

**NASA AVIATION SAFETY REPORTING SYSTEM:
SIXTH QUARTERLY REPORT**

July 1 – September 30, 1977

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and

**Aviation Safety Reporting System Office
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July 1978

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SUMMARY

During the sixth quarter of ASRS operations, 1,357 reports were received. A sample of reports relating to weather is presented; this section describes both weather problems and problems associated with the dissemination of weather information. Wake turbulence and jetwash have been the topics of several reports. A variety of problems encountered by both pilots and controllers in the performance of their duties is discussed.

An analytical study of reports relating to cockpit altitude alert systems has been performed. A recent change in the Federal Air Regulation permits the system to be modified so that the alerting signal approaching altitude has only a visual component; the auditory signal would continue to be heard if a deviation from an assigned altitude occurred. Failure to observe altitude alert signals and failure to reset the system were the commonest causes of altitude deviations related to this system. Cockpit crew distraction was the most frequent reason for these failures. It was noted by numerous reporters that the presence of the altitude alert system has made them less aware of altitude; this lack of altitude awareness was a major factor in these reports. Failures of crew coordination were also noted.

It is suggested that although modification of the altitude alert system may be highly desirable in short-haul aircraft, it may not be desirable for long-haul aircraft in which cockpit workloads are much lower for long periods of time. In these cockpits, the aural alert approaching altitudes is perceived as useful and helpful. If the systems are to be modified, it appears that additional emphasis on altitude awareness during recurrent training will be necessary; it is also possible that flight crew operating procedures during climb and descent may need reexamination with respect to monitoring responsibilities. A selection of alert bulletins and responses to them is presented.

INTRODUCTION

This is the sixth in a series of reports describing the activities of the NASA Aviation Safety Reporting System (ASRS) (refs. 1-5). It covers the period from July 1 through September 30, 1977,

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the System's sixth quarter of operation under a Memorandum of Agreement signed on August 15, 1975 by the National Aeronautics and Space Administration and the Federal Aviation Administration.

This report presents a series of reports illustrative of specific problems reported to ASRS. An analytical study of problems associated with the altitude alert system is described. A third section presents alert bulletins disseminated by the ASRS and responses to those bulletins.

AVIATION SAFETY REPORTS

Introduction

All previous ASRS quarterly reports have included a sampling of information submitted to the reporting program. This publication presents examples of reports dealing with thunderstorm information and operations, wake turbulence and "jetwash," and pilot and controller performance. The pilot and controller performance category deals with those instances when human performance is at some degree of variance with the action that is prescribed within the system or is anticipated by another person, or both.

Readers are reminded that these reports are unverified and that specific information cited in them may or may not be correct. We believe, however, that the lessons which can be learned from them are valid.

Thunderstorm Information and Flight Operations

Pilots and controllers share a common respect for the characteristics and consequences of thunderstorm activity. No one disputes the importance of obtaining accurate information regarding thunderstorms, and then keeping that information current; but as the following reports show, sometimes even planning and the best motives have to be supplemented with diligence and common sense:

The New England area this particular day was experiencing heavy rain and strong gusty winds. Several weather sigmets were in effect and local flooding was forecast. I wanted to get a picture of just what kind of thunderstorm activity I might encounter. I went upstairs to the U.S. Weather Bureau which I've been told has some of the most sophisticated and most expensive weather radar in the country. I asked the gentleman in charge what weather I might encounter. He told me he was sorry but he was too understaffed to give weather briefings. I said I didn't want a briefing but just a look at the weather radar. He stated that I wasn't allowed access to the radar room. A sign on the door also denied entry. I went into the radar room and my presence was again challenged by the gentleman behind the scope. I was asked to leave. His presentation was set for local area return and I asked if he would flip to larger scale for a minute so I could get an idea of the weather in my direction of flight. He said he wouldn't and I left the room no wiser. The gentleman in charge was very nice, but again stated he was too short staffed to complete his job assignments and to give weather information out to inquiring pilots.

* * *

Just prior to departure there was lightning activity and heavy precipitation. Taxiing out to runway 33 for departure and in position on 33 we checked the radar for precipitation return and saw the cell which had passed overhead earlier but not much else. After departure we asked to continue SSW bound to deviate around the weather we were painting. Departure turned us over to the Center who reported that along the airway there had been reported severe turbulence by light aircraft. We asked to deviate as necessary continuing southwest until we found a clear shot toward our first stop. We were able to avoid all but about 3-4 min of moderate turbulence; however, even while smooth there was much electrical activity. Within a 15-min period we took from 4-7 strikes on the nose. We lost no systems or subsystems. On arrival I walked around the aircraft and other than paint missing from the radome found no damage. Based on this and no loss of systems I continued to our destination where the aircraft was swapped. We were scheduled to depart at 2100 hours. I asked the dispatcher to call the National Weather Service to ascertain the position of the front. He was told they were too busy to give the information. It was hard to tell from the weather sequence the position of the weather so at that point I cancelled the last flight. There seems to be a problem getting information from the National Weather Service to the aviation community. In this case the new severe weather regulation didn't and couldn't help as there was a scarcity of information.

* * *

I tried to obtain a weather briefing from the XXXX Weather Bureau for a flight to Mankato, Minnesota.

The weather was marginal with thunderstorms reported. The only information I could obtain from the briefer was last hour reports and a written forecast for the area. When asked for radar report and convective outlooks all we were told was that there were thunderstorms over the whole area.

When pressed for more information, I was told that they had weather reports to get out for the radio and television stations and didn't have any more time to talk to me.

This has happened many times in the past and most of the information you get you have to almost beg out of them.

The problem lies in the fact that some of the briefers are not knowledgeable in aviation weather and also only one man is on duty at night.

I advise my students not to call the XXXX Weather Bureau for a weather briefing. As a flight instructor I get a very poor briefing from them, most of the time.

* * *

I was pilot in command of an airplane operating IFR between the New York Metropolitan area and the Washington D.C. area. At approximately 0830 local, I called the flight service station and received a weather briefing which indicated that I would be flying into an area of light rain showers as I approached the Washington, D.C. area. They did not indicate that any airmets or sigmets existed for my route of flight. I decided to file an IFR flight plan which I did at 11:30 A.M. (approximately). At that time I asked for and received a weather update. I also filed for a route-of-flight that would have taken me along the coastline, rather than inland. (I filed direct to JFK VOR V-16 Kenton VOR V-44 Balto direct IAD). When I received my clearance, it was for RV direct Solberg, V-30 East Texas, V-39 Lancaster V-1435 Westminister RV direct IAD). At issue is the fact that I departed within 5 minutes of my proposed departure time (1 P.M. local) and from East Texas VOR south into the Dulles area I encountered unforecast turbulence, rain, and just God-awful conditions. At 6,000 ft on the gauges, near Baltine I tuned in Dulles ATIS, which said that a sigmet was in effect for "moderate to severe icing above 4,000 ft in the Dulles area, (I was told by the FSS that the freezing level was 8,000-9,000 ft in the D.C. area) and that moderate, occasionally severe turbulence existed below 4,000 ft within 100 miles east of the mountains." What a choice. I landed uneventfully at the Dulles Airport at about 3:15 P.M.; the sigmet was issued, I found out later, about 1:30 P.M. How come no one advised me of the deteriorating weather conditions during my 2 hour, 40 minute trip? Once I found out that a sigmet existed for my route of flight, I had strong second thoughts about flying that day.

* * *

New captain in the left seat and the chief pilot was in the right seat. The flight was predicted to be rough most of the way. Actually the flight was smooth until a few minutes prior to descent. Weather at our destination was -X 5 @ 1 R - 1005 (wind) 1 hour prior to our takeoff. The forecast was for 1,500 ft, 1½ miles and overcast to broken. Indications were that the weather had moved out as predicted until descent. The descent was started late because of turbulence. Upon questioning, ATC indicated a few cells on descent. We were unable to descend to the 30 mile arc at 10,000 as requested. Approach control asked if we could make the 25 mile arc at 10,000 ft. As we hurriedly began to setup for what we assumed would be a runway 4 approach, we were told by the flight engineer that the ATIS was giving 1,900 ft BKN 3400 OVC 1½ miles R- Wind 130 at 17 landing runway 13, using the ILS localizer back course. The chart was compared by the two pilots during seven heading changes, one lightning strike, and light hail and turbulence. Because runway 13 is reasonably short and this aircraft is quite heavy (reference 138 knots) I questioned its use. The chief pilot in the right seat had the winds confirmed now at 120 at 12 knots. The approach was continued. We had no more information provided. The ATCT asked if we had the field in sight as we approached MDA. Heavy rain began and I suggested a go-around. The chief pilot stated we had some time left to MAP. We maintained MDA for about 20 more seconds.

"Runway in sight" and I saw the runway lights. VASI showed us high. The power was reduced. "You are high, do you see the VASI?" The power was reduced even more and just as the nose was being raised we received a short GPWS signal.

Airspeed picked up in descent was swapped for altitude and the airplane touched down 12 knots over reference, right in the center of the runway. Visibility at time of touchdown was down to the minimum in very heavy rain.

About halfway down the runway it became apparent the reversers were not going to be effective. Heavy braking and continued pulling by both pilots on the reverse levers finally began to decelerate the airplane a little. As the reversers came in full, the airplane was into 100% release on the anti-skid system. We had no brakes at all and the airplane began to yaw left and slip to the right of the runway. We tried coming out of reverse a little for regaining control but the airplane continued its slide. About this time the tower said "Previous aircraft have reported the last half of runway 13 braking action as nil." The chief pilot said, "Too late we are off the runway."

Once I realized that the airplane was off the runway I kicked right rudder to relieve the side loads. The airplane straightened up, slowed, and came under control so I reentered the runway and stopped the airplane about 800 ft from the end. Oddly enough, the airplane felt normal. We checked everything over and tested the taxiing very slowly. Everything appeared normal. We decided to continue taxiing slowly and stop if any abnormalities appeared. None did, so we taxied to the gate. Our only problem was poor visibility from very heavy rain. We had to ask for steers while we taxied.

Luckily the airplane was not damaged. We also were lucky enough to miss the runway lights. One tire was cut slightly and the No. 2 engine may have received FOD from the heavy reverse. Otherwise the airplane was OK.

Our destination city was reported to be in a flash flood watch just minutes after our arrival. The chief tower operator stated that when the wind was stated to be 120 at 12, actually they observed "090 degrees to 120 degrees varying rapidly 12-15 knots." Immediately after our incident, runway 4 approaches were utilized and the wind was stated to be 090° at 12 knots.

We were lucky. This approach should never have been attempted in these conditions. Too bad we didn't know what the conditions were.

The following comments were received from the Director, Aviation Affairs, NOAA. They are included here because they explain certain of the problems brought up in the previous reports.

"This office and the NWS have reviewed the draft report.

"Undoubtedly there have been instances such as those cited where National Weather Service personnel have been less than cooperative. Unfortunately, unless specifics are made known and written complaints reach us, we are unable to judge the circumstances.

"With regard to use of NWS radar, it must be understood the *primary* purpose is to provide information for all users concerning severe weather which may pose a threat to life and/or property. To quote our instructions to field offices, 'The NWS

has no greater statutory responsibility than preparing and distributing forecasts and warnings of impending severe weather. There may be times when all types of routine work may have to be temporarily suspended so that a warning, watch, or urgent statement can be distributed rapidly to the public and public officials in and near threatened areas.' The radar scope in a NWS office will *normally* be inaccessible to the individual during periods when severe weather is observed. In most instances only one operator is on duty and he cannot take time to explain the situation or relinquish his scope to an interested pilot. For this reason it is usually necessary to deny entry to the radar room.

"As for the statements regarding the 'Weather Bureau,' there are times when a qualified aviation briefer may not be on duty. In this case, unqualified personnel are instructed to only read the forecasts and reports as they are received on the teletypewriter circuit. Of course, the manpower situation commented on is a never-ending problem.

"We have an ongoing aviation weather quality control program within the National Weather Service, the purpose of which is to make sure the user receives the best possible products. Unfortunately, we cannot investigate specific incidents which are reported through the ASRS. We shall, of course, continue to instruct our personnel to provide every service possible to the aviation user as well as to the general public"

When their respective operations are confronted with nearby thunderstorm activity, pilots and controllers require a high level of cooperation and coordination to prevent encounters with the exigencies of severe storm penetrations. The following pilot reports describe a few of those encounters and raise related issues:

Upon arriving in the Chicago area we were given a hold south of Chicago Heights on Victor 7. As we approached the area we could see large, building cumulus to the west and were just inquiring as to their intensity and the possibility of holding further to the east or possibly flying around the south side of the activity and holding to the southwest in the Joliet area when we were given a vector.

The heading of 360° appeared to be a good vector to hold us well to the east of the weather. Also, since the ATIS was advertising runway 14L and 14R we assumed we were about to be vectored due north over the Lake and then on to a left base for runway 14L.

Upon reaching the southern shore of Lake Michigan we were given a new heading of 270. Since our radar confirmed a hole in the activity at this point we complied. After completing the turn we asked and were informed that the new runway was 9R. We then asked how many aircraft were ahead of us and were told eight for runway 9R.

By the time all of this information was gathered by my crew we were well committed into the area of increasing thunderstorm activity. As the area intensified, we asked for repeated deviations, altitude changes, and speed reductions. Most of our requests were denied because of traffic. The area was saturated with both

thunderstorms and aircraft. At one point I considered mandating a turn to the southwest to avoid cell activity with a declaration of emergency if necessary but decided against it because I felt this could create a greater traffic hazard.

Finally we were turned on base for an approach and it was at that point that we encountered wind shear to the degree that I had to apply takeoff power on all three engines to maintain flying speed. We encountered hail, heavy rain, and turbulence during the approach but found the airport itself in moderate rain only.

It is my opinion that when thunderstorm activity approaches a high-density airport, arrivals should be ceased, aircraft informed better and, finally, when approaches are resumed, flexibility allowed for.

Approach control should reduce the number of aircraft so that pilots can be accommodated when they need deviations. Above all, ATC should not let the area become saturated with aircraft.

Upon landing I complained to Approach Control but found them very unsympathetic and resigned to the situation as it was.

If this type of situation is allowed to continue there will be more wind shear landing type accidents in the future.

* * *

On departure I was unable to obtain requested vectors or altitudes to avoid thunderstorm activity north of the airport. I first requested an altitude of 5,000 ft and was told this was impossible due to traffic. We were given a heading of 80° which directed us toward the heavy cell activity. I requested a vector of 120° and was told this was impossible and would not be necessary due to the fact that aircraft ahead of us were encountering only moderate turbulence and rain. Climbing through 16,000 ft, we encountered moderate to severe turbulence and hail. I then turned to 120° and kept heading until we were out of the heavy storm activity. I had decided to make a complete 180° turn if the hail and turbulence continued.

I could not believe the hostility and lack of cooperation we received in a situation where we needed it so badly. One remark the controller made either to me or to a flight ahead of me when he was told our radar showed heavy rain cells was: "That really doesn't worry me." This lack of concern almost caused a disaster. Had I not briefed the flight attendants to remain seated and had the seat belt and no smoking signs been off, someone would most certainly have been injured. If the hail or turbulence been much greater in intensity we could have had aircraft damage.

My feeling is that an air traffic control system that makes no allowance for thunderstorm activity is just unworkable. Such a situation just cannot exist if flights are to be conducted safely. My flight and passengers were subjected to unnecessary danger. There is nothing about any thunderstorm of any intensity that there is nothing to worry about.

* * *

We were returning from a training flight. Instructor and two first officer trainees aboard. Weather briefings indicated squall-line activity in the area; however, no significant turbulence encountered until midpoint on the ILS. Previous aircraft had reported "moderate or possible severe" wind shear on final. Tower stated that a "hook cloud" was reported 5 miles SW of airport but did not make subsequent reports of the cloud's movement. Traffic was heavy, controllers busy, 20-mile downwind leg. We intercepted the glide slope at 2,800 ft MSL, in and out of clouds, strong south wind requiring a 20° correction to the left. Approximately 1 mile MSL (600 ft AGL) encountered strong updraft and north wind which pushed south of centerline. Aircraft was also pushed off top of glide slope (full deflection) with power at idle, airspeed increasing from 140 to 160 KIAS, nose slightly above rate of climb approximately 700 fpm.

Weather was very turbulent, control difficult, heavy rain, very dark. We attempted to keep from climbing further by maintaining idle power and forward controls. Downdraft encountered while in this condition. As aircraft went through 1,400-1,500 ft MSL, first officer called 3500 fpm rate of descent. PIC added power, recovered above the trees just outside the airport boundary and slightly south of centerline. Altimeter read 1,100 ft MSL (less than 100 ft AGL) at bottom out. Subsequent ILS and landing uneventful as cell moved northeast. The aircraft encountered this shear as a tornado touched down in the very near vicinity. Numerous other aircraft also missed the approach due to wind shear.

Questions: When are we going to get some real-time quantified information on wind shear? Why does approach control vector airplanes into a storm cell when a tornado is suspected? (Incidentally, an emergency weather warning was issued on commercial radio during my approach — why is this information not available to pilots?) What do conditions have to be to warrant a controller looking at a storm cell and saying, "I'm not sending an airplane through that"? I understand that this burden is conveniently placed on the PIC — who does not know whether it is just heavy rain or actually a severe and hazardous weather phenomenon. How are pilots to be informed when weather conditions suddenly become severe enough to endanger the airplane? How can we get away from the practice of shooting the approach based on the fact that the airplane ahead shot it?

