General Aviation Weather Encounters

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TABLE OF CONTENTS

Appendices

List of Tables and Figures

Tables

Figures

ACRONYM LIST

ACARS	Aircraft Communication Addressing and Reporting System
ADDS	Aviation Digital Data Service
ADF	Automatic Direction Finders
ADIZ	Air Defense Identification Zone
AOPA	Aircraft Owners and Pilots Association
ARTCC	Air Route Traffic Control Center
ATC	Air Traffic Control
ATIS	Automatic Terminal Information Service
ATP	Airline Transport Pilot
ASOS	Automated Surface Observing System
AWOS	Automated Weather Observing System
CAMI	Civil Aerospace Medical Institute
CFI	Certified Flight Instructor
CNN	Cable News Network
DME	Distance Measuring Equipment
DUATS	Direct User Access Terminal Service
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FAS	Flight Advisory Service
FF	Flight Following
FPM	Feet Per Minute
FSS	Flight Service Station
GA	General Aviation
GPS	Global Positioning System
HF	High Frequency
IAF	Initial Approach Fix
IMC	Instrument Meteorological Conditions
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IR	Instrument Rating
MSL	Mean Sea Level
MVFR	Marginal Visual Flight Rules
NASA	National Aeronautics and Space Administration
NBAA	National Business Aviation Association
NOAA	National Oceanic and Atmospheric Administration
NORCAL	Northern California TRACON
NWS	National Weather Service
PATWAS	Pilot's Automatic Telephone Answering Service
PIREPS	Pilot Reports
SIGMETS	Significant Meteorological Information
SQS	Supplemental Question Set
SVFR	Special Visual Flight Rules
TFR	Temporary Flight Restriction
TRACON	Terminal Radar Approach Control
TWB	Transcribed Weather Broadcast
VFR	Visual Flight Rules
VHF	Very High Frequency
VOR	VHF Omnidirectional Range

Executive Summary

General Aviation Weather Encounters Study

The 2007 Joseph Nall Report cites 14.8 percent of all fatal pilot-related general aviation accidents were categorized as weather related. This appears to be a consistent rate and is comparable to the 2005 and 2006 Nall Report statistics.[1] The 2007 Nall Report states that most often "...these resulted from pilots continuing VFR flight into instrument meteorological conditions (IMC)". Aviation accidents are defined as those events that involve "any person suffering death or serious injury, or in which the aircraft receives substantial damage". These events are classified as NTSB reportable accidents as defined by the National Transportation Safety Board (NTSB) regulations under Subpart A & B, NTSB 830.5 (49 CFR 830.5). Other aviation events, described as incidents, are eligible to be reported confidentially to the NASA Aviation Safety Reporting System (ASRS), which is a collaborative program between the Federal Aviation Administration (FAA) and the National Aeronautics and Space Administration (NASA) at the NASA Ames Research Center. FAA Advisory Circular 00-46D describes the provisions of report submission to the NASA ASRS.

General Aviation (GA) weather incident events are frequently reported to the ASRS. GA incident reports contribute approximately one-quarter of the total ASRS report intake. ASRS report intake for 2007 was 45,603, of which 10,531 were GA reports. These incident reports are highly valuable in safety analyses because unlike most accidents where the pilots likely succumbed to the accident, these pilots have survived to tell their story. Their report submissions to ASRS can assist in the pre-emptive safety efforts of the FAA and the aviation community to reduce general aviation accidents. In this case, this study can contribute information to the prevention of GA weather related accidents.

