood, Colorado which found average maximum decibel levels for the test day at greater than 80 dB for 25 percent of all flights monitored, with peaks of 85 dB. Over half of the 40 overflights in the sample registered greater than 75 dB. (xviii)

Any land development that would serve to impose further noise-related flight constraints on the critical primary approach and departure path to Sardy Field would result in unacceptable additional hazards to both aviation and populations living below.

End of Excerpt from ASI Report.

5.0 Statement by Mr. Wallace Roberts

This statement serves as an addendum to the interview sections of the Factual Report at the FAA National Flight Procedures Office in Oklahoma City. Mr. Roberts's qualifications are noted in his statement, and all opinions or conclusions in this report are those of Mr. Roberts and may not reflect those of the Air Traffic Group.

See attached PDF File.

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William English
Air Traffic Group Chairman