* * *

We were proceeding direct to the ABC VOR on a heading of about 180°. There was a line of thunderstorms in the area of the VOR and the airport, or just north of the airport. About 20 minutes before landing the second officer got the latest weather; it was 2.5 miles visibility, thunderstorms, and the wind was 310/10, we looked at the 36L approach plate. I did not see the small print in the right center of the approach plate. There is no ATIS.

As we got closer to the VOR and the line of thunderstorms, the line seemed to fill in and be intensifying and was in the shape of a horseshoe with us in the center. I asked the ARTCC for the lowest available altitude and he assigned us 6,000 ft. Then approach control assigned us 2,000 ft when we changed to them.

We were level at 2,000 ft and the controller told us to turn right to (I believe) 210°. I looked at the radar and told the controller that I would have to go through the line of thunderstorms, but 210° looked the worst and I asked if I could head 180° for about 5 or 6 minutes then turn left to about 150°. He said that was approved. As we were going through the line the first officer told the controller we were turning southeast. We continued on the southeast heading for a few minutes, and the controller asked if we saw the towers at twelve o'clock. We looked up and saw the towers through the rain at our immediate left front. Both the first officer and I pulled back on the yoke and climbed to 2,500 ft. After passing the tower we broke out of the rain, descended back down to 2,000 ft, and were vectored for a visual approach to 18R.

Even though coming that close to the towers is unsafe, I believe Approach Control was doing a fine job with heavy weather and quite a bit of traffic, and almost every airplane wanted the lowest possible altitude both in and out of our destination airport.

Contributing factors:

1. Too small print on the approach plate for an obstacle that size, especially when the crew is very busy.
2. Late warning by Approach Control of entry into an area below minimum altitude.
3. ATIS would have been helpful to tell us the latest weather and runway.

Pilots have the option of not exposing their aircraft to the possible hazards of continued flight into thunderstorm activity. The following reports provide a look at four cases where the pilot in command exercised that option and used the authority to avoid or lessen possible problems.

This incident took place on V-789, 20 miles east of XYZ VOR at 7,000 ft. We were westbound on V-789, cleared to descend to 8,000 ft and on approach control frequency. The aircraft radar was painting numerous thunderstorms. Approach control put us on a heading of 270° and cleared us to 6,000 ft. The aircraft radar painted a cell at our 12 o'clock and 6 miles ahead. I requested a 15° turn to the right to avoid the cell. The controller said to maintain the 270° heading. Again the request was made; the controller said to maintain 270° and switch frequency. We hit the cell and took a lightning strike. The controller then gave us a left turn to 120°. That heading would have put us into more cells, so I requested a left turn to 200°. Request was granted, then a heading of 180° was approved and we continued our approach to a normal landing.

* * *

While climbing out of ABC on a jet airway there were scattered thunderstorms in the area. We went to the left about 3 miles to get around a thunderstorm that was

on and to the right of centerline of the airway. As we were approaching abeam of the thunderstorm, heading 230°, the ARTCC told us to turn right heading 240° to avoid entering a restricted area. Any right turn would have put us in the thunderstorm. I told him I would take my chances in the restricted area rather than going through the thunderstorm. Within 2 minutes we were by the storm and returning to course. The Center then gave us a heading of 260° when able, which we complied with.

* * *

On descent into XYZ, the ARTCC told us to descend to FL280. We could not because of severe thunderstorms which we were topping at FL310. ATC insisted after I asked for a delay because of the weather. It was necessary to use my emergency authority not to descend until we were beyond the thunderstorm.

This type of air traffic control is ridiculous, to insist on a descent into severe weather; then to have to write all these reports to protect yourself when all you are doing is a professional job correctly.

* * *

The weather was a fast moving cold front moving northeast along a line from approximately western Virginia through eastern Georgia. We were dispatched from Point A to Point D, with intermediate stops at Points B and C subject to landing limits. All the stops on our proposed route of flight to Point D were below limits when we left Point A, with the exception of Point D which had 200 ft and one-half mile visibility with no temperature/dew point spread. The alternate for Point D was Point E (200 miles away). I questioned the reasoning for even conducting the flight to begin with. Dispatch was determined not to cancel the flight, however. We encountered severe turbulence on the regular route; I altered course, bypassing Points B and C and heading direct to Point D. We encountered severe turbulence several times enroute and 90 knot tailwinds. I encountered severe turbulence and windshear on approach into Point D. Executed a missed approach at Point D and diverted to Point F. I cancelled the flight; these flight conditions were unsafe and the flight should never have been dispatched to begin with.

While the ultimate authority for safe aircraft operation rightfully rests with the pilot in command, the sophistication and complexity of the national aviation system creates a condition of interdependency among all the system's participants; the severe weather reports cited above highlight the need for cooperation and coordination among all parties responsible for safe flight operation.

Wake Turbulence and Jetwash

Reports received by the ASRS program indicate that wake turbulence remains a significant problem requiring consideration by controllers and pilots alike. In addition to the issue of wake turbulence, other reports are making a strong case for consideration of "jetwash" as a very real

problem in the airport environment. This section sets forth an array of examples dealing with both wake turbulence and jetwash. Most of the reports in this section involve heavy or wide-body transport category aircraft. The purpose of this is twofold; (1) to remind the aviation community that wake turbulence and jetwash are considerations for all sizes of aircraft, and (2) if these conditions can be problems for heavy aircraft, they are surely issues for consideration by those who fly or provide traffic control and assistance to light aircraft.

The first report illustrates that even wide-body aircraft are not immune from wake turbulence problems:

A wide-body military transport aircraft was cleared for takeoff on runway 8R. An air carrier wide-body transport aircraft had just passed over runway 8R while landing on runway 4R. Approximately 3,500 ft into the military aircraft's takeoff roll at 100 knots (rotation speed, 118 knots) the aircraft pitched up 2° to 3°, rolled right approximately 5°, and had a 5° to 10° heading change to the right.

The aircraft was returned to a normal attitude immediately and the takeoff was aborted. Flight controls and brakes were checked and found to be operating normally. The aircraft made a takeoff later that day without incident. The control loss occurred at approximately the predicted location of the right wing tip vortex from the civilian wide-body transport which had passed overhead less than 1 minute previously. It appears that due to the light wind conditions (340° at 3 knots) and the short interval (less than 1 minute), the vortex from the right wing of the slow, dirty, civilian wide-body turbojet persisted at a high enough velocity to involve the large T-tail of the military wide-body turbojet and caused the momentary loss of control.

The next two reports describe a second type of wake turbulence problem and are more specific about the circumstances surrounding the occurrences:

Our flight (a standard-body turbojet) was scheduled between ABC and XYZ; a slow down and holding was required by Center to aid "flow control" into airport. After holding for approximately 25 minutes and burning an additional 2,000 lb of fuel the flight was cleared for a runway 26 approach. The aircraft was vectored to intercept the runway 26L ILS. Approach control requested 160-170 knots to the LOM at which time we were told our traffic was aircraft B (a wide-body turbojet) 5 miles ahead. We were able to pick out aircraft B's strobes, reported such, and were told to switch to the tower at LOM. Upon reaching the LOM we switched to the tower and were instructed to continue the approach. Runway became marginally visible at approximately 6 n. mi. out. About 3-4 miles from touchdown the tower cleared us to land and informed us the aircraft we were following had "gone around." Holding a plus 25+5 knots on final for possible turbulence at approximately 200 ft AGL we encountered strong horizontal wake turbulence and it lasted until landing. In our judgment the turbulence wasn't extreme enough to warrant a go-around but it was certainly uncomfortable. This turbulence information was passed to the tower and an in-depth description was given to ground control. We eventually determined we had been following a wide-body turbojet trainer that had been cleared by the tower for the option (i.e., land or go around). We believe

this information should have been passed on by the tower and certainly greater separation was called for.

* * *

The pilot of a light twin-engined aircraft reports that:

Several times each week I encounter what I consider dangerous situations in and around XXX airport. XXX is a favorite airport for pilot training in air carrier and military jets (heavy). I certainly don't mind following this type of traffic as long as the heavy makes a touch and go or full stop. I'm getting a little tired of going around or making 360's on final, allowing the wake to subside. I fly passengers several times each day on a scheduled basis. To allow for a safe smooth approach, I think when the pattern is busy, these heavies should make full stops or touch and goes. Low approaches are dangerous for the guy following.

Two other reports discuss potential wake turbulence problems that did not occur, possibly because the pilots chose an alternative course of action.

The tower cleared our light twin-engine aircraft for an intersection takeoff on runway 33 approximately 30 seconds after a twin-engine, turbojet, transport aircraft on the same runway passed the same intersection on takeoff roll without having rotated. No wake turbulence caution was issued by the tower although we were aware of the possible danger and accepted responsibility for wake avoidance (however, we made no communication indicating this to the tower). The tower volunteered no wind information when issuing the takeoff clearance and we had to request a wind check in order to better visualize the wake turbulence condition. The wind was given as: 300 at 15 knots. We elected to remain to the left of the runway centerline during the takeoff and climbout. When told to contact Department Control we did so and on initial call-up requested a left turn on course (in consideration of the wake hazard), although a right turn would have been more appropriate to our east-bound course.

Departure Control instructed us to turn right on course. I repeated my request for a left turn and Departure denied it again, citing traffic on left downwind to runway 33 as the reason and instructed me to turn right. I rejected the right turn, citing wake turbulence and Departure cleared us for a straight out departure (following directly in the path of the departing jet!). We then terminated the radar service, contacted the tower again (we were still within the airport traffic area), requested a left downwind departure which was approved as requested and the flight continued uneventfully to its destination.

Conclusions:

1. A less experienced flight crew might have accepted the takeoff clearance without question and could have been caught in the wake turbulence on takeoff or subsequently vectored into it.

2. The apparent intransigence of the departure controller and/or the departure control procedures led to the necessity of terminating the radar service, which totally defeated the intended purpose of the TRSA.

Recommendations:

1. Utilize established procedures for issuing wake turbulence cautions.
2. Issue wind advisories together with takeoff clearances as a matter of course when potential wake turbulence hazards are factors in the takeoff.
3. Approach and departure controllers should be more willing to accede to the wishes of the pilot in command and be more willing to give him credit for being at least as aware of the traffic situation as it affects his aircraft as the controller is.

* * *

Aircraft A (a standard-body turbojet) was beginning a flight from ABC to XYZ, and was in a long line of heavy aircraft awaiting departure. The departure interval between several heavy aircraft was running approximately 30 seconds. Aircraft B (a heavy wide-bodied turbojet) departed immediately prior to us (aircraft A) and having noted the previous intervals, our clocks were started. Aircraft A was cleared onto runway 31L and 40 seconds after the departure of the heavy was cleared for takeoff. The crew informed the tower that only 40 seconds had elapsed between our takeoff clearance and the heavy aircraft B and only a little over a minute after another heavy. The crew requested the 2-minute or 5-mile spacing required since we were not a heavy aircraft type. The tower then ordered us off the runway. When the crew inquired as to why, tower came back and told us that we were holding up the traffic flow. We began to clear the runway while continuing to question this. At this time the voice of another controller came on the air and told us that we were a radar departure and did not require the 2-minute or 5-mile separation. By this time, the 2 minutes had elapsed and our flight departed.

The terminology of a "radar departure" in reference to spacing for takeoff between heavy jets and standard jets was new to us. I had never heard it before. If they were attempting to tell us that radar showed a 5-mile separation, it still is incomprehensible since I do not see how a transport aircraft can accelerate to a speed which would give a 5-mile separation in 40 seconds, and at the same time not exceed the speed limits in a control zone and beneath the floor of a TCA.

We believe that the tower, in an effort to expedite the departure flow, was simply getting aircraft off without regard to type or weight, and they resented our attempts at conducting what we thought was a safe operation under current standards for separation.

However, in the final analysis, the tower either wittingly or unwittingly was conducting a potentially hazardous operation in spite of regulations governing this.

Since this has happened several times recently, I decided that the matter needed some attention before precedent set in and possibly caused an incident or accident.

As noted in the introduction to this section reports of "jetwash" are a common enough occurrence to warrant attention from the ASRS and the aviation community. The following reports exemplify "jetwash" problems:

I was on final approach for landing on runway 27 at ABC. A heavy, wide-bodied turbojet transport was in position on runway 32 for takeoff. The "heavy" was cleared for takeoff, while we were on short final, (about 250 ft above the field). I maintained extra speed, and remained higher-than-normal glide path (landing long) in attempt to stay above the expected jetwash. However, in spite of the high approach path, my aircraft was subjected to considerable jetwash from the No. 2 engine of the wide-body transport. I landed long with a normal roll-out.

This could have been avoided by the tower allowing a greater spacing of aircraft when this combination of runways is in use. In the future, I shall refuse to land on 27 if a wide-body aircraft has just passed 27 on 32 takeoff. I will take the penalty of making a go-around, as this is not a safe operation.

Upon landing, this problem was discussed with ATC personnel. The tower watch supervisor said their procedures approve such operations and they are told that "wake turbulence" isn't generated by aircraft on the ground. As the pilot of an aircraft that experienced the problem, I want to stress that I am talking about *jet wash*, and *not* wake turbulence.

* * *

The standard-body turbojet transport had cleared the runway at taxiway "X" and stopped with its tail to runway 9R. As the corporate-type turbojet passed in the vicinity of taxiway "X" on the landing roll (at approximately 90 knots) the left wing pitched up and the aircraft yawed to the left. Tower personnel reported seeing sparks coming from the vicinity of the small turbojet aircraft at this time. Aircraft control was regained and the pilot attempted to stop on the remaining runway. Braking action at the end of the runway was poor due to the rubber deposits on the runway surface. The pilot elected to accomplish a high speed turnoff (approximately 50 knots) onto the last available taxiway, since there were no runway remaining markers available. The aircraft skidded onto the taxiway and came to rest on the taxiway centerline 90° to the taxiway heading (and 180° from the landing runway heading). Postflight inspection revealed complete tread separation from both main tires, and skid damage to the right wingtip, fuel vent valve, and right outboard leading edge panel. All parts except the leading edge panel required replacement. The preliminary report indicates that the turbojet transport was cleared to cross the adjacent runway (9L) 20 seconds prior to the tower personnel noticing the sparks coming from the small turbojet. Exact cause of the mishap cannot be determined; the most probable cause of loss of directional control which led to the mishap was jet blast from the taxiing turbojet transport.

Pilot and Controller Performance

The final section of this sampling of ASRS reports provides a look at "deviations" in the performance of pilots and controllers. One of the most interesting by-products of a confidential reporting system is the continued confirmation that we all make mistakes; furthermore, most people have learned to benefit from their own errors and from those of others. As the following reports reflect, it can be quite productive to put into writing a description of an occurrence and the probable reasons why it happened.

One of the more frequent categories of performance deviations is that of altitude errors. The following examples address two such situations:

The flight was cleared from 33,000 to cross 25 DME southwest of XXXXX intersection at 15,000. As the pilot flying, I mistook the altitude as 25,000. The first officer put 15,000 in the altitude reminder. At about 9 miles from the 25-mile fix the center asked if we would make the restriction. I said yes and the first officer told the center yes. We were out of 26,000 for 25,000 in my mind. There was no way I could make the 15,000/25 DME and take the airplane along. We had to get a vector and descended as rapidly as possible.

I asked my first officer why he didn't correct me or call the altitude to my attention. He said he didn't like to mention such things and thought I could possibly make it.

I feel I confused the 25 DME with altitude. Possibly a name on a much used fix could prevent this.

* * *

The aircraft was on an IFR flight from east of Kimberly, Oregon to Olympia, Washington. This route put the aircraft's flight path over Mt. Hood, OR, which has an elevation of 11,245 ft MSL, with a minimum vectoring altitude of 13,500 MSL. The aircraft was supposed to be squawking 1100 on his transponder but was actually on 1700. We did not pick up the aircraft on radar, because of the wrong code, until west of Mt. Hood, almost to Portland. Sector X then, having had the aircraft finally squawk 1100, identified the aircraft and handed it off to sector Y. When the aircraft checked in on sector Y's frequency, the aircraft reported level at 12,000 MSL. This was challenged by the radar man, and the pilot reaffirmed at 12,000. When asked where he received clearance to 12,000, the pilot said 35 n.mi. west of Kimberly, Oregon. The radar man on section X did not recall, and was positive, in fact, that he did not descend the aircraft to 12,000. The aircraft had flown from 35 n.mi. west of Kimberly to 20 n.mi. east of the PDX VORTAC, west of Mt. Hood, at 12,000, with all the controllers involved believing he was at 14,000. There was no conflict with known traffic at 12,000, although there could have easily been, but at the very least the aircraft flew in extremely close proximity to Mt. Hood which could have precipitated a disaster if he had been exactly on course for the summit instead of to the north of it.

If the narrowband radar had been operational, we would have seen the mode C altitude of 12,000 and this incident would not have happened as it did. The pilot, of course, copied someone else's clearance to 12,000 and precipitated the incident.