In an effort to increase the understanding of weather event dynamics and factors contributing to these general aviation incidents, the ASRS GA Weather Encounters Study was conducted between July and December 2005. This project was requested and funded by FAA AFS-230. The process used by the ASRS to conduct this project was to identify candidate reports from the overall report intake at ASRS and contact reporters by telephone to request their participation in the study. Those who agreed to participate were mailed a package that included a Supplemental Question Set (SQS) concerning their reported GA weather event. The SQS was developed through collaborative efforts between NASA ASRS, FAA AFS-230, and FAA Civil Aerospace Medical Institute (CAMI). Completed supplemental questions provided additional information to the reporter's analyzed and de-identified ASRS report. There were 100 respondents providing supplemental information to their original ASRS report concerning a weather incident under general aviation Federal Aviation Regulations (FAR) Parts 91, 135 or 105 aircraft operations for this GA Weather Encounters Study.

The qualifications of the 100 pilots who participated in the GA Weather Encounters study were generally representative of the overall general aviation community. The average flight experience in hours was approximately 3,200. The median[2] of flight experience was 877 hours and was used here due to the fact that the majority of pilots in this group had less than 2000 hours. The average flight experience in actual

[1] 2007 Nall Report, Accident Trends and Factors for 2006, AOPA Air Safety Foundation, pg. 5.

[2] Definition of Median (source: dictionary.com): The middle number in a given sequence of numbers, taken as the average of the two middle numbers when the sequence has an even number of numbers: 4 is the median of 1, 3, 4, 8, 9.

instrument conditions for the 71 instrument rated pilots was 666 hours. The median of experience flying in actual instrument conditions for these 71 instrument rated pilots was 49 hours. Over half (43 of 71) of these pilots had 100 or less hours of experience flying in actual instrument conditions. Many pilots mentioned the importance of training in actual conditions versus "under the hood" or "simulator" time. These levels of flight experience may have contributed to these weather encounter events.

Interestingly, there was not a noticeable difference in the scenarios, experiences, and recovery techniques between the instrument rated (71 of 100) and non-instrument rated pilots (29 of 100). A high number of pilots had some level of instrument experience or training (80 out of 100 pilots) which may have helped mitigate the consequences of a weather encounter; most specifically VFR flight into IMC. One pilot stated:

> *"Get as much IMC experience as possible . . . Emphasize unusual attitude recovery in recurrent IFR training – this is what saved me."* (Report Number 52)

The participant pilots were asked to rate the accuracy of forecasts for their incident flight. They indicated that the weather was "worse than" forecasted for the departure airport 20 percent of the time, for the enroute segment 41 percent of the time, and for their destination airport 45 percent of the time. This may indicate that a number of the pilots in the study did not update, or were not able to effectively update, their weather data while in flight. Increased emphasis, during initial flight training on the value of, and methods for, obtaining weather updates in flight may be an effective prevention strategy.

Over 50% of the pilots in this study did not file flight plans before departure for a variety of reasons including staying in the pattern, being very familiar with their route, time pressures, and not wanting to be constrained by a set route on an IFR plan.

Eighty percent of the aircraft in this study had GPS units on board and 70% of the pilots utilized GPS during their flight. A majority of pilot recovery strategies involved the use of navigation equipment, specifically panel-mounted or portable GPS units. The reports described both the advantages and disadvantages of using GPS. Some pilots reported that GPS equipment was extremely helpful in recovering from their weather encounter. However, original ASRS pilot report narratives also contained some comments related to over-reliance on GPS panel-mount or portable units.

Pilots in this study provided their perspective on strategies for preventing undesirable weather encounters and cited additional or enhanced training as a primary prevention tactic. They also suggested that GA pilots should consider:

- Understanding sources and utilization of various weather sources.
- Seeking additional instrument training, including unusual attitude training.
- Getting up-to-date weather information while enroute.
- Acknowledging personal weather minimums and resist pushing these "personal" limits.
- Using autopilot or wing-leveler technology to assist in workload and reduce vertigo/disorientation in the event of inadvertent IMC encounter.
- Not taking off, turning back or landing at an alternate airport if weather forecasts are poor or weather deteriorates.