Holding pattern operations can provide an environment for deviations. As with most other errors, the reasons for holding pattern deviations tend to be cumulative:

We were IFR to ORD. Center advised us at RFD to hold northwest of the Farmm intersection on V-100 to maintain 7,000. We read back the clearance and he acknowledged. We were working off the low altitude chart. There is no hold pattern depicted at Farmm. Center became very busy and we were finally handed off to Approach about 1 mile before Farmm. We checked in but Approach was also very busy and it seemed some time before he acknowledged us. When he did tell us to ident he informed us we were holding the wrong way and to hold as depicted. We immediately got out the Area Chart and found the holding pattern. We made one turn around and were sequenced for the approach.

The holding pattern as depicted on the Area Chart has nothing to do with Victor 100. In fact it does not occur on any airways. We read the clearance as to hold northwest of Farmm on Victor 100; Center acknowledged. The pattern is also a left-hand pattern — no mention was made of nonstandard. It was Approach who finally said "as depicted." We were VFR on top so we could watch for traffic. I think it would have been a different story if it was solid IFR as all the westbounds in the area were holding at Farmm.

I think it was a little of ATC's and the crew's fault. It was ATC's in that they did not clarify. And it was the crew's for not having out the Area Chart. Also if you would notice the Chicago Area Chart there are quite a few holding patterns not on the inbound airways. Maybe they could be included on the low altitude chart. When going into ORD, one has to have out all the plates and with the constant double checking of the ATIS, getting out the right plate and working radios it's very easy to just work off the low altitude chart.

* * *

We were eastbound on J56 to DEN via Drako. As we were intercepting the Kiowa 305 radial, ATC gave us a hold at Benam-northwest with right turns—20 mile legs. With only an instant to check the chart it told us that Benam was 88 DME which was our position. Because of the easterly heading, the holding pattern required was a turn to parallel outbound on the nonholding side. We turned left to 305°; after a closer look at the chart when everything had settled down we found that we had turned at Esters intersection — not Benam. We continued turning left and intercepted the 305 radial without being the full 20 miles from Benam — within the confines allotted us. The Center questioned our flight path. We had been trapped by three things.

1. The late improper issuance of a hold fix when we were on top of it at 340 knots

2. By the few seconds allotted to check the chart and react to the instructions
3. And the unintelligible, confused mass of fixes, airways, headings, and small print mileages within the immediate confines of Benam intersection.

* * *

This flight was on a round robin instrument training flight. About 20 miles from ABC the pilot (working on instrument rating) called Center for an ILS to ABC with a missed approach to DEF. Center cleared the flight to 7,000 ft (which the pilot acknowledged) and advised of a 10-minute delay for three preceding aircraft. Center instructed the flight to "... hold at ATLOW intersection." The pilot, another private pilot in the back seat observing (also an instrument rating candidate), and I tried to find ATLOW on the enroute chart to no avail. At this time we understood Center to clear the flight to 4,000 ft and the pilot responded "... leaving seven for four." We received no contradictory information and started descent to 4,000 ft. We subsequently found the ATLOW intersection on the ILS Approach Chart and having passed the intersection, turned to the outbound heading of 306°—which was incorrect. I noted at this time that the flag on the No. 2 VOR was 'OFF' but that the needle was indicating. We were at all times VFR conditions and looking. I studied the intersection instructions and reset the No. 1 VOR to the ALW R-357 (i.e., OBS to 177) and instructed the pilot to reverse course and track inbound. I then reset the No. 2 VOR to PSC OBS 058 to determine the intersection.

At this time Center advised that we had flown outside the holding airspace. I asked for a vector to the intersection and was informed that the aircraft was 4 miles northwest of the intersection. This instruction was followed by instructions to proceed to and hold at Dexxy (LOM) at 5,500 ft. The pilot started to climb and I instructed him to call Center and ask if he wanted us to climb. At this time we were informed that we should have been at 7,000 ft holding ATLOW. We continued to and held at Dexxy (LOM) and were cleared for the ILS with further instructions to land at ABC (not on the flight plan) and call Center on the commercial telephone, collect. We landed and called from the FSS and were again instructed to use the commercial lines. I called and talked to the team chief. We discussed the incident with the revelation that we were believed to have flown through another flight holding ATLOW at 5,000 ft. Since we were both looking, I believe that this did not, in fact, happen. I believe that we probably flew through the airspace, or near the airspace reserved for the other aircraft. This is, of course, somewhat academic. Had we been in IFR conditions, aircraft proximity would have been a guess. . .

It occurs to me that I, particularly, was not staying ahead of the flight, and did not anticipate the intersection holding, but rather anticipated holding at the VOR. The fact that the intersection was not on the enroute chart took me by surprise and I wasted perhaps a minute or two finding it on the approach chart. Since there was no published pattern, the pilot, in the absence of other instructions started a standard holding pattern but mistook the 126° for the inbound holding track and also the 064° radial from PSC as forming the intersection. The 058 radial is not shown on

the approach plate, but is printed below the ATLOW INT (IAF). That little group of numbers is pretty busy, and I can easily see the confusion there. As for the altitude change, we were in no hurry and had absolutely no reason to descend to 4,000 ft without ATC instructions. We believed that we had received these instructions and had acknowledged them. A more thorough preflight study of the approach plate may have prevented the holding infraction.

The next reports provide examples of instances when variability in controller performance can result in less than desirable situations:

The aircraft (82D) was inbound to the ABC VOR with a destination of ABC. The ARTS tag on this aircraft had dropped off the target and subsequently out of the system due to a weak beacon return. The controller working this aircraft was manually and mentally tracking this aircraft without benefit of automation tags.

At 0755 I relieved the EAST HIGH controller. He briefed me on the aircraft that he was working without mentioning 82D. The only strips and/or ARTS tags agreed with what he told me so I assumed I had a complete briefing. Shortly thereafter I remember seeing a transponder equipped aircraft tracking southwest-bound approximately 20 miles northeast of Metro. However, I did not give it much thought beyond that.

At 0815 82D requested to "start down." I immediately started trying to remember 82D to no avail. I told 82D that I did not have him in radar contact and simultaneously found an inbound strip to ABC on another position. I asked 82D for a DME position report and the pilot responded 7 miles NE of ABC VOR. I saw a target on the radar display at that position and issued a turn-away from the ABC airport in the event there was IFR traffic in that vicinity. Simultaneously the radar hand-off position stopped departures off Metro International.

I then tagged 82D. The radar hand-off position had then obtained approval from the WEST HIGH controller for 82D to enter his airspace. I issued the heading and altitude requested by the receiving controller and transferred the aircraft to that controller. The aircraft received normal IFR handling from that point and landed at ABC.

The controller on the radar hand-off position had taken the position about the same time that I had and he did not know about 82D until I did.

82D transitioned airspace controlled by another controller without his knowledge or approval. He was also in airspace jointly owned by EAST HIGH and WEST HIGH without WEST HIGH's approval. This airspace is reserved for Metro International departures only. Any one else in this airspace must be jointly coordinated between EAST and WEST HIGH in advance.

This deviation was caused by the relieved controller failing to adequately brief his relief.

* * *

Thunderstorms in the Metro area had aircraft deviating off-course to arrive and depart the Metro area. Aircraft were using the same opening in the thunderstorm line northwest of Metro to arrive and depart. Radar beacons were intermittent to nonexistent (officially logged out on FAA 7230-4 at 1030); noise level was extremely high. Metro tower repeatedly calling for IFR releases. All requests from Metro tower blast out non-discretely on every speaker in the radar room. Radar west had the responsibility of releasing IFR aircraft from both Metro and military airports. Radar west hand-off position was not staffed. I received the strip and I must have nodded my head to accept hand-off on aircraft B at 1514. I don't remember seeing a particular target. At 1515 I released aircraft A off of runway 12R at Metro airport after telling the tower to have patience and hold down their persistent yelling for releases. B's route of flight was ABC V77 TTT. A's route of flight was Metro 289° outbound to BBB. At 1517, B called me at same time I handed-off aircraft C in the Blue corridor outbound instead of White corridor because of weather to Center. I had already coordinated this route for C with Center. C was level at 10,000 requesting 13,000. Center told me to leave him at 10,000. Aircraft D and aircraft E were inbound in the Blue corridor, descending to 11,000. I changed C to Center 10 miles southwest of XYZ at 10,000. At 1517, Metro tower called the airport boundary on A and I acknowledged. Center called and attempted to explain about D deviating and subsequently handed-off E in the Blue corridor inbound. I told Center that I hadn't seen D and he said he'd call me back. At 1518 A called climbing to 10,000 and I acknowledged. I exchanged traffic information between aircraft F and A. E called me level at 9,000. I queried him again on the altitude of 9,000 before approving further descent, due to C at 10,000. E was deviating around the weather and should have been at 11,000. At 1519 I turned A to heading three zero zero and advised him of the weather area. I advised him of two targets in that general area. Neither target had a beacon. A third target was already behind A, also no beacon. At 1520, A advised me that the traffic was at 6,000 and A was starting his turn to 300°. I realized one of the targets was B at 6,000. At 1521 I handed-off A to Center. I handed-off the nonbeacon target just northeast of XXX to Center as B and they took radar on him as if his beacon was working normally. I advised my supervisor of the situation and was relieved. Factors contributing to situation: Inadequate radar beacon equipment, inadequate override system, high noise level over hot-line speakers, no staffing for radar hand-off man, thunderstorms, and frontal passage. Situation occurred because of diversion of attention on controller's part.

* * *

We were making an ILS flight director approach to 27L. Runway 27R was closed for construction. The ILS was identified and rechecked since this airport uses a "flip-flop" ILS for 27L-9R and they had changed runways shortly before our approach.

The approach was normal until approximately 100 ft above minimum. At that time we saw the MALSR approach lights off considerably to the right. A quick

cross-check of the instruments indicated that we were centered on the ILS. By this time we were at minimums where we broke out of the weather and saw the runway straight ahead and made a normal landing. The runway lights and all approach lights for 27R, the closed runway, had been turned on. After landing I commented to ground control that it was a bit of a surprise to pick up the approach lights for a closed runway. He sounded surprised and about 10 seconds later all the lights for 27R were turned off.

We did learn a few lessons from that experience.

1. We were about the third airplane to land on 27L. None of those ahead of us mentioned that the approach lights for 27R were operating.
2. It was tempting to turn towards the approach lights although all of our cockpit instruments indicated otherwise.
3. 27L does not have MALSR.

Sometimes both the pilot and the controller contribute to the situation:

We had landed on runway 4, about 25 minutes prior to the incident about to be reported. The runway was clear and dry with a 10-knot, 90° crosswind. All runway lights and nav aids normal.

We changed aircraft in order to fly back to our home base. However, our new aircraft had an inoperative anti-skid system. Though the wind was from the northwest, favoring runway 31, 6,198 ft long, I elected to request runway 4 which was 9,000 ft long. The aircraft's limitation section showed that runway 31 was only 198 ft longer than absolute minimum for takeoff with anti-skid inoperative.

Engines were started, runway 4 requested, at which point the tower/ground controller (apparently a one-man operation) suggested we use runway 22 which was a shorter taxi.

Shortly before we reached the end of Runway 22 the tower cleared us for take-off. The before takeoff checklist was completed and I turned on the landing lights. I lined up on the white centerline of runway 22 and advanced the throttles to take-off power.

All aircraft parameters looked normal as we accelerated. I concentrated on the runway center alignment but something didn't look right. The runway edge lighting was off. I said nothing and continued the takeoff. An important consideration was that aborting a takeoff with anti-skid inoperative might be dangerous due to exposure to blow-outs.

After we were about 1,000 ft in the air the tower said (paraphrasing), "Pretty dark out there, wasn't it?" My first officer said, "What do you mean?" The tower said, "I got tied up on the telephone and forgot to turn on the switch."

We were then cleared to Center frequency.

In these times of high electrical costs and conservation of resources, runway lights are sometimes turned off. Since I had landed on the runway I planned for the next takeoff, and since the tower cleared me for takeoff on the runway I assumed the lights were on.

The anti-skid inoperative problem compounded my concerns that once the takeoff began, since we were at relatively low gross weight, acceleration would be rapid through V1 and VR and an aborted takeoff somewhat hazardous.

Further, the tower controller apparently was handling a greater than normal workload and was distracted, forgetting to turn on the runway lights.

The contents of ASRS reports reveal that there are many reasons, or at least explanations, why aircraft sometimes do not go where they are expected to go. The following reports provide an array of examples of operations that went astray; additionally, each reporter provides some insight into why the respective excursion occurred.

Our aircraft arrived in ABC and I went into the operations office to check weather and use the restroom. On returning to the aircraft I asked the first officer if we had an ATC clearance. He replied that we did and I asked him what it was. He said "cleared as filed maintain 5,000 expect 11,000 10 minutes after departure." Our flight plans are all Center-stored and I asked him, "How are we filed?" to verify the routing I had on my Center-stored flight plan and his, as filed, was the same as mine, as filed, namely V519 XYZ direct MNO. The departure went normally and we were handed-off to Center No. 1. As I flew the aircraft on the previous routing to 11,000 ft, we crossed the VOR and proceeded on course V519. Approximately 25 n.mi. southeast of the VOR, as we were being handed-off to Center No. 2, Center No. 1 asked, "Are you flying the XYZ 1 arrival?" I answered that we weren't, that it was my understanding we were cleared V519. He said that we were not but that we could work it out with Center No. 2. Hand-off was effected and Center No. 2 turned us to 165° and vectored us to the approach gate for MNO. I again asked the first officer for the clearance that he copied and he said that it was his mistake, that he did not know what XYZ 1 arrival meant; that he checked my approach plates and his, and neither of us had an ABC S.I.D. by that name; so he ignored it but read the clearance back "MNO as filed maintain 5,000, expect 11,000 10 minutes after departure." And that ABC Clearance Delivery accepted the read-back and that he did not think to ask me about XYZ 1 arrival when I returned to the aircraft. I felt like I had been sold down the river by an otherwise very trustworthy, competent first officer. Clearly, he made a serious mistake as I suppose I did in not checking the clearance with clearance delivery. To do so, however, would surely leave your first officer with the feeling that "this guy doesn't trust me," which is now the case. But on the other hand, trust and coordination are definitely necessary for a safe operation. While cross-check is a healthy and worthwhile cockpit activity, it becomes counter productive when one crew member feels "I'm getting a check ride" from the other crew members. For this reason, I probably won't question the next clearance

I get from this or any other first officer, but I'll be uneasy and the nagging fear that he may have miscopied or misunderstood will be in the back of my mind. Many of our days require 14 hours in the cockpit and the physiological needs of crew members necessitate that all are not going to be present in the cockpit at all times.

* * *

The situation occurred when the copilot flew the departure as he had copied and read it back from Clearance Delivery, which was not the manner in which it was intended.

The flight was a scheduled air carrier flight from XYZ to ABC and the stored flight plan route begins with "ZZZ 007R/31 DME. . . ." and continues to destination. In a review of the tower tapes, XYZ Clearance Delivery gave the following verbatim clearance: "Cleared as filed, right turn to 295° vector ZZZ 007 radial, climb and maintain 8,000 ft. . . ." The copilot read the clearance back as "Cleared as filed, with a right turn to 295°, ZZZ 007 radial climb and maintain 8,000 ft. . . ." The read-back missed the essential word "vector."

In other words the controller wanted a 295° heading until picked up for vectors to the 007° radial. But the copilot understood to fly 295° heading and then passing the VOR to fly the 007° radial. The flight was flown in this manner resulting in a premature turn over the VOR, which conflicted with other traffic.

The situation is further complicated with the understanding of Departure Control at nearby NAS, who say the clearance the pilot should receive is a "295° heading for vector to ZZZ 007 R at 31 DME." There was no mention of 31 DME in the clearance the flight crew received.

Further it has been XYZ's departure procedure in the past that this same flight turned over the VOR to fly out the 007 radial. Now, according to XYZ tower, they want the 295° heading until at least 8 DME, when they will vector to the 31 DME to avoid noise sensitive areas.

Suggestions: Use of the word "maintain" in the clearance "right turn to 295°, vector ZZZ 007 radial," so that a new clearance would now read "right turn to 295°, maintain for vector to ZZZ 007 radial." This would provide a back-up indication that Departure Control intends to vector the aircraft. For to miss the single word "vector" in the clearance can change its meaning with disastrous results.

* * *

There are two jet airways that proceed southeast-bound out of SDF VORTAC; J-89 and J-99. I mistakenly tracked outbound on J-99 (the flight plan called for J-89) for about 10 minutes until the Center called our attention to it and a correction was made. To my knowledge, this error did not cause any traffic conflicts and the flight proceeded normally, thanks to an alert controller.

I am reporting this because I believe there are several reasons why this happened that could be corrected, thereby precluding other pilots from making the same mistake.

1. Both these airways proceed out of SDF in the same direction (southeast bound) and have similar numbers: J-89 and J-99.
2. Both have headings (and radials) with similar sounding numbers: 147° and 167°.
3. The inbound reciprocal of J-89 is 347° while the outbound heading on J-99 is 147°.

With such similarities in numbers, the possibility of a "Murphy's Law" trap is high. Because both these airways are used frequently and interchangeably on Chicago to Florida flights, it occurs to me that the following changes might be made to preclude future pilot error in tracking the wrong airway.

1. Change the number of one of the airways so as to distinguish the two very clearly (i.e., get rid of the "9s")
2. Change the outbound radials/hdg by 1° to eliminate the 147°, 347°, and 167° similarities. A 146°, 348°, and 168° situation might indeed help other pilots from making the same mistake I did.

* * *

Our flight was cleared as filed, V-99E Boomy, maintain 7,000 until 16DME, then climb to 17,000. Basically, that was the clearance. The most significant portion being the altitude restriction until established on V-99 east/16DME then climbing to the final cruising altitude.

The flight actually departed XYZ and climbed on the 043 radial of the ABC VOR instead of the 055 radial of the ABC VOR. Center asked for confirmation of the clearance to proceed via V-99E and the actual radial that the flight was on at that moment. We were actually climbing between the two airways. At 11,000, the Center informed us that there was no conflict of traffic, to proceed direct to ZZZ.

After reviewing the incident, we discovered that we got the heading from the V-99E northeast-bound from the EEE VOR instead of northeast-bound from the ABC VOR. Obviously, the flight was in error. However, the circumstances prior to the incident are most important. I am firmly convinced that one thing, by itself, never causes an incident. It is always a series of things that lead up to an incident.

The flight departed Metro airport (heavy airport terminal construction — always a hassle) with a jump seat rider enroute to XYZ. The flight passes through two Center sectors and due to the proximity of the boundary always has a hassle getting

down to the approach altitude (6,000 MSL, or so) early enough to make for a smooth operation. Center No. 1 turns you over to Center No. 2, and then Center No. 2 immediately (or shortly thereafter) turns you over to XYZ Approach Control. Each wants to know where you are, your altitude, etc. As a result, you generally end up high. We did just that on this occasion. Requested a visual approach, and asked to circle to runway 22. The winds were southwest at 3 to 5 knots, and light aircraft were using runway 4. Tower was unable to approve the request to circle. As a result the flight had to circle (270 to the right) to get down and properly lined up for the approach. After landing, the flight had to taxi back down the active runway (due to airport construction and ramp closure) and park on an inactive runway to discharge passenger. As a result of that back taxi, the light airplane traffic had to go around. It would have been a much smoother operation for our flight to circle and land on runway 22. Even the jump seat rider agreed! The point — another hassle. Extended delay on the ground due to the airport construction, crew faced with an extremely short layover in our next stop, a different clearance, with an altitude restriction, and a quick look at the chart — the result, a wrong airway.

I'm not sure what the answer is or should be. Alternate airways always seem to be involved in incidents, never the regular airways. Perhaps it's the charting, or the numbering. V-99E or V-99W vice V-999 or a completely different number. It has been my experience (19 years with a scheduled air carrier and 22 years with the military) that this type of thing always happens with an alternate airway and numerous other distractions. There must be an answer. Some key to preclude it or alert the crew.

* * *

Two aircraft were chartered out of Metro to pick up passengers at ABC. I was going directly to ABC. The other aircraft was making a stop at DEF to let off a passenger.

I was approaching intersection No. 1 when I heard the other aircraft talking to DEF FSS for advisory. I also have a son attending college at DEF; he had just returned to college 2 days prior and I had him on my mind. As I attempted to cross the pass between intersection No. 1 and intersection No. 2, I encountered low clouds and was unable to continue VFR. Returning to the VOR and thinking of filing for a clearance, I heard the other aircraft talking to DEF again. I then called ABC radio via the VOR to request a clearance; they advised me to go direct to Center for the clearance. I did so and requested a clearance from the VOR to ABC, or so I thought. I received the clearance, which I thought was to ABC, so I continued the flight. Not once did I realize that I had requested a clearance to DEF or even in receiving the clearance that it was for DEF. With DEF on my mind I was thinking one thing and saying another. I realized what had happened upon calling ABC radio advising them I was making an approach to ABC airport.

Weather between the VOR and DEF was VFR even at the altitude I was cleared to. Between the VOR and ABC I was in IFR conditions for 8 minutes over a distance of 20 m.mi. Upon passing ABC VOR I broke out into a broken condition.

I was aware that there was no other IFR traffic in the ABC area from listening to Center frequency. There was a C-130 over XYZ at the time enroute to ABC and I knew he would be landing behind me. Upon landing at ABC I loaded my passengers and taxied to the active when the C-130 landed.

It never dawned upon me that I was flying in the opposite direction from that for which I was cleared, it was not on purpose.

HUMAN FACTORS ASSOCIATED WITH ALTITUDE ALERT SYSTEMS

Introduction

In 1976, in response to requests from air carriers, the FAA issued a Notice of Proposed Rule Making (NPRM 76-15) regarding modification of the altitude alert systems required on all civil turbojet aircraft since February 29, 1972 (FAR 91.51) (table 1). Pilots had long complained about the signals emitted by this device, which provides an aural and visual signal when an aircraft either approaches, or departs from, the altitude manually set in a reminder window. It was noted that during short-haul operations particularly, such signals may be heard many times during a single flight. They may, therefore, be ignored. Since the "approaching altitude" signal is the same as the "deviation from altitude" signal, pilots will tend, after a time, to pay equally little attention to either.

The substance of the requested modification, which was incorporated in the FAR's on September 21, 1977, was to eliminate the aural warning approaching altitude, so that only a visual alert would be observed as one approached the preset altitude. Aural warnings would occur thereafter if the aircraft departed the assigned altitude (table 1). The modifications are optional; each operator may decide whether or not to modify his systems in accordance with paragraph (b)(1)(ii).

Altitude deviations are common among flight crew errors reported to ASRS. Interview studies conducted by NASA during 1975 and 1976 had suggested that the perception of the altitude alert system by pilots engaged in long-haul operations was somewhat different from that of crews engaged in short-haul operations. It was, therefore, decided to conduct a study of Altitude Alert reports in the ASRS database, with the hope of determining what problems flight crew members were having with this device.

Approach

At the time this study was conducted, the ASRS database contained 6,511 reports. A search of these reports yielded 36 in which an altitude alert problem was identified by ASRS reporters or analysts. It was assumed that the altitude alert system was operating properly in cases in which no malfunction was reported. Four occurrences were reported twice; the study sample thus involved 32 occurrences. These were examined to determine what had happened, and to the extent possible, what relevant human and system factors were associated with the occurrences.

TABLE 1. - ORIGINAL AND REVISED FEDERAL AIR REGULATIONS

Original Regulation	Revised Regulation
91.51 Altitude alerting system or device; turbojet powered civil airplanes. [August 31, 1971] (a) Except as provided in paragraph (d) of this section, no person may operate a turbojet powered U.S. registered civil airplane after February 29, 1972, unless that airplane is equipped with an approved altitude alerting system or device that is in operable condition and meets the requirements of paragraph (b) of this section. (b) Each altitude alerting system or device required by paragraph (a) of this section must be able to - (1) Alert the pilot, upon approaching a preselected altitude in either ascent or descent, by a sequence of both aural and visual signals in sufficient time to establish level flight at that preselected altitude; (2) Provide the required signals from sea level to the highest operating altitude approved for the airplane in which it is installed;	91.51 Altitude alerting system or device; turbojet powered civil airplanes. [September 21, 1977] (a) Except as provided in paragraph (d) of this section, no person may operate a turbojet powered U.S. registered civil airplane unless that airplane is equipped with an approved altitude alerting system or device that is in operable condition and meets the requirements of paragraph (b) of this section. (b) Each altitude alerting system or device required by paragraph (a) of this section must be able to: (1) Alert the pilot: (i) Upon approaching a preselected altitude in either ascent or descent, by a sequence of both aural and visual signals in sufficient time to establish level flight at that preselected altitude; or (ii) Upon approaching a preselected altitude in either ascent or descent, by a sequence of visual signals in sufficient time to establish level flight at that preselected altitude, and when deviating above and below that preselected altitude, by an aural signal; (2) Provide the required signals from sea level to the highest operating altitude approved for the airplane in which it is installed;

Results

All of the reported occurrences involved altitude deviations. As would be expected, the vast majority occurred during climb or descent (table 2).

The reasons given for these altitude deviations fell generally into three classes. These are shown in summary form in table 3. Each class of factor is discussed and illustrated in the following section.

Associated factors were cited in many reports. A total of 55 factors was thought to be pertinent in these 32 occurrences. These factors are listed in table 4 and are discussed in the following section.

TABLE 2. — ALTITUDE DEVIATIONS IN OCCURRENCE REPORTS

Type of deviation	Number	Percent
Altitude overshoot in climb	16	50
Altitude overshoot in descent	11	34
Altitude excursion in cruise	4	13
Altitude undershoot in climb	1	3
Total	<u>32</u>	<u>100</u>

TABLE 3. — ENABLING FACTORS IN ALTITUDE DEVIATIONS

Enabling factor	Number
Did not observe alert or warning	
Distracted by other event	13
Cockpit crew overload	4
Undershoot: alert did not occur	1
Unable to see or hear warning	1
No reason apparent to pilot	<u>1</u>
	20
Did not set altitude alert system	
Did not hear or misunderstood clearance	5
Forgot or overlooked	4
Set alerter, but incorrectly	<u>1</u>
	10
Absence or failure of altitude alert	
Possible malfunction	1
Absence of system	<u>1</u>
	2
	<u>32</u>

TABLE 4. — ASSOCIATED FACTORS IN ALTITUDE DEVIATIONS

Factor	Number
Human factors	
Distraction	13
Crew coordination	11
Communication problems	6
Inexperience, training	2
Complacency	<u>1</u>
	33
Alert system design factors	
Too many signals; confusion between alerting and warning signals	6
Location or brightness of light	3
Aural warning too soft	<u>2</u>
	11
Aircraft and system factors	
Aircraft performance better/worse than anticipated	3
Malfunction of aircraft equipment	4
High noise levels in cockpit	1
Absence of altitude alert system	<u>1</u>
	9
Environmental factors	
Thunderstorms	1
Cloud buildups	<u>1</u>
	2
Total number of factors cited in 32 reports	<u>55</u>

In most reports, the narrative included mention of the factor that brought the deviation to the pilots' attention. These factors are summarized in table 5.

TABLE 5. – RECOVERY FACTORS AFTER
ALTITUDE DEVIATIONS

Deviation first noted by	Number
Air traffic controller	18
Other flight crew member	8
Pilot flying	3
Altitude alert system warning	1
Not obvious from report	2
	32

We have summarized the occurrence types, enabling and associated factors observed in these occurrences, and factors that led to recovery from the altitude deviations. These factors are discussed in the following section.

Discussion and Examples

Examination of the altitude overshoots during climb showed no remarkable differences between them and the occurrences that took place during descent. Taken together, these occurrences account for more than five-sixths of the total sample. While most occurred to air carrier aircraft, corporate jet aircraft were also represented. Comparatively few of the occurrences involved a serious potential conflict with other aircraft.

Enabling factors (ref. 3) associated with the altitude deviations are shown in table 3. About two-thirds involved failure to observe the altitude alert or warning signals. Failures to observe the signal were twice as common as failures to reset the system. The most common reason cited for failure to observe was distraction, which is discussed in more detail below. Cockpit crew workload was said to be a factor in four instances, as in some of the altitude deviations which were discussed in a previous study of problems during profile descents (ref. 5). (No profile descent reports were retrieved by the search terms used in this study.)

At approximately 2115 we departed ABC nonstop for DEF. We were cleared for a climb to 6,000 ft and a right turn to 240°. Due to cold weather, a light airplane, and trying to maintain 250 knots, we obtained a high rate of climb. Due to other distractions – that is, rechecking SID, looking outside the cockpit for other traffic, resetting climb power, and selecting OBS radials – we inadvertently passed through our assigned altitude. Departure control requested our altitude at which time we were at 7,200 ft . . . immediate action was taken to descend to our assigned 6,000 ft. No evasive action was required. Contributing factors are pilot workload during the departure phase, which was accelerated due to rapid rate of climb, and human error.

In one case, the altitude alert could not have appeared; the pilot undershot his final altitude by 1,000 ft.

After departure we were cleared to 11,000 ft by Departure Control. The aircraft climbed very slowly due to a combination of warm temperature and heavy load. Once we were turned over to the Center and the workload diminished, I started to complete the log book and time sheets, etc. The first officer, who was captain qualified, was flying the aircraft from the left seat. I, the captain, was serving as first officer. The aircraft leveled off and picked up speed; we remained level at 10,000 ft for several minutes. As I finished the paper work and looked up Center called and

asked our altitude. I then looked at the altimeter and noticed it read 10,000 ft. I responded "Out of 10,000 for 11,000" and assumed control.

In another, the altitude alert and warning both occurred; the human factors which permitted the signals to be missed are of interest.

We were cleared from FL220 to 13,000, descending at about 2,000 ft/min with the altitude alert set for 13,000 ft. I was flying the aircraft and did not hear the altitude alert horn or see the altitude alert light; we descended right on through 13,000. The captain was talking on another radio to our company and he called my attention to altitude. I made an immediate correction to a climb attitude and started climbing back to 13,000 at which time the captain called Center and cancelled IFR as we were within 25 miles of our destination and in VFR conditions. I noticed at this time that my seat position was too high for me to see the altitude alert light which is placed high on the instrument panel. On further checking, we found the aural warning horn was not loud enough to be heard as I was wearing moulded ear pieces and the aural horn does not sound through the head set.

Ten cases involving failure to set, or incorrect setting of, the altitude reminder were found. In four, a misunderstood clearance appeared to be the reason for the failure. In four others, the crew simply forgot or overlooked this task.

The flight was cleared to cross 30 DME east of Indianapolis at 10,000 ft and 250 knots. As the flight descended through FL210 at 2,500 ft/min at Mach 0.80 we were restricted to 14,000 ft in the descent. Passing through FL180, the before-landing preliminary checklist was completed. While descending through 13,000 (and that was wrong), I applied full thrust and rotated toward 15° nose-up briskly as Center asked our altitude and said to climb to 14,000 immediately . . . I noted the altitude alert was set at 10,000 ft. . .

The altitude reminder was incorrectly set in one case which involved a possible number confusion (heading vs altitude).

During captain's talk to passengers we received a change of heading and altitude from 9,000 to 14,000(?), 16,000(?). Captain started climb and changed power while talking. When he was finished, first officer said "left to 160°"; captain turned aircraft and kept climbing; 16,000 ft was in reminder window. We leveled off at 16,000 and called Departure Control for higher . . . I feel that possibly the captain misunderstood the 160 as an altitude rather than a heading and put 160 in reminder window . . . however, neither captain nor first officer remember putting 160 in the window.

In the tenth case, neither pilot heard the revised clearance (if in fact it was delivered).

The flight was cleared for takeoff on runway 13. The before-takeoff checklist was completed; the last item on the checklist is "assigned altitude." Both first officer and I acknowledged 9,000 ft and 9,000 ft was set in altitude reminder window. After being switched to Departure Control I noticed slightly below and about

1/2 mile at my 10:30 position another aircraft. My rate of climb was approximately 4,000 ft/min, so no evasive action was needed to miss the aircraft, but I wondered why he was that close. I asked Departure why and they replied that we had a 2,000-ft hold-down from tower. At no time during taxi or takeoff did either of us hear or acknowledge a 2000-ft restriction. We both believed our flight to be cleared to 9,000 ft.

One report involved a possible failure or malfunction of the altitude alert system. Another, involving the absence of the system in a military aircraft being flown by a reserve officer who was an air carrier pilot, is interesting because it illustrates clearly how dependent we can become on automatic devices which usually function correctly, and which were intended as backup devices for the flight crew.

This was an Air Force Reserve C-130 and crew on a scheduled flight of over 8 hours with five stops. We were on J-2. About 1530 hours, Houston Center called and asked us to verify altitude. We were assigned FL180. Upon cross-checking altimeters we found we were at 17,000 ft MSL and descending at about 150 ft/min. The autopilot had been engaged since level-off and the altitude hold was supposed to be still engaged. When we realized we were 1,000 ft below assigned altitude, the autopilot was disconnected and an immediate climb to FL180 started. Houston gave us an immediate right turn. Upon reaching 180, Center cleared us direct to LCH and nothing further was said about the incident. The autopilot was disengaged without verifying that the altitude hold was engaged, but I distinctly remember engaging altitude hold following autopilot engagement. There is no altitude warning system on this airplane. . . After several hours of flying when the autopilot performs perfectly there is a tendency to omit altitude from your scan unless something abnormal happens or you are intentionally changing altitude. . .

Associated factors (reference 3) in these reports can be categorized in four classes: human factors, alert system design factors, aircraft and other factors, and environmental factors.

Even in the cases in which distraction was not the primary enabling factor, it was often present and pertinent to the occurrence. The total number of cases in which this factor was cited was 23, over 70% of the sample. Distractions were usually due to ATC instructions, traffic, required cockpit procedures, or combinations of these factors.

ATC distractions usually involved late changes of clearance or large numbers of vectors over a short period of time.