INTRODUCTION

Issues related to weather encounters for operators of General Aviation (GA) aircraft are a top safety priority for the Federal Aviation Administration (FAA) and the aviation community. The 2007 Nall Report puts GA weather-related accidents and fatalities into perspective in the following citation:

> *Pilot-related weather crashes were comparable to the previous year, registering 51 (5.2 percent) total and 32 (14.8 percent) fatal pilot-related accidents. Most often, these resulted from pilots continuing VFR flight into instrument meteorological conditions (IMC). In the long term, weather accidents continue their gradual increase.*[1]

In support of FAA and aviation industry efforts to improve awareness, knowledge, training, and procedures related to aviation weather in GA operations, FAA requested that the National Aeronautics and Space Administration (NASA) Aviation Safety Reporting System (ASRS) undertake a study of GA weather encounter incidents. ASRS incident reports are known to be a rich source of human factors information and of insights that may not be available in other data. The reputation of the ASRS in the aviation community, which has confidentially protected the identity of reporters for over 30 years and 770,000 reports, was a key factor in the participation of pilots in this study. It is through that trust that pilots, who experienced and reported these weather events, volunteered to provide additional information. In addition to the original ASRS incident report, the GA Weather Encounters Study includes ASRS reporter responses to the supplemental set of questions; hereinafter referred to Supplemental Question Set (SQS). This set of supplemental questions about GA weather was developed through collaborative efforts between NASA ASRS, FAA AFS-230, and FAA Civil Aerospace Medical Institute (CAMI).

A six page Supplemental Question Set "SQS" was used to gather additional data

The GA Weather Encounters Study marked the first time that ASRS has used a written, rather than the telephone structured callback, method, to obtain additional descriptive information from reporters. The ASRS chose the written Supplemental Question Set (SQS) for several reasons. First, written sets of supplemental questions were expected to yield a high level of reporter participation when cooperation was solicited in advance. In addition, because structured callback interviews conducted by telephone are labor-intensive and expensive, the study costs could be reduced by a written SQS voluntarily returned to ASRS by reporters.

Both methods of gathering supplemental information (i.e., written SQS and telephone structured callbacks) have been successful. The use of these research tools has made it possible to obtain enhanced information about the factual details surrounding an incident as well as subjective information that might otherwise remain unknown, such as reporters' decisions, practices and attitudes.

[1] 2007 Nall Report, Accident Trends and Factors for 2006, AOPA Air Safety Foundation, p. 5

OBJECTIVES

This study had three objectives, which were to:

- Develop an understanding of the types of events and situations GA pilots experience related to weather;
- Document event dynamics and contributing factors underlying GA weather incidents; and
- Support ongoing FAA efforts by utilizing ASRS data provided by GA pilots in pre-emptive risk reduction for GA operations in adverse weather operations.

APPROACH

SCOPE

Reports included in the study were required to meet the following criteria:

- Involve a weather encounter reported to ASRS by a GA pilot;
- Involve any model of aircraft conducting operations under FAR Parts 91, 135 or 105, including helicopters.

SUPPLEMENTAL QUESTION SET (SQS) DEVELOPMENT AND DATA COLLECTION

In early 2005, ASRS analysts began to identify candidate ASRS reports from the incoming report flow. ASRS also conducted focused outreach activities to stimulate GA weather reporting to the program. ASRS's primary outreach tool was an article in Issue #307 of its monthly publication, *CALLBACK*, announcing the study and soliciting relevant incident reports from the GA community. Additional outreach activities included ASRS interaction with representatives of aviation organizations, such as the AOPA, the National Business Aircraft Association (NBAA), and other aviation and government groups.

The SQS development was a collaborative effort between FAA CAMI, FAA AFS-230, and NASA ASRS at NASA Ames Research Center. Iterative development and testing was conducted to produce a final SQS. In July 2005, ASRS analysts began calling reporters and inviting them to participate in the GA Weather Encounters Study. There were 121 pilots who agreed to participate and the SQS was mailed to those pilots. By December 2005, 100 completed SQS packets had been received at ASRS, and ASRS staff began preparing the data for further tabulation and analysis. All collected data was treated confidentially, and any details that could identify individuals or organizations were removed prior to data analysis.