All prestart conditions were normal (excepting heavy rain and icing in terminal area) until ATC clearance was received. Filed flight plan was not given, but new plan was accepted to expedite a usually complicated starting procedure at Haneda. Due to a minor mechanical problem after pushback we returned to blocks, shut down, and cancelled clearance. About 30 minutes later we began the entire procedure again with ATC issuing the original (nonfiled) oceanic clearance. During our maintenance delay, however, we determined that the "new" VOR to be utilized for departure

from Japan was out of service. Since it was to be a Doppler navigation leg, we simply computed the required course and distance to properly depart the Tokyo area as assigned. The takeoff was normal (into heavy rain, light turbulence, and icing) and as we were in a right turn at about 900 ft and while turning on anti-ice, etc., we were then reassigned an east Chiba departure to maintain 7,000 ft. While extremely busy with abnormally heavy departure duties (icing, re-setting radials and Doppler system, not to mention a new nonstandard noise abatement profile), we climbed through 7,000 to about 8,700 ft. The controller questioned us, then assigned us FL330. I'm glad we missed the 8,000-ft inbounds. . . Altitude reminder was not reset to 7,000 ft, thus no aural or visual warning.

* * *

On takeoff from Meacham Field we were issued a clearance to 4,000 ft. By the time we were 10 n.mi. west of Meacham we had been given approximately four altitude assignments and four heading assignments. We were required to execute each assignment, which I consider excessive maneuvering in a turbojet aircraft. . .

* * *

. . . In this instance, due to many previous altitude assignments and restrictions we had heard the altitude alert sound a warning many times approaching assigned altitude; we had become conditioned to associate the warning with a normal approach to altitude. This time, because of continual changes in routes and altitudes, concern with profile for fuel conservation and checklists we descended through our altitude and when the altitude alert sounded we all felt at first it was a normal approach to altitude warning and did not react appropriately until a cross-check of altimeter and assigned altitude revealed the excursion. Because this was a very competent and conscientious crew, the cross-check was almost instantaneous and the descent below altitude was only a few hundred feet. But the fact that we had all become conditioned to interpret that warning from the device as normal bothered us and we felt it a proper concern to pass on to the NASA Aviation Safety Reporting System.

Traffic pointouts were distracting, although their importance has been discussed previously (ref. 3). There is a natural tendency for all crew members to try to locate traffic visually when such a call is received.

During climbout from Denver, Departure Control reported a target at our ten o'clock position. We had just been cleared on course J-116 and were in a left turn. . . Both crew members were looking out trying to sight the traffic given by radar. We were looking directly into the sun through a light haze condition. Our assigned altitude was 10,000 ft and we exceeded it by approximately 800 ft momentarily and took immediate corrective action. . .

* * *

. . . While being radar vectored on a northeast heading by Houston Center a revised clearance was issued, when climbing through FL200, to maintain FL210. We had been previously cleared above FL220. Along with the new clearance, traffic information was given to us regarding an airline flight southeast bound at FL220. Almost immediate visual contact was made with the crossing traffic. Before reaching FL210, both pilots began a new search for the traffic because attention had since reverted back into the cockpit. While I was still occupied with trying to regain contact, Houston called and inquired about our altitude. I noted that my altimeter read 21,700 ft and the first officer's read 21,600, and also that both vertical speed indicators were passing through zero from climb to descent . . . the first officer had already realized we were above altitude and had begun a smooth transition back to FL210. Obviously, lack of attention to the altimeters was the cause of this situation. I don't believe either of us was aware that the other's attention was fixed outside the cockpit.

Intra-cockpit distractions were reported in several instances. These involved cabin staff, questions from flight crew, malfunctions, and other tasks.

. . . The aircraft had just descended through a clouded area where light icing existed. The airspeed in descent was 250 knots and rate of descent was about 1,000 ft/min while in the clouds. We broke out in the clear . . . and immediately lowered the nose and accelerated to about 370 knots and 4,000 ft/min . . . to make a crossing restriction. As we broke out in the clear, we secured the engine anti-ice. The number 2 anti-ice light did not extinguish and the crew began to troubleshoot the light. Furthermore, at 370 knots in an airline aircraft the cockpit noise level is very high . . . we did not hear the altitude warning bell . . . the pilot at the controls was turning on and off the engine anti-ice switches (which were on his side of the cockpit). The captain did not make the required altitude callout 1,000 ft above level-off. . . . The principal reason the incident occurred was because the flight crew was preoccupied with an engine anti-ice malfunction . . . coupled with a high rate of descent and high cockpit noise level

* * *

We were cleared to descend to FL210 (captain flying). Second officer questioned captain about fuel for next leg of flight. As we left 220 the first officer did not advise "220 for 210." Center advised traffic at 200 as we descended through 210 . . . captain pulled aircraft back up from 205 to 210. Not a near miss but very poor procedure . . .

Problems involving flight crew coordination appeared to have been present in 11 reports (one-third of the sample). These took several forms. The tendency for all crew members to "go outside" when traffic is called has been mentioned. The same problem can occur when an anomaly is discovered within the cockpit.

We were cleared to 6,000 ft and broke our altitude. At about 6,800 we discovered our error and immediately returned to 6,000 ft . . . no evasive action was

required. The entire crew got involved with looking at charts, as there was some discrepancy on the radial we were to intercept outbound. The crew had been preoccupied with traffic prior to a turn on course. The altitude alert bell, even though in the high position, was barely audible. The altitude alert light cannot be seen from the captain's seat

* * *

Cruise altitude had been FL390. Received descent clearance to 240 only 107 miles from destination airport. I computed that a 3,500 ft/min descent was required. . . . After leaving FL300 a question from the cabin attendants regarding our geographic location prompted a discussion among the crew and myself about which town was which. The controller subsequently cleared us to cross a point 15 miles north of PBI at 6,000. At that time we were out of FL200 and were still hard pressed to make the descent in compliance with the clearance. We discovered the error when the approach controller asked us what altitude we had previously been cleared to; we looked at the altitude alert selector and it was still set to 240. Not until that moment had any of us realized that we had busted our altitude clearance. Fortunately, the weather was VMC

In a few cases, other tasks disrupted monitoring to permit an altitude deviation to occur.

Our flight was cleared to descend from 9,000 to 8,000. The copilot repeated the clearance, set the altitude alert at 8,000 and announced leaving 9 for 8 as I started descent. I descended, leveled off, set the power, and engaged the altitude hold on my flight director. Then three things happened in rapid order. The copilot exclaimed "Were not we cleared to 8?" The approach controller cleared us to 7,000 and then asked our present altitude. I realized I had leveled off at 7,000. The following conditions and factors applied: workload was relatively light; however, the first officer had glanced away momentarily to stow his long range chart and the second officer was calling for a gate assignment. The altitude alert was set properly and was operating properly. Flight conditions were VMC. This was my third trip with this crew this month; they could only be described as competent, highly qualified, and alert. I find it hard to believe but it happened. First, that I descended through the altitude and second, that I must have ignored the altitude alert warnings; finally, that an alert crew and approach controller failed to catch my mistake in time.

* * *

Flight was cleared to 6,000 ft by Departure Control after takeoff. This was acknowledged by captain as first officer was flying at the time. However, 8,000 ft was inadvertently set into the altitude reminder. About this same time the climb checklist was being accomplished and a flight attendant entered the cockpit with a form for the captain's signature, dealing with the fact that we were running 1½ hours late. Shortly thereafter, Southwest Departure requested verification of our altitude, which was reported as "out of 7,800 for 8,000." We were then advised that we were only cleared to 6,000 but to maintain 8,000 for now. . . . The main factor . . . was

that the wrong altitude was set into the altitude reminder and not picked up by any of the crew members. This was possibly due to some slight distraction or confusion in the cockpit at the time. . . . Other factors involved: our increasing dependence on the altitude reminder — which gives you no signal that you did not set in the proper altitude. Also, being in VFR conditions, the crew was looking out more for other aircraft rather than keeping their heads in the cockpit and being more aware of the altitude.

In others, procedures or communications breakdowns occurred.

As captain, I misinterpreted the assigned flight altitude as being 16,000 ft; we were actually cleared to 14,000 ft. The first officer had read back the clearance correctly when it was received; however, we both forgot to set the altitude reminder to 14,000. The altitude reminder was set at 16,000 ft, the previous leg's assigned altitude. . . . It is normal procedure for our airline to reset the altitude reminder to zero when either cleared for the approach, or cancelling IFR. This obviously was not done, and was a factor in this incident.

* * *

On the ground at Portland, the first officer called for ATC clearance to Seattle. Clearance was "as filed, maintain 9,000 ft, expect FL200 3 minutes after departure." I missed the first portion of the clearance and picked it up at "FL200" (the Center-stored altitude) and got the frequency and transponder code. I set 20,000 in the altitude alert unit and set in the transponder code as the first officer read back the clearance. Again I did not hear the 9,000-ft restriction and asked if we were cleared as filed; the first officer answered yes. I thought I understood the entire clearance. The first officer made the takeoff and I changed to Departure Control and reported leaving 1,000 ft climbing to FL200. The controller said "Roger" and gave us additional climb instructions which included a heading change at 2,500 ft. At about 8,000 ft the first officer asked if we had been cleared to 20,000 and I replied yes. At 10,000 ft the controller asked what altitude we had been cleared to and again I replied "20,000." He said we should have been stopped at 9,000, then cleared us to FL200 and asked us to expedite through 11,000. . . . The crew composition helped create this situation as the first officer regularly flew this trip, the captain was a management pilot who hadn't flown the route recently and the second officer was a reserve who was totally unfamiliar with the route. The first officer, on taxi-in at PDX, had set 9,000 ft in the altitude reminder in anticipation of what he knew was a normal altitude restriction for departure. When the captain thought he was given FL200 he set in that altitude; this action was missed by the first officer, who later assumed he had missed something and continued to climb through 9,000 ft

Communications procedures, within the cockpit or between air and ground, gave rise to problems in six cases, one of which is the previous example. In two cases, an incorrect clearance read-back was not challenged by ATC; we have cited this problem in a previous study (ref. 3). In three cases, required callouts 1,000 ft above or below assigned altitude were not made and this omission was cited as contributing to the deviation. In another case, the crew did not confirm an altitude clearance.

Eleven reporters cited deficiencies in the altitude alert system. Over half described it as giving too many signals, leading to confusion between the device's alerting and warning functions and a tendency to ignore the signals. It is noteworthy that all of these complaints came from pilots on short-haul aircraft and routes.

During six altitude changes enroute Berlin to Munich airline crew was subjected to six different alert chimes and flashing lights incorporated in the altitude warning system. Descending at 3,500 ft, pilot was distracted by heading change and localizer intercept and failed to level at 3,000 ft. Passing 2,700 ft the altitude alert chimed and the light flashed. Pilot ignored the warning and continued descent. At 2,500 ft copilot called out "altitude." The pilot leveled and climbed back to 3,000 ft. The incident illustrates poor system design in which a "warning" signal is heard repeatedly in normal operations. The warning sound becomes a normal sound and its value is negated. . . . In our operation each pilot hears this sound approximately 360 times per month. . . .

* * *

Cleared to 6,000 ft, altitude alert programmed for 6,000 ft. Captain gave a report to a light aircraft to help him stay clear of a cloud deck. Three crew members missed the altitude alert going off as we went through 6,000 ft. The aircraft descended 400 ft below altitude. The altitude alert goes off both when approaching altitude and when deviating from an altitude; as a result, it is beeping quite frequently during descent. This tends to lead the crew to disregard the alert system, especially when they are distracted by other duties. . . . A further descent was prevented only an ATC controller's fast response to the altitude excursion.

This, of course, is precisely the problem that led air carriers to seek permission to modify the altitudes alert system.

Other aircraft factors involved performance markedly better (or worse) than usual. In two cases, the aircraft climbed more rapidly than expected. One has been cited, the other appears here.

O'Hare weather 700-ft overcast, 2 miles in fog, tops 4,000 ft, icing in clouds. We were cleared to 5,000 ft, maintain runway heading. First officer was flying. After cleaning up the aircraft, the first officer lowered the nose to increase IAS to 250 knots. About 3,500 ft we received clearance to turn to 270°. As turn was started we broke out on top in brilliant sunlight. I called for anti-ice off. The first officer was busy but turned off the engine A/I switches while the second officer turned off the wing A/I. Rate of climb was 4,000 ft/min and IAS steady when I caught the altimeter reading of 5,300 ft. I called this out immediately and the first officer's response was good, smooth, and positive. Maximum altitude in pushover was 5,700 ft. No traffic observed, no comments from controller, attendants or passengers. One very sobering experience. My crew is a scheduled one. . . . As one can tell, the sequence of events between 3,000 and 5,000 ft was compressed. A more moderate climb rate would leave us in icing longer, but would have simplified the level-off. Speed and heading changes, IMC to VMC, icing, and the switching off of the anti-ice contributed to the

overshoot. . . . We all missed the altitude warning and I missed the 1,000-ft callout and we needed both — or either. I call it a total crew oversight.

Three reports involved autopilot malfunctions; in one, level-off on autopilot was unsuccessful, in two others, the altitude hold failed.

The flight took off from Pasco, cleared to Yakima at 8,000 ft. Copilot was flying on autopilot. The copilot attempted to level off at 8,000 ft but the autopilot continued to climb. We disengaged the autopilot and returned to 8,000. My altimeter read 8,700 ft

* * *

Aircraft was stabilized in level flight at FL260 on autopilot, copilot flying aircraft. Autopilot malfunction allowed aircraft to drift up to FL265. When discovered by pilot immediate action was taken to return to assigned altitude . . . during this time Center called to question altitude. . . . Contributing factors were probably clear weather conditions causing inattention to detail and slow instrument cross-check . . . the copilot divided his attention to peruse contents of his flight bag for a few seconds. . . . Increased awareness and closer attention to instrument cross-check would prevent future problems of this nature.

High cockpit noise levels were cited in one report as interfering with perception of the auditory alert/warning signal. External environmental factors were pertinent in two other reports. In one of these cases, crew workload was obviously very high.

Flight was cleared to an altitude of 7,000 ft, Cedar Rapids to Moline. Considerable thunderstorm activity between terminals. In attempting to circumnavigate the weather and trying to convince the controller of the necessity of diversions because their radar evidently did not show the amount of activity, the flight reached 7,500 ft in updraft conditions along with diverted attention in discussions with controller. Controller advised "Radar indicates your altitude at 7,500." Correction was made immediately.

Recovery factors: It is interesting to note that in 56% of cases, an air traffic controller first noticed the altitude deviation. The ability of either member of the pilot-controller team to back-up the other if sufficient information is available has been cited in previous ASRS reports. Conversely, this finding also suggests that within-cockpit monitoring in these cases was less effective than is desirable.

In summary, several human factors were found to be associated with altitude deviations in aircraft equipped with cockpit altitude alerting systems. Most of the errors involved a failure to observe altitude alerting or warning signals, or a failure to set or reset the altitude alert system.

The most common factor cited in these occurrence reports was distraction, associated with cockpit or navigation procedures, ATC or within-aircraft communications, or other air traffic.

Breakdowns in flight crew coordination were noted in several reports. Many of the reports appeared to involve failures in monitoring by the pilot not flying. This failure is also suggested by the fact that in over half of the occurrences, an air traffic controller was the first person to notice the altitude deviation. It appears from these reports that further development of and strict adherence to standard operating and monitoring procedures for climbs and descents would be of help in minimizing altitude deviations. It is clear also that distractions during climbs and descents should be held to an absolute minimum.

General Discussion

Several reports in this sample made note of decreased flight crew altitude awareness because of the presence of the altitude alert system. The system was originally conceived as a backup, not a primary means of altitude control. It has become more than that, as do most such aids if they function reliably.

It is clear that if the altitude alert system, long present in the cockpits of high-performance aircraft, is to be modified by removal of the aural warning approaching altitude, the change must be compensated for by greater altitude awareness among flight crew members. This should not represent a problem, but it may well require increased attention in recurrent training during the period of the changeover.

The question of whether this permitted change in the system should be implemented in all cases is an open one. It was noted in the introduction to this report that long-haul pilots perceive the altitude alert system somewhat differently from short-haul pilots. Several pilots engaged in long-range operations stated that they appreciated the aural alert "approaching altitude," particularly toward the end of a tiring flight. These pilots, of course, heard the alert much less often. Their flying task involves long periods of comparatively low workload, with consequent lower levels of arousal. It is at least arguable that perhaps the altitude alert system as presently configured is preferable in such operations, although this would permit continued dependence upon the device.

In short-haul operations, on the other hand, there is little doubt, based on ASRS reports, cockpit observation, and pilot interviews, that most pilots find large numbers of aural alerts "approaching altitude" distracting and would like to see them removed, so that the aural signal would only warn of a departure from assigned altitude.

Conclusions

It is concluded that altitude awareness on the part of flight crew members has been adversely affected by the altitude alert system. It appears that the removal of the aural signal approaching altitudes would assist in enhancing flight crew altitude awareness, if accompanied by appropriate retraining efforts at the time of the changeover. It is also possible, however, that this change in the altitude alert system may not be equally desirable in long-range operations involving long periods of low workload.

These data also suggest the desirability of an examination of flight crew procedures and monitoring responsibilities during climbs and descents. It appears that improvements in altitude control are needed and might result from more specific assignment of monitoring duties during these phases of flight.

ALERT BULLETINS

Introduction

One of the ASRS program's principal means of focusing timely attention on possible problems as reported from the aviation community is the Alert Bulletin process. As in previous ASRS Quarterly Reports, examples of Alert Bulletins are included in this report because Alert Bulletins and the responses to them often reveal beneficial information which can be put to good use by persons and organizations concerned with the National Aviation System. The following examples have been categorized into six general classifications to assist in locating Alert Bulletins which may relate to topics of specific interest to the reader.

Air Navigation

1. Text of AB: Hayward, CA, Decoto Intersection: Extremely erratic reception of the SFO VOR 076 radial signal, which forms one reference line of the Decoto intersection, has been experienced and reported by various aircraft operators. The intersection formed by the OAK VOR 114 radial and the SFO VOR 076 radial constitutes the final approach fix for the Hayward VOR-A approach. Because of the erratic signal, identification of the FAF has occurred as late as 2.5 n.mi. beyond the actual intersection. When used as the point for calculation of the MAP, late identification of the FAF places approaching aircraft past the Hayward Airport and into Oakland International Airport's control zone. One reporter urges that a flight check be made of the SFO VOR signal at the 2,300-ft MSL altitude. The reporter also suggests that the Woodside VOR (OSI), which provides a reference radial for the Alvarado intersection (1/2 mile from Decoto) could be used to provide a more reliable cross-reference for the VOR-A approach FAF in lieu of the present SFO VOR signal.

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Text of Response: Flight Inspection showed the Decoto intersection unsatisfactory. Woodside VOR is also unsatisfactory at that location. The VOR-A approach has been suspended pending procedural changes.

2. Text of AB: Torrance, CA (TOA), in the vicinity of LING intersection: Confusion appears to exist regarding the V-64 airway in the vicinity of the LING intersection and the Torrance airport. The north/south segment of V-64 (170° radial of LAX VOR) joins the east/west segment of V-64 (251° radial of SLI VOR) at an acute angle at LING intersection. IFR operations out of Torrance airport, with instructions to fly a heading to intercept V-64, are frequently confused or require

clarification as to which segment of V-64 is intended by ATC. Reports point out that other than the LOC Runway 29R missed approach instructions and the Torrance entry in the IAP's IFR Takeoff and Departures Procedures, no means are available to help clarify the possible V-64 confusion except to ask ATC personnel. One reporter suggested changing the numerical designation of one of the existing airway segments.

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Text of Response: Torrance departure procedures are in the process of being changed to eliminate possible confusion for vectors to V-64. Torrance tower will specify in the initial departure clearance the specific segment of V-64 to which the aircraft will be vectored.

3. Text of AB: Roanoke, VA, Roanoke Municipal/Woodrum Airport (ROA): IFR departure procedures from this airport are reported as being more complicated than normal due to the lack of any graphic depictions of the departure courses. For consideration in support of the need for some type of graphic depiction, one reporter provided the following itemization:

- a. The current departure procedures are in text form, not published in a standard chart form, e.g., S.I.D.'s,
- b. Pilots unfamiliar with this airport might overlook the text published on the reverse side of the approach plate under the airport diagram,
- c. The current text provides no graphic depiction or definition of the intersections used for the departure procedure,
- d. The fact that an additional low altitude enroute chart is required in order to follow the procedures text adds to cockpit workload and possible confusion during departure,
- e. Tower personnel do not generally provide any advanced notice that IFR departure procedures are in effect; first notice usually comes when the aircraft is cleared for takeoff.

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Text of Response: Departure procedures and/or ceiling visibility minimums are established to assist pilots conducting IFR flight in avoiding obstructions during climb to the minimum enroute altitude.

Proper preflight planning will eliminate overlooking published departure procedures. During periods of inclement weather, the appropriate departure procedure is broadcast on the voice feature of the Woodrum VOR to aid the pilot in planning departure actions. In addition, the IFR departure procedure is issued as part of the ATC clearance. The ATC facility at Roanoke has had no adverse comment concerning the application or use of these procedures.

4. Text of AB: Various locations: FAA Handbook 7400.2B, par. 102d, indicates that navaids should not bear the name of an airport unless there is only one navaid and it is located on the airport. Report cites LSN, RNO, SCK, FAT and other VOR's located off airports and points out that

serious confusion can arise as to clearance limits or routes of flight when two separate facilities bear same name and/or identifier.

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Text of Response: The Los Banos VOR will be changed to Panoche. We have requested appropriate authority to change the name of Reno, Stockton, and Fresno VORs. Handbook 7400.2B is currently being coordinated for update and correction. Paragraph 102d is being considered for change.

5. Text of AB: Palm Springs, CA, Palm Springs Municipal Airport: A pilot report points out a potential problem involving the missed approach procedures for the VOR-A approach at this airport. Assume an aircraft is aligned on a final approach course for runway 30. The pilot elects to execute a missed approach. Following the published missed approach procedures — “Climbing left turn to 5000 heading 090 degrees intercept and climb via TRM R-302 to TRM VORTAC and hold” — would probably put the aircraft into the San Jacinto Mountain. The pilot suggests that the geographic characteristics of this particular location warrant an alternate missed approach procedure or a special, separate precautionary note on the face of the approach plate. The suggested wording reads as follows: “Standard missed approach procedures N/A once established on final approach for runway 30 — Alternate missed approach procedures. . . .” The reporter acknowledges existing regulations and other references (e.g., AIM Part 1, pp. 1-76 and 1-77) concerning missed approaches from a circling procedure; nonetheless, it was felt that the terrain features at PSP, and perhaps some other airports, justified an alternate missed approach procedure or at least an extra note of caution. The point is further emphasized by the fact that the only other approach to PSP is an RNAV-B which places the MAP more clearly in line with runway 30; additionally, for this RNAV approach there is a different missed approach procedure utilizing a climbing right turn away from the mountains to the west.

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Text of Response: Our review does not indicate that there is a potential problem with the missed approach for the VOR-A approach to the Palm Springs, California, Airport, if the procedure is executed as published. Our conclusions are based on the following considerations:

- a. The VOR-A approach was originally designed in 1970 to provide an instrument approach with realistic minimums to an airport in a difficult environment. This procedure has been utilized by several airlines and to our knowledge, there have been no adverse comments concerning the use of the procedure.
- b. The IFR portion of the approach terminates at the Palm Springs VORTAC. If the pilot does not encounter weather conditions at or above 1,712 ft HAA and 3 miles visibility, a missed approach must be commenced. If the pilot does encounter weather conditions at or above the published minimums, he may proceed in visual conditions to the airport as indicated by the visual flightpath (dashed arrow) depicted on the approach chart.
- c. The approach chart is annotated to preclude circling southwest of runway 12-30.

To eliminate any possibility of misinterpretation, however, the Western Region is taking action to have the following changes incorporated into the procedure:

- a. Increase the visibility from 3 to 5 miles.
- b. Add a note requiring that the airport be visible at the missed approach point.
- c. Add a note advising of rapidly rising terrain 1 mile west of the airport, with high terrain in all quadrants.

6. Text of AB: New York, NY, JFK Terminal Area: Reports concerning VFR operations in the area immediately south of JFK airport suggest the need for additional information on sectional and terminal area charts, as well as the AIM part 4 terminal area graphics relating to the NY TCA. The current AIM part 4 graphic display of the NY TCA notes that pilots should "contact Kennedy Tower 125.25 or 256.9 surface to 2000 ft" when operating in the area underneath the TCA south to a line 20 n.mi. from JFK; the terminal area chart for New York City contains no such notation for this area. In addition to the desirability of having all applicable charts and graphics reflect identical information and instructions, it was suggested that the instructions to contact the JFK tower be emphasized as being particularly critical with regard to the heavily traveled area under the TCA from the surface to 499 ft in the immediate vicinity of Rockaway and Long Beaches. Reporters were particularly concerned about this specific area because of (1) the proximity of dense IFR inbound and VFR transient traffic, and (2) the potential for wake turbulence hazards resulting from light aircraft flying under heavier aircraft making approaches to runways 4L and 4R and JFK. One report suggested putting the "contact Kennedy tower" instructions in the area of Rockaway Beach, or extending a heavily-shaded arrow from the instructions to the Rockaway Beach area.

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Text of Response: TCAs are no longer published in the AIM. They are now depicted on Sectional, Terminal Area, and IFR Charts.

The reason for not informing pilots to contact Kennedy tower on a specific frequency is that Kennedy Approach Control is responsible for radar advisories throughout most of that area. Approach control will assign tower frequency and transfer communications to the tower whenever appropriate.

7. Text of AB: Greenville, SC, Greenville Downtown (GMU), Greenville-Spartanburg (GSP) and Donaldson (7A1) airports: Recent report draws attention to confusing notation on VFR and IFR enroute charts which depict the control zones for these airports. Legend says "Greenville Downtown-Donaldson CZ's eff. 0700-2300/Greenville-Spartanburg other times." This is interpreted by pilots to mean that the GMU and 7A1 control zones are not in effect at other hours, whereas in actuality the zones are still used after 2300 hours, controlled by GSP ATCT using GSP weather to determine permitted operations. It is also noted that under this arrangement, if GSP is IMC and controlling traffic accordingly, while GMU is actually VMC, conflicts can arise between uncontrolled VFR aircraft and IFR approaches both using GMU during these hours.

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Text of Response: The notation on VFR and IFR en route charts concerning Greenville-Downtown and Donaldson Airports is confusing and will be amended as follows:

Greenville-Downtown – Donaldson
CZ's eff. 0700-2300

The notation concerning Greenville-Spartanburg will be deleted.

The reporter states that in actuality, the control zones are still used after the hours of 2300 local. This is a common misconception at locations with part-time control zones. One of the prerequisites for a control zone is aviation weather reporting. When aviation weather is not available, then a control zone cannot exist.

The absence of a control zone, however, does not cancel or prohibit an instrument approach procedure to an airport. Minimums are usually adjusted upward and weather information, if available, is normally from another location, such as Greenville-Spartanburg.

In his example, the reporter said that Greenville-Spartanburg Airport could be reporting instrument conditions when, in fact, either Greenville-Downtown or Donaldson could be in VFR conditions. He says that during these conditions, conflicts can arise between uncontrolled VFR aircraft and IFR aircraft conducting an instrument approach. It is true that uncontrolled VFR aircraft could be operating in that area (while remaining clear of the Greenville-Spartanburg control zone). Greer Approach Control is a radar facility and normally can provide traffic information to aircraft conducting an instrument approach to either of those airports. In any event, a pilot conducting an instrument approach in VFR conditions is responsible for his separation between himself and uncontrolled VFR traffic.

Airports: Facilities and Maintenance

8. Text of AB: Olympia, WA, Olympia Airport: Report regarding approach lights for runway 17 indicates that these lights are on stands up to 16 ft high on the first 580 ft of pavement; runway threshold is displaced 1,000 ft. Report describes a charter aircraft which had to be told to observe the threshold because he was descending into the lights. "This was not the first occurrence of an aircraft trying to land in the approach lights"

Reporter indicates that many pilots have indicated that lights are not visible in the daytime and suggests that contrast needs to be increased, possibly by covering the area with dirt and seeding it. A pilot report describing the same problem states that he had great difficulty seeing approach lights in daylight due to sun and shadows on partially wet runway.

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Text of Response: We are aware of the problem with the approach lights in the first 580 ft in the runway 17 displacement. A Preapplication for Federal Assistance has been received from Olympia Airport recently. One of the high priority work items in the preapplication is to correct the undesirable condition as you have stated in your alert bulletin.

The airport owner proposes to remove all the runway pavement occupied by the approach lights with the exception of a 20 by 20 ft pad under each light and 12-ft strip of pavement to be used for a service road. The removed paved area will be backfilled with top soil and seeded with grass. This work will be accomplished in the summer of 1978.

9. Text of AB: Redlands, CA, Redlands Municipal Airport: Pilot report indicates runway is narrow without shoulders. He notes that there have been three ground-loop accidents involving substantial damage. It is suggested that widening of runway or adequate shoulders are needed.

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Text of Response: Runway is 80 ft wide, adequate to accommodate light aircraft of general aviation served by this type of airport. The City of Redlands stated there are 12-ft graded shoulders at each side of the runway. The area north of the runway is a rough terrain covered with heavy bushes and large rocks. This area is extended into the runway safety area which should be cleared of all objects for 75 ft from runway centerline. Since clearing the safety area according to standards involves a large amount of money beyond the City of Redlands capability, no improvement is expected at the present time.

A request to place a warning to pilots in the Airman's Information Manual has been submitted to National Flight Data in Washington.

10. Text of AB: Denver, Colorado, Stapleton International Airport, Runway 35C at DEN is also designated taxiway Z. Pilot had begun takeoff roll on 35C after being cleared for takeoff on runway 35R. Pilot reports that the crown of the runway slope conceals runway 35R and the north end of 35C; that due to the short length of 35C a takeoff may not be successful for some aircraft. Reporter suggests signs to positively identify 35C, the coincidental taxiway Z, and taxi route to 35R.

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Text of Response: Within 6 weeks after the incident reported to ASRS, a large red sign with white letters stating "Runway 35C Restricted" was installed approximately 15 ft outboard of the paved shoulder at the threshold marking of runway 35C. No further instances of large aircraft taking off on runway 35C have been recorded.

11. Text of AB: Bonner Springs, KS, Kansas City Suburban Airpark (4K2): A recent report alleges that even though all current, applicable charts and airport directories indicate the availability of unicom (122.8) at this facility, no such service is being offered. The reporter suggests that the unicom service should be reinstituted or the charts and other references should be updated to show that unicom service is no longer available.

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Text of Response: The National Flight Data Center published in the National Flight Data Digest No. 134-13 dated July 20, 1977, UNICOM no longer available at the Kansas City Suburban Airport.

The current issue of the Airman's Information Manual Part 2 Autumn-Winter 1977-78 and the Kansas City Sectional Chart effective December 29, 1977 will no longer indicate UNICOM. The source of this change was a message from the Kansas City Flight Service Station.

Subsequent information from FAA indicates that this information has now been removed from the directory and the chart.

12. Text of AB: Ukiah, CA, Ukiah Municipal Airport (UKI): A number of instances of aircraft landing on the wrong runway have been reported since the removal of the tetrahedron at this airfield. The problem is particularly critical for aircraft not equipped with a radio.

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Text of Response: To resolve this problem noted by subject bulletin, the City of Ukiah has installed a wind-tee which is presently being operated in a fixed position by airport management to complement and supplement the lighted wind sock. Ukiah FSS Chief has advised that this has not stopped the recent wrong way landings and takeoffs against both the wind-tee and sock, even by commercial pilots.

13. Text of AB: Anchorage, Alaska, Merrill Field: Laborers and equipment performing work on taxiways and other facilities are reported to be creating conflicts with aircraft operations at this airport. Several reported conflicts, and a potential for an ongoing hazardous condition, are attributed to the lack of any communications between the work crews and the airfield's ATCT. Alleging numerous instances of laborers and vehicles encroaching onto active runways while aircraft are landing and departing, one reporter suggests that coordination through radio communications be established or that affected runways be closed during periods of maintenance activity.

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Text of Response: Provisions requiring the contractor to maintain radio communication with the tower are contained in the specifications for the construction project. Attached are reproduced portions of all specifications; refer to section 90.13 "Contractor's Radios."

The contractor was also made aware of these provisions of the contract at the preconstruction conference. The importance of controlling his operations, as well as the operations of his subcontractor, to provide maximum safety and free movement of aircraft was stressed. The airport manager also stressed the requirement to maintain constant radio contact with the tower during construction activities.

During the construction period this past summer some infractions did occur where equipment and personnel encroached on the runways and taxiways. When these instances occurred the airport manager was advised of the infractions and immediately contacted the contractor and required them to use the radio as required in the original contract. On some occasions the airport manager was not immediately available.

We are initiating revised procedures to increase communications and coordination to prevent future occurrences.

14. Text of AB: Various locations: The line service personnel providing fuel service are reported to be causing cracks and total separations to occur in the fuel filler necks of various general aviation aircraft. Reporter, a certified mechanic with inspection authorization, encountered five

cases of fuel filler neck failure in the past year. The same reporter suggested the following analysis as to why the failures occur:

“This failure (of the fuel filler neck) is caused by fuel servicing personnel failing to support the fuel nozzles and hoses when servicing the airplanes. Few people have any appreciation for the load that a fuel nozzle and a long fuel hose can exert when permitted to sag or hang in the fuel filler neck. In this configuration the slightest pulsation of the hose, or someone stumbling over the hose, and the damage is done—resulting in a costly, time-consuming repair. Furthermore, with the advent of the automatic cut-off fuel nozzle, it is common practice to insert the nozzle in the fuel filler neck, turn it on, and then go off and leave it. These fuel filler necks were not designed for such abuse.”

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Text of Response: The subject material of this Alert Bulletin is rather common knowledge in general aviation and the Bulletin has been widely circulated. We have, however, forwarded it to AFS-581 for investigation and inclusion in the General Aviation Inspection Aids.