There were two sets of initial data utilized for this study. One was the ASRS data analysis accomplished by ASRS Expert Analysts using the standard ASRS Coding Form and the other was the data responses from the SQS. Both were used to form a single de-identified data record that provides a complete description of each incident. Aggregated data summaries from the ASRS Coding Form and the SQS can be found in the Appendices listed below:

- **Appendix A** contains the SQS form used for this study. There are six sections in this SQS: (A) Flight Planning & Weather Briefings, (B) Incident Information, (C) Contributing Factors and Consequences, (D) Aircraft Equipment, (E) Instrument Experience, and (F) Summary.
- **Appendix B** contains selected fields from the ASRS Coding Form (completed by ASRS Expert Analysts based on ASRS pilot reporting form information) and ASRS Expert Analyst report synopsis.
- **Appendix C** contains a comprehensive data summary for all the questions in the SQS including pilot reporters' opinions as to why the incident occurred and what preventative measures they would recommend.

The study set consisted of 100 GA weather encounters

In this study, a single event occurrence reported to ASRS is referred to as a "report." There were 100 unique events (reports) in this study set. The figures and tables presented in the study findings will cite the number of completed answers or responses out of the total data set of 100. For questions that provided opportunities for multiple responses, the label will indicate this by the statement, "not mutually exclusive."

FINDINGS

The responses to the ASRS SQS were received at the ASRS through the mail from those pilots who volunteered to provide additional explanatory information to their original ASRS report. It is through this generous contribution by those pilots that the following data results have been possible. The study findings being evaluated in this document will utilize two levels of information. The first is the original ASRS report with ASRS Expert Analyst data coding. The other data supplementing this is each SQS response, which adds deeper information concerning the original report. When the findings reported are as a result of information provided in the SQS, the specific question used will be referenced (i.e., SQS #). If not stated, other findings will be based on information provided in the original report that includes the ASRS Expert Analyst evaluation.

DESCRIPTIVE INFORMATION

Ninety-eight of the 100 incidents in the data set occurred between January 2005 and November 2005 (two others were received during this timeframe, however described weather events that occurred previously, but were included based on the richness of the reporter's report).

Pilot Qualifications

ASRS summarized data on pilot experience for the study group from the original ASRS report submission and Section E of the SQS. In the 100-report study set, the certificates and ratings are summarized in **Table 1**. Forty-two pilots held a Private Pilot certificate, 39 held a Commercial Pilot certificate, and 16 held an Airline Transport Pilot certificate.

Seventy-one pilots held an Instrument Rating (SQS E.1). Of the 29 non-instrument rated pilots, 12 stated that they were working on their instrument rating. Twenty-nine of the study participants held a Certified Flight Instructor (CFI) certificate. Additionally, 35 held Multi-engine ratings, and 4 held Flight Engineers ratings.

83 pilots had either an IR or had started IR training

Table 1. Pilot Qualifications*

Certificates	Instrument	MEI	CFI	F/E
ATP (n=16)	16	7	6	4
Commercial (n=39)	37	24	21	0
Private (n=42)	17	3	0	0
Unknown (n=3)	1	1	2	0

*Ratings by certificate type are not mutually exclusive (e.g., one ATP certificated pilot may have reported both an MEI & CFI rating.

Overall Pilot Experience

Pilots in the study group averaged 3,159 hours of total flight time. The median for respondents was 877 hours of flight experience (see **Figure 1**).

NOTE: Measurements of the median vs. average may be most useful when a few individuals with extensive experience in the thousands of hours can significantly skew the average for the group (i.e., 9 pilots claimed 10,000 or more flight hours). Seventy-two of the 100 pilots had 2,000 hours or less in experience.

Instrument Flying Experience

Information on instrument flight experience was evaluated through responses to questions in Section E (SQS E.3 through E.7) of the SQS and is summarized below:

E.3) How many actual instrument hours have you flown?

- The average flight experience in actual instrument conditions for the 97 pilots who responded to this question was 483 hours. The median for this group was 25 hours.

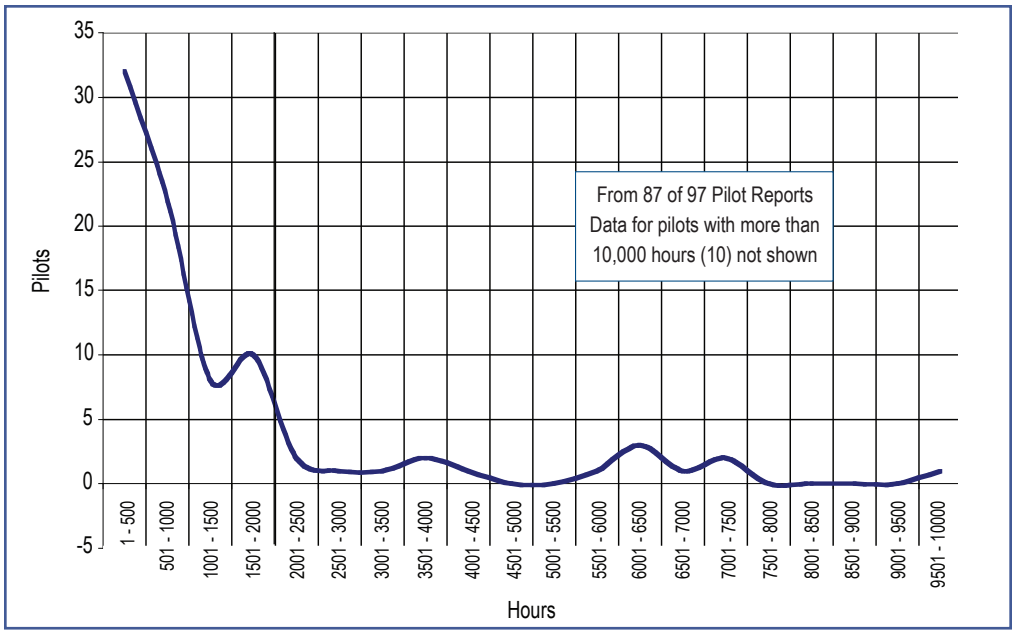

Figure 1. Reporter Flight Time (n=87)

- 79 pilots out of 97 pilots who responded to this question reported having flown between 0.5 to over 1000 actual instrument hours.
- 18 pilots did not have any hours of actual instrument flying.
- 40 pilots had flown between 0.5 and 40 actual instrument hours. Eight were non-instrument rated pilots in training for an instrument rating and 32 were instrument rated.
- The average flight experience in actual instrument conditions for the 71 instrument rated pilots was 666 hours.
- The median flight experience in actual instrument conditions for these 71 instrument rated pilots was 49 hours. Over half (43 of 71) of these pilots had 100 or less hours of flight experience in actual instrument conditions.

E.4) How many simulated (under the hood) instrument hours have you flown?

- 92 pilots out of 94 pilots who responded to this question reported having flown between 1 to over 100 "under-the-hood" hours.
- 31 pilots had flown 40 or less "under-the-hood" instrument hours (21 were non-instrument rated pilots, 10 were instrument rated).
- 23 of the 71 instrument rated pilots in the study had 100+ hours of simulated "under the hood" instrument time.

E.5) How many simulator hours have you had?

- 71 pilots out of 96 pilots who responded to this question reported having between 1 to over 90 simulator hours.

- 25 pilots did not have any hours in a simulator.
- 46 pilots had between 1 and 40 hours of simulator time (12 were non-instrument rated pilots, 34 were instrument rated).

E.6) How many instrument approaches had you conducted in actual instrument conditions in the year prior to the incident?