Airports: Lighting and Approach Aids

15. Text of AB: McCarren Airport, Las Vegas, NV: Numerous reports have been received alleging consistent discrepancies between wind direction and velocity provided by the control tower and actual conditions at the end of runway 25. The distance between the anemometer used for ATC purposes and the approach end of runway 25 is approximately 2 miles. Even though a lighted windsock exists at the end of the runway, pilots continue to cite irregularities associated with the fact that ATC instructions are in conflict with the actual conditions as indicated by the windsock. Reporters also contend that while the windsock is essential for the accurate indication of wind direction it is virtually useless for purposes of determining the wind's velocity. One report contained the following statement:

“I myself have observed opposite direction wind than that given by the tower. In one case, I was given a wind of 270° at 7 knots and the windsock on runway 25 indicated a strong east wind. I discussed the possibility with the tower that their equipment was in error. I requested to takeoff on runway 7 and had a delay because 25 was the active. While waiting, I observed a four-engine jet run off the end while rotating (temperature was 102°). There was dead silence on the radio for some time and then the runway was changed to 7.”

Pilots report that wind shear is commonly experienced during normal operations to runway 25. For these reasons, they urgently request installation of additional wind direction/velocity measuring equipment which can give accurate indications of surface winds in TDZ area on that runway.

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Text of Response: Budget action was initiated in July 1976 by Las Vegas tower to install wind sensing equipment near the touchdown zones of runways 25 and 19 L/R. In addition, the National Weather Service has been asked to study the placement of wind measuring equipment at Las Vegas McCarren Airport, and to make recommendations. The Western Region will continue to seek early resolution of the cited problems through budget action and procedural adjustments.

16. Text of AB: Otisville, MI, Otisville-Rixport Airport: Existing threshold and runway lighting on runway 18-36 is reported to be creating a hazard for night operations into this airport. Runway 18 has no operational threshold lights, and the runway 36 threshold lights are of the green omnidirectional type; pilots landing at night are therefore required to decide whether to land short of or beyond the one line of threshold lights that they perceive. In addition, a pilot report contends that one-third of the low intensity runway lights are either burned out or not visible on approach to landing. The effect of these two conditions is to create the illusion that a landing on runway 18 is over a displaced threshold of 585 ft. The critical character of this confusing runway and threshold lighting is compounded by the presence of trees and power lines in the path of a runway 18 missed approach.

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Text of Response: Letter from the Airport Manager to the Michigan Aeronautics Commission stated: "Until further notice, Otisville-Rixport Airport will be an unlighted airport." Since the owner is not obligated to provide lights, this solution is satisfactory to this office. By letter of this date to AAT-430, we are requesting revision of the AIM to show no runway lighting at this site.

17. Text of AB: Evanston, WY, Evanston Municipal Airport: A pilot report indicates that contrary to current reference source information there are no runway lights at this airport and that runway lights have never been available. A.I.M. Part 2 indicates "LI RWY LGTS" and "RWY LGTS OPER DUSK-DAWN. 2 CLEAR ALIGNMENT LGTS AT EACH END. REFLECTORS ALONG RWY." AOPA Directory indicates beacon and runway lights are available on request. Jeppesen indicates runway lights available. The reporter also states "runway reflectors are insufficient."

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Text of Response: The subject NASA alert bulletin concerns lighting at Evanston Municipal Airport, Evanston, Wyoming. An investigation reveals that the only runway lighting consists of two clear alignment lights at each end of runway 16/34. The only other nighttime runway visual aid for airmen consists of clear reflectors spaced approximately 200 ft apart along each side of the runway.

It is apparent that the complaint of the "reporter" to the NASA Safety Reporting System is valid. The AIM should be changed to indicate that there are no runway lights. The AOPA and Jeppesen organizations should be encouraged to also make similar changes.

Enclosed is a copy of the current Airport Master Record (FAA Form 5010-1) dated March 23, 1977 for Evanston Municipal Airport. Please note that nowhere on this form does it indicate the presence of a complete runway lighting system.

18. Text of AB: Marshall, MI, Brooks Field Airport: Pilot report indicates that on a recent night, rotating beacon was operating but neither REIL, or runway lights were operable. No NOTAM was on file. Condition has existed since June. City Manager advises that repairs are imminent, according to report, but lack of information concerning airport condition is of concern.

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Text of Response: The Airport Manager notified this office by telephone on December 20, 1977 that:

1. The runway lights have been repaired and are all operative.
2. The REIL's on both ends of the runway are still inoperative. The parts needed for repair of the REIL's are on order. He will immediately call the FSS in South Bend, Indiana, to issue a NOTAM regarding the inoperative REIL's. This office will encourage the Sponsor to repair the REIL's as soon as possible.

19. Text of AB: Harrisburg, PA, Capital City Airport (HAR): The published missed-approach procedures for both the ILS runway 8 and VOR runway 12 approaches for both the ILS runway 8 and VOR runway 12 approaches do not provide heading information for the leg to intercept the inbound 203° radial of Ravine VOR. One pilot reporter observed that even a moderately extreme left turn could cause a pilot to miss the radial and the intersection altogether.

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Text of Response: When a turn to intercept a radial is required, the amount of turn and angle of intercept is normally left to the discretion of the pilot; however, to further improve and clarify the missed approach procedures, the ILS runway 8 and VOR runway 12 will be revised to provide a heading to intercept, vice a turn to intercept the desired radial.

Air Traffic Control: Facilities and Procedures

20. Text of AB: New York, NY, J.F. Kennedy Airport (NYCIFRR): Turbojet pilot reports receiving Canarsie approach with reported weather 3,800 overcast, 4-5 miles. He crossed VOR at 1,500, was cleared to 1,000 ft on the 041 radial at 2.6 miles (MAP). At that point, he did not have contact with ground or lead-in lights, but was further cleared by ATC to descend to 600 ft and to turn right (vectors to runway 13R) and report runway in sight. He broke out high with runway too far to the right and executed a missed approach. After requesting an ILS he was cleared for another Canarsie VOR approach to 13L except that he was told he would be cleared to descend to 500 ft. The second approach was terminated at MAP, followed by an ILS to a landing on runway 13L. Pilot asks whether controllers are authorized to give vectors past MAP and below MDA under IMC.

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Text of Response: Because over 2 months have passed since this incident took place, no specific information is available from facility records. The Canarsie Approach is a VOR approach which

requires the use of "lead-in" lights that provide the pilot with a path to follow to the runway. The approach is used only when weather conditions permit visual reference and use of the lights. When pilot reports indicate that the lead-in lights cannot be seen, use of this approach procedure is discontinued. When the missed approach point (MAP) is reached and the pilot does not have the lights in sight, a missed approach is mandated. When this occurs, Kennedy tower issues a right turn and climb instructions so that the published missed approach procedure is not commenced. This is done because it provides a shorter route to another approach, keeps the aircraft away from residential areas to the left and also keeps the "miss" away from La Guardia Airport airspace.

Although facility management is unaware of any misapplication of this procedure, they will continue to monitor controller actions regarding this procedure as well as all others.

The following is in answer to the question asked by the pilot in the last sentence. No, a controller may not vector arriving aircraft beyond the MAP below minimum descent altitude under instrument meteorological conditions, except in an emergency situation. However, an aircraft may be provided vectors and altitude assignments that differ from the published missed approach procedure, once the pilot or controller initiates a missed approach.

21. Text of AB: Miami, FL, Opa Locka Airport: Potential conflict situations have been reported as a consequence of ATC policy permitting the release of aircraft departing on runway 27R toward arriving IFR traffic inbound on the VOR runway 9L approach. The departing traffic is given "maintain runway heading" even though the inbound traffic is approaching on an established course converging at an angle of no more than 20° from the reciprocal of the departing traffic's course. This situation is alleged to be the product of a letter of agreement between the Miami ATCT and the Opa Locka ATCT which specifies that the Alcat intersection (FAF) will be the cutoff point for determining departure releases instead of the Miami VOR (IAF). Reporters contend that because the Alcat intersection is less than 4 miles from the airport (actual distance = 3.8 miles) such a letter of agreement is contrary to the provisions of FAAH 7110.65, paragraph 345.

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Text of Response: Present procedures do allow for the release of IFR departure aircraft at nonapproach control tower locations with respect to arriving IFR traffic, if authorized by the controlling facility. In this case, authorization to apply visual separation (paragraph 492b) was granted to Opa Locka tower by Miami tower and specified in a Letter of Agreement between the two facilities.

Since the final approach fix for runway 9L (ALGAT) is 3.8 miles from the runway, the procedure indicated in paragraph 345a is not authorized at Opa Locka.

Action has been initiated to relocate ALGAT intersection to a position at least 4 miles from runway 9L. This relocation will satisfy the requirements of paragraph 345a and permit the procedure. (Subsequent information indicates that ALGAT intersection has been relocated 4.8 miles from runway 9L.)

As an interim measure the Letter of Agreement was amended as follows:

"Opa Locka Tower shall not release any IFR/Special VFR departures after an IFR arrival has reported SWABB or SEABO inbound unless visual separation is applied. A 7NM radar fix will be used in lieu of ALGAT."

"MIA Tower shall transfer VFR practice/IFR approaches/VFR advisories to Opa Locka Tower not less than 7NM prior to the airport and provide a 7 NM radar fix for OPF RWY 9L VOR approaches."

22. Text of AB: Chicago ARTCC, FWA Low Sector (B5R): Controller reports indicate the existence of a practice that has resulted in potential conflict situations. Narrowband radar is being maintained at low settings to decrease the clutter around the antenna. The result of this practice is the periodic nondisplay of primary targets on RDP screens. The same aircraft not displayed on narrowband are generally capable of providing strong primary targets on broadband. Corrective action in the form of "peaking" the RDP to a higher setting solves the problem of lack of primary target display. This problem, discussed in this specific instance with regard to the FWA low sector, has also been the subject of other controller reports from other parts of the ATC system.

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Text of Response: Narrowband and broadband radar operation provide similar flexibility of adjustment for controller use. Comparable presentations can be achieved; however, to adjust for a "clean scope" or as free of clutter as possible, some comparability is lost. The radar data processing system (RDP), when peaked, will provide the primary target display for controller use.

23. Text of AB: Wilmington, NC, New Hanover County Airport: Model 375 intercommunications system does not work properly and has posed persistent problems since installation in early December 1976. Receiver volume must be full on and despite this, radio reception is unreliable due to fading. Intercommunication is difficult and there is no visual indication at receiving end that a call is in progress.

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Text of Response: Engineers from this office and from the telephone company visited Wilmington, North Carolina, ATCT on February 28, March 1, and March 2, 1977, to investigate subject problems with the TELCO 375 system. Neither the local Air Traffic Chief nor the Sector Field Office Chief was aware of the subject problems.

An alignment of the system was made to insure proper levels and proper operation. Some levels were found to be marginal but not so as to impair reliable communications. These levels were corrected. The reference to intercommunications being difficult apparently refers to the lack of the position override feature which is not available with the 375 system.

This office feels that the TELCO 375 system at Wilmington is functioning properly and that no further action is required.

24. Text of AB: Boston (MA) TRACON — Departure North and West Sectors: Recent controller reports describe the existence of a potentially hazardous condition resulting from the lack of coordination between departure control positions physically removed from each other. The report alleges that because of the distance between the respective departure control positions the proper degree of coordination does not take place, particularly during those periods when the ARTS III

equipment is out of service. This condition permits VFR aircraft, worked by two different controllers, to operate in proximity to each other or be vectored in converging paths without either controller being aware of the other controller's traffic or intentions.

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Text of Response: The physical distance between the two departure controllers is not so excessive as to prohibit coordination when required. Additionally, both controllers are equipped with communication facilities to provide them with instantaneous coordination with the other positions.

The ARTS III data eliminates the need for coordination between these two positions over 98% of the time since the alphanumeric tag identifies the controller who is working the aircraft. In those cases when the ARTS III data is not available, instantaneous personal or telephone communications between the two controllers is easily accomplished.

Boston ATCT Order 7110.48 is also being rewritten to require traffic coordination between the tower cab local controller/assistant local controller and both departure radar controllers. (Subsequent information indicates the order was revised in August, 1977, and now bears order no. 7110.54.)

25. Text of AB: Anchorage, AK, Lake Hood SPB (LHD): Pilot reports contend that with the recent closing of the ATCT at Lake Hood surface wind directions and velocities supplied by the Anchorage International Airport's ATCT do not agree with the actual conditions on the lake at the time of those wind advisories. One reporter spoke with an ANC ATCT controller regarding this continuing discrepancy; the controller acknowledged the problem, but stated that ATCT personnel are obligated to report the wind conditions as they are indicated by the NAC equipment. Considering the nature and volume of seaplane operations at Lake Hood, it was suggested that a separate wind monitoring station be established for the lake's operations.

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Text of Response: The Lake Hood SPB (LHD) Control Tower was closed in May of this year and the tower function was moved in to the newly commissioned Anchorage International Airport Control Tower. At that time, the wind monitoring device (anemometer) was removed from the LHD tower roof and reinstalled atop a pole within 50 ft of the LHD tower at its approximate same height. A wind direction and velocity indicator was remoted into the new tower. This wind information is and has been given to all aircraft operating on Lake Hood. A separate wind indicator (anemometer located in center of Anchorage International Airport) is used for Anchorage Airport wind data.

An earlier report by the facility chief, Anchorage tower, indicated a possible erroneous reading on the Lake Hood wind instrument whenever the wind was out of the south-southeast and above 10 knots. This was brought to the attention of the National Weather Service who checked the equipment for accuracy and the site for possible cause for wind deflection. A slight calibration error was noted and corrected. There was no other apparent reason for an erroneous wind reading.

No further comment is on record. The problem no longer exists.

26. Text of AB: Anchorage, Alaska, Anchorage ARTCC: As a result of a Letter of Agreement between ZAN and Alaskan Flight Service Stations at uncontrolled airports, the FSS personnel are instructed to conclude IFR clearances relayed through the FSS with the statement "(clearance) . . . contact Anchorage Center on (frequency) after departure." Pilots are reported to be interpreting the "contact Anchorage Center . . ." statement as a termination of communication with the FSS. The result of this interpretation is a failure by pilots to report departures to the appropriate FSS. The consequences of an FSS not knowing of an aircraft's departure are reported to include: (1) delays in relaying pertinent information to the ARTCC, (2) excessive delays in issuing clearances to other aircraft, and (3) confusion as to the actual position of recently departed IFR aircraft. One suggested means of eliminating the confusing interpretation involves simply changing the phraseology to state: "(clearance) . . . report departure on this frequency, then contact Anchorage Center on (frequency)."

* * *

Text of Response: The phraseology in the subject Letter of Agreement could cause premature frequency change by a departing IFR aircraft, thus hampering FSS specialist in performing effective airport advisory service.

The subject Letter of Agreement has been revised to reflect the phraseology, ". . . report departure on this frequency, then contact Anchorage Center on (frequency)." Expected effective date of this revised Letter of Agreement is December 20, 1977.

Hazards to Flight

27. Text of AB: Los Angeles, CA; Whiteman Airpark (047): Pilot reports indicate the existence of conflict situations between aircraft operating in the traffic pattern at Whiteman Airpark and traffic on approach into Hollywood-Burbank Airport. Despite a 2000-ft MSL traffic pattern at Whiteman and a 3000-ft MSL floor until past Whiteman on runway 15 approaches into Hollywood-Burbank, several reports have described encounters between aircraft using the two airports.

* * *

Text of Response: We agree that there is an area of possible conflict between aircraft inbound to runway 15 at Hollywood-Burbank Airport and aircraft operating in the traffic pattern at Whiteman Airpark.

Aircraft on visual approach to runway 15 are issued a crossing restriction of 3,000 ft MSL over the Whiteman Airpark traffic pattern. In addition, VFR aircraft inbound from the north to runway 15 are instructed to proceed to the Hansen Dam for a straight-in-approach. This approach path passes approximately 2 miles abeam of Whiteman Airpark.

Another problem exists when aircraft depart San Fernando Airport, approximately 1 mile north of Whiteman Airpark, inbound to Hollywood-Burbank. We have no control over where they make initial contact with Burbank tower. The most direct route to runway 15 is through the Whiteman Airpark traffic pattern and that is where initial contact is often made.

The Whiteman Airpark is located below an area of our TRSA that extends from 3500 to 7000 ft. Many aircraft attempt to fly under our TRSA and under the traffic inbound to runway 15. In doing so, they do pass through the Whiteman Airpark traffic pattern.

As long as there are two uncontrolled airports in such close proximity to Burbank Airport, the existence of conflict situations will be a possibility. Burbank tower makes every attempt possible to keep aircraft clear of the Whiteman Airpark traffic pattern by restricting aircraft under their control. We also attempt to inform pilots of the hazard at pilot meetings, through pilot bulletins, and by personal contacts with pilots.

Aircraft landing at Burbank Airport are required by FARs (Part 91) to contact Burbank tower before entering the Airport Traffic Area. Whiteman Airpark lies within the Burbank Airport Traffic Area.

28. Text of AB: Avalon, CA, Catalina Airport vicinity: A tower, approximately 100 ft high, located on the second-highest peak on the island, is reported to be a hazard to VFR traffic. The tower was lighted until 2 years ago, has been unlighted since.

* * *

Text of Response: Communication tower +100 ft AGL, owned by Los Angeles County Communication Department, located at the VOR circling approach, mostly to runway 22, approximately 1/4 miles north of the VOR, lat. 33° 23' 12" N, long. 118° 24' 0" W, site elevation 2,010' MSL. Tower warning light was broken by vandalism.

The County Communication Department is aware of the situation and stated that the light fixture is scheduled for inspection on December 15, 1977. Lighting repair will take place within 3 weeks from today.

NOTAM AVX 12/1 has been issued on December 13, 1977, for this obstruction from Los Angeles FSS.

29. Text of AB: Ellinwood, KS, Ellinwood Municipal Airport (1K6): Power lines immediately north of the airfield are reported to be a problem for all types of aircraft operations at this facility. In addition, none of the current charts, notams, or A.I.M. Part 2 information contain any notations regarding the presence of the power lines north of the airport.

* * *

Text of Response: The power line hazard immediately north of the Ellinwood Municipal Airport has been resolved. The power lines have been removed and placed underground.

We appreciate your bringing these safety matters to our attention.

30. Text of AB: Teterboro, New Jersey, Teterboro Airport (TEB): A recent pilot report has identified a possible hazard in the vicinity of the south and west approaches to this airport. A tower, 436 ft high and 1.5 miles from the threshold end of runway 06, is a significant obstruction to aircraft attempting to execute circle-to-land approaches into this field from the southwest. One pilot,

cleared to land on runway 01 and approaching from the southwest using the ILS runway 06 procedures, barely missed the tower while on the base leg of his circle-to-land approach onto runway 01. The pilot involved noted that a major factor in this critical approach procedure is the notation contained in the footnote of both the current ILS and NDB runway 06 approach charts. Given the height and proximity of the 436-ft tower to both runways 01 and 06, the reporter urges that consideration be given to clarifying the footnote by changing it to read "Circling NA north and west of airport between runway 06 and runway 19 centerlines extended." The pilot also stated that the problem is compounded by the tower, which is alleged to be poorly illuminated with only the top light lit, blending in with the lights and surface coloration of the densely populated urban area surrounding the airport and the tower.

* * *

Text of Response: The ILS Runway 06 procedure for Teterboro has been reviewed and determined to meet criteria and specifications requirements for publication of such procedures. Based on the information provided, it seems the pilot may have failed to adhere to FAR 91.117(b) and descended prematurely from the circling MDA. The circling MDA of 740 ft was established to provide at least 300 ft of vertical clearance above the cited tower elevation. Had the MDA been observed, the near miss with the tower could not have occurred. This same MDA has been in effect since May 30, 1968, and we are not aware of any past problems with this procedure relating to the tower in question.

31. Text of AB: Omaha, NE: Information obtained from both pilots and controllers indicates that a weather observation station serving Omaha, located approximately 10 miles west/northwest of Eppley Airfield, regularly releases observation balloons without providing timely notification to the appropriate air traffic control facility. In one case a departing air carrier aircraft was confronted with a weather balloon and its suspended monitoring equipment immediately after breaking out of an undercast; evasive action was required to avoid a collision.

* * *

Text of Response: Existing regulations, FAR 101, do not require the Weather Bureau to provide pre-launch notice prior to releasing weather balloons. The physical size and other characteristics of the balloons used; i.e., their 5 ft diameter and gas capacity, excludes them from the provisions and restraints of advance notification. The construction characteristics and physical nonhazard make-up of these balloons are not felt to pose a safety problem to aircraft operations at Eppley.

Although not required by regulations, guidelines have been established whereby pre-launch notice is provided whenever the release is to be effected on or near an airport. By traditional connotation, "near" has been held to be within approximately 5 miles of the airport; this distance being the general dimension of an airport traffic area or control zone. Washington Headquarters, Weather Bureau presently considering national needs as to possibly issuing a specific distance criteria in lieu of the current "on or near" guideline.

Since the launch point at Omaha is 10 miles away from Eppley Airport, advance release notification is currently not required.

32. Text of AB: Tucson, AZ, Tucson Approach Control airspace: Controller report describes several instances in past month involving sailplane operations from Ryan Airfield, 10 miles southwest of TUS. At least two occurrences have been near midair collisions between airline aircraft and sailplanes. Report states that there is no present mechanism for making controllers aware of times of intense sailplane activity and no sterile or protected areas for sailplane activity to prevent them from vectoring IFR aircraft through such areas.

* * *

Text of Response: The chief of Davis-Monthan RAPCON has thoroughly investigated this Aviation Safety Report. He is not aware of any near midair collision reports that have been filed involving sailplane operations at Ryan Airfield.

A meeting was held with representatives of the soaring club and Davis-Monthan RAPCON. At Tucson, AZ, the soaring club representatives were also unaware of any near midair collisions with sailplanes during the past 6 months. The discussion was related to the traffic flow in the Tucson area for both departing and arriving aircraft. At this meeting, the soaring club advised that they would, to the extent possible, advise the FSS in advance of planned soaring activities. The FSS would, in turn, send an AIRAD. The RAPCON would then become aware of these activities by means of the AIRAD.

Due to limited airspace, mountainous terrain limitations, and the nearness of the soaring club operations to Tucson, there is no practical way to sterilize airspace for soaring activities in the Ryan Airfield/Tucson area. Both areas are located within the primary departure/arrival routes to the northwest of Tucson and within the altitude stratus normally occupied by arriving/departing aircraft.

The majority of the sailplanes are not transponder-equipped, nor do they maintain radio communications with Tucson Approach Control. Consequently, the RAPCON's responsibilities in this area lie in issuing traffic advisories to aircraft on their frequencies on a workload-permitting basis and ensuring that controllers are aware of this potential problem.

The chief of Davis-Monthan RAPCON briefed his assistant chiefs on this subject and they will carefully monitor glider/sailplane activity and forward written reports of any hazardous situation that may occur. All facility personnel have since been briefed on this potential problem.

33. Text of AB: San Diego International-Lindbergh Airport, San Diego, CA: Converging traffic patterns involving a mix of aircraft types are creating a potential conflict situation at this airport. Heavy aircraft on the approach to runway 27 are placed in proximity to light aircraft operating in the right traffic pattern for runway 31. A recent pilot report noted that aircraft descending onto runway 31 from the pattern altitude of 1,015 ft (MSL) encounter runway 27 traffic executing arrivals and missed approaches in a zone between the 780-ft (MSL) level and pattern altitude.

* * *

Text of Response: The situation pointed out by the reporter, that is, of traffic downwind for runway 31 and arriving traffic on runway 27 posing a potential traffic conflict, has been in effect

for a long period time at Lindbergh Field. The downwind to 31 traffic pattern altitude is assigned at 1,200 ft. In the instance reported it would appear that the downwind traffic was lower than the assigned pattern altitude.

We are informed that in the past, alternate procedures were examined and found to be infeasible. We are taking a new look at the procedure and will thoroughly explore, and implement where feasible, several alternatives including:

1. Use a left pattern for traffic landing runway 31 from the north. This would involve the aircraft flying over the center of the field (using the tower as a checkpoint). This does present a problem maintaining visual contact, but with a combination of use of the BRITE radar and visual, we believe it may prove to be effective and useful in many traffic situations. It also requires coordination in most cases with North Island tower as it infringes on their traffic patterns.
2. Raise the downwind altitude for runway 31 traffic to 1500 ft.

Subsequent information: New procedures, for example, left traffic for runway 31, are now used when, in the controller's judgment, traffic for runway 27 will be a factor.

Military-Civil Coordination

34. Text of AB: Air carrier pilot report indicates that approach controllers may not be aware of TERPS maximum descent gradient for standard instrument approach procedures.

Aircraft was cleared for VOR DME-A to Myrtle Beach AFB to cross the final approach fix at 3,000 ft. The Grand Strand VOR used for this approach is on the Grand Strand airport.

The pilot understood that Myrtle Beach RAPCON assigned the altitude restriction to avoid the Grand Strand airport traffic area. The descent gradient from 3,000 ft at the final approach fix exceeds TERPS criteria. Pilot refused the approach clearance and was vectored for a contact approach.

* * *

Text of Response: Air carrier pilots report described Myrtle Beach RAPCON controller assigning altitude restrictions of 3,000 ft at FAF for DME-A circling approach to Myrtle Beach. Published FAF altitude is 1,600. Pilot alleged that the 3,000-ft altitude exceeded TERPS criteria; he refused the approach clearance and was vectored for a contact approach. Controller probably issued altitude restriction to avoid airport traffic area of Grand Strand Airport (FAF is at airport). Investigation revealed that the descent gradient did not violate the TERPS maximum descent gradient of 400 ft/n.mi. Controllers are not bound by regulation to apply descent gradients; it is the pilot's responsibility to determine if he can comply and advise if he cannot.

Action: Locally, this approach procedure will be used only when necessary due to traffic or equipment outages. All controllers briefed. Comment: This may be a system deficiency concerning education/misunderstanding of pilot/controller responsibilities concerning TERPS criteria.

35. Text of AB: Melbourne, FL, Airport: Airport has a VFR tower. A report indicates that on at least some recent occasions, Patrick AFB Approach Control failed to apply applicable separation standards to arriving aircraft. In one case, with IFR conditions at MLB, aircraft A had passed LOM on ILS 9 with aircraft B on final for back course 27 approach and aircraft C 2 miles northwest approaching visually in accordance with clearance from Patrick. Reporter alleges that incidents have been properly recorded on at least two occasions but that these occurrences have not been handled as systems errors or military facility deviations.

* * *

Text of FAA Response: The Air Traffic Division of the Southern Region and the USAF have been actively working toward improving the level of air traffic service in the Melbourne/Patrick area. The USAF Air Traffic Control Analysis of Patrick Approach Control completed in 1977 indicated that the USAF would take action to improve training at Patrick and would work on strengthening understanding between Patrick Approach and Melbourne Tower.

There is no indication that incidents involving system errors or military facility deviations have not been reported. The FAA ATREP at Patrick has reported two deviations since October 1977. One involved a situation similar to the circumstances described in the alert bulletin. It should be noted that the deviation was filed though standard separation was maintained.

A BRITE IV installation for Melbourne tower is pending completion of a microwave link from the ASR at Patrick. Commissioning of this BRITE will enhance the level of air traffic service at the Melbourne Airport.

Subsequent information: A previously unforeseen need for a repeater site has been identified. The repeater site is being programmed. Estimated commissioning date for the BRITE IV is November, 1978.

* * *

Text of USAF Response: NASA ASRS Alert Bulletin alleged that Patrick AFB RAPCON, the IFR controlling agency for Melbourne, had on some recent occasions failed to apply applicable IFR separation standards. Opposite direction approaches were specifically mentioned. The reporter also alleged that on at least two occasions these occurrences were reported but were not handled as military facility deviations as required.

Investigation: Patrick safety could not do a satisfactory analysis based on the bulletin, due to lack of sufficient identification data. Opposite direction approach procedures are covered in local Letter of Agreement. They have been coordinated and approved by FAA and HQ AFCS and are considered adequate. The Patrick RAPCON has a FAA representative (ATREP) who is responsible for processing military facility deviation reports concerning the facility. HQ AFCS has noted the AB and will monitor the interface of Patrick RAPCON and the local civilian airports serviced.

36. Text of AB: Philadelphia, PA, and McGuire AFB, NJ (WRI, NXX): A recent report describing a potential conflict between a flight of tactical aircraft and an air carrier climbing out of New York alleges that flight plans and thus flight strips on such aircraft departing WRI and NXX

often do not describe accurately the intentions of these aircraft. Resultant changes in flight plan, including cancellation of IFR plans, make it extremely difficult for New York ATC personnel to provide adequate service to civil and military aircraft alike.

* * *

Text of Response: NASA/ASRS Alert Bulletin described report of potential conflict between military tactical aircraft from McGuire AFB and NAS Willow Grove. Report alleges that filed flight plans of tactical aircraft do not describe intentions accurately. Resultant changes in flight plan including cancellation of IFR, make it extremely difficult for ATC personnel to provide adequate service.

Action: AB did not identify the specific type aircraft and time of incident. Restricted Area 5002 that borders McGuire AFB is used by approximately nine units stationed at various eastern locations. Included is the 108th TFW (F105S) at McGuire. The 108th does have some nonstandard departure procedures developed for local safety reasons. Some conditions call for cancellation of IFR enroute in order to join formation. Statement is included in remarks section of flight plan when this is to be done. All departure procedures were reviewed and discussed with CATO, McGuire. Determination was that procedures are adequate and should not pose a problem for New York Center.

37. Text of AB: State of Pennsylvania: Pilots report numerous potential conflicts between military aircraft and civil helicopters at low altitude on training routes (TR) 855 and 856 when flight service stations have not had current information on the status of the routes. These reports have been received subsequent to a meeting with McGuire AFB personnel and the Pennsylvania Helicopter Pilots Association. During the meeting it was apparently indicated that military aircraft would use the routes only when ceiling was at least 3,000 ft, whereas flights have been observed and conflicts have occurred with ceilings no better than 1,200 ft. It was also indicated that proper notification would be provided to FSS facilities in the area, but this has apparently not occurred. Report indicates that there are more than 50 civil helicopters operating within the perimeter of these training routes.

* * *

Text of Response: TR 855 and 856, northwestern Pennsylvania (McGuire AFB, NJ, CPR) – NASA/ASRS Alert Bulletin cited pilot reports of numerous potential conflicts between military aircraft and civilian helicopters. Report indicates there are more than 50 civil helicopters operating within the perimeter of these training routes. Report stated violations of weather criteria and military coordination with flight service stations (FSS's).

Investigation: HQ 108 TFW at McGuire is operator of these training routes. The routes are flown down to 400 AGL at speeds between 300-500 knots for required combat-ready training. All TFS were developed IAW FAA handbook 7610-4C and are operated IAW file. The major command prohibits use of the TR when weather is less than 3000/5. All scheduled use of the TRS is coordinated with the 108 TFW/do at least 24 hours prior to use. This info is passed to Philadelphia FSS the evening prior to the day of intended flight. A scheduling LCG is maintained by 108 TFW/do with a disposition time of 1 year. An aircrew ICS level information book is maintained in opera-

tions and is required reading for all pilots. The book includes a caution on helicopters operating 500 AGL and below in vicinity of lines. The low-level program is a highlighted area by USAF and will remain a high point of interest in the future.

An FAA response indicates that TR 855 and TR 856 will be replaced by IR 704, IR 705 and IR 707. Subsequent information from FAA indicates that these three routes were implemented on January 26, 1978, and that TR 855 and TR 856 will also be converted to VR routes effective January 1, 1979.

Ames Research Center
National Aeronautics and Space Administration
Moffett Field, California 94035, July 18, 1978

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1. Report No. NASA TM-78511		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle NASA AVIATION SAFETY REPORTING SYSTEM: SIXTH QUARTERLY REPORT, JULY 1, 1977 - SEPTEMBER 30, 1977*				5. Report Date	
				6. Performing Organization Code	
7. Author(s)				8. Performing Organization Report No. A-7559	
9. Performing Organization Name and Address Ames Research Center, Moffett Field, Calif. 94035 and Aviation Safety Reporting System Office, Battelle's Columbus Division, Mountain View, Calif. 94043				10. Work Unit No. 515-51-11-01	
12. Sponsoring Agency Name and Address National Aeronautics and Space Administration Washington, D.C. 20546				11. Contract or Grant No.	
				13. Type of Report and Period Covered Technical Memorandum	
15. Supplementary Notes *See also TM X-3445, TM X-3494, TM X-3546, TM-78433 and TM-78476				14. Sponsoring Agency Code	
16. Abstract During the sixth quarter of ASRS operations, 1,357 reports were received. A sample of reports relating to weather is presented; this section describes both weather problems and problems associated with the dissemination of weather information. Wake turbulence and jetwash have been the topics of several reports. A variety of problems encountered by both pilots and controllers in the performance of their duties is discussed. An analytical study of reports relating to cockpit altitude alert systems has been performed. A recent change in the Federal Air Regulation permits the system to be modified so that the alerting signal approaching altitude has only a visual component; the auditory signal would continue to be heard if a deviation from an assigned altitude occurred. Failure to observe altitude alert signals and failure to reset the system were the commonest causes of altitude deviations related to this system. Cockpit crew distraction was the most frequent reason for these failures. It was noted by numerous reporters that the presence of the altitude alert system has made them less aware of altitude; this lack of altitude awareness was a major factor in these reports. Failures of crew coordination were also noted. It is suggested that although modification of the altitude alert system may be highly desirable in short-haul aircraft, it may not be desirable for long-haul aircraft in which cockpit workloads are much lower for long periods of time. In these cockpits, the aural alert approaching altitudes is perceived as useful and helpful. If the systems are to be modified, it appears that additional emphasis on altitude awareness during recurrent training will be necessary; it is also possible that flight crew operating procedures during climb and descent may need reexamination with respect to monitoring responsibilities. A selection of alert bulletins and responses to them is presented.					
17. Key Words (Suggested by Author(s)) Aviation safety Incident reporting Human factors Communications			18. Distribution Statement Unlimited STAR Category -03		
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 60	
				22. Price * \$4.50	

*For sale by the National Technical Information Service, Springfield, Virginia 22161

U.S. GOVERNMENT PRINTING OFFICE: 1978 - O - 272-782 6398

NASA ASRS (Pub. 5)