- 58 pilots out of 95 pilots who responded to this question reported having between 1 to over 80 instrument approaches in IMC in last 12 months.
- 37 pilots did not have any instrument approaches in IMC.
- 18 pilots conducted between 1 and 5 instrument approaches in IMC.

E.7) How many instrument approaches had you conducted in actual instrument conditions in the 90 days prior to the incident?

- 48 pilots out of 97 pilots who responded to this question reported having conducted between 1 to over 40 instrument approaches in IMC in last 90 days.
- 83 pilots conducted 5 or fewer instrument approaches in IMC (55 were instrument rated, 28 were non-instrument rated pilots). Forty-nine (25 instrument rated, 24 non-instrument rated) of the 83 pilots had conducted zero instrument approaches in IMC.

83 pilots conducted 5 or fewer instrument approaches in IMC in the past 90 days

Instrument Training

As stated in SQS E.4 and E.5, a large majority of study participants reported some instrument training experience. Ninety-two pilots reported having in-aircraft, under-the-hood training, and 71 had instrument simulator time.

Unfortunately, the SQS did not include a question concerning whether a pilot was considered IFR current at the time of the event, as defined by FAR Part 61.57(c)(1):

> *Every six months a pilot needs to perform at least six instrument approaches, holding procedures, and intercepting and tracking courses through the use of navigation systems. A pilot has another six months to get current before having to take an instrument proficiency check. During that six months they may not file IFR.*

Table 2. Aircraft Equipment

Weather Equipment	None	Equipped	Used	Unserviceable
No weather avoidance equipment	66	–	–	–
Weather Radar	–	12	9	2
Lightning Detector/Stormscope	–	22	10	1
Weather Data Link	–	6	4	1
Other	–	5	4	0
De-Ice / Anit-Ice Equipment	**None**	**Equipped**	**Used**	**Unserviceable**
No de-ice, anti-ice or related	73	–	–	–
Wing / tail De-icing boots	–	10	3	0
Wing / tail bleed-air anti-ice	–	3	0	0
Wing / tail electric anti-ice	–	2	0	0
Wing / tail TKS (fluid type anti-ice)	–	1	0	0
Propeller de-ice or anti-ice	–	10	4	0
Engine (air) inlet anti-ice	–	15	4	0
Windshield de-ice or anti-ice	–	14	2	0
Other	–	10	8	0
Autopilot / Wing-Leveler	**None**	**Equipped**	**Used**	**Unserviceable**
No autopilot or wing-leveler	44	–	–	–
Wing-Leveler	–	12	1	2
Basic autopilot	–	21	9	1
Approach-capable autopilot	–	30	19	0
Communication Equipment	**None**	**Equipped**	**Used**	**Unserviceable**
No communication equipment	0	–	–	–
Single VHF transceiver	–	18	5	1
Dual VHF transceiver	–	71	59	0
Combination NavCom	–	62	53	1
HF transceiver	–	5	2	0
ACARS	–	2	0	0
Skyphone	–	5	0	1
Cell phone	–	22	3	2
Other	–	2	2	0
Navigational Equipment	**None**	**Equipped**	**Used**	**Unserviceable**
Single VOR Receiver	–	26	16	1
Dual VOR Receiver	–	68	4	3
ILS	–	65	18	3
ADF	–	44	9	7
DME	–	42	22	3
GPS	–	80	70	0
INS / IRS	–	3	2	0
Integrated area navigation	–	3	1	0
Moving Map	–	48	43	1
Terrain Warning System	–	10	6	0
Other	–	7	6	0
None	1	0	0	0

Aircraft Type and Equipment

The majority of aircraft (79) were light single-engine aircraft. Six aircraft were light twins, and 5 were light-to-medium turboprops. The remaining aircraft included one sailplane, three corporate jets, and six helicopters. A list of all aircraft types can be found in **Appendix B**.

All aircraft were equipped with basic, serviceable communications and only one did not have any navigation equipment. Eighty of 100 aircraft were equipped with GPS, and 70 pilots utilized GPS navigation during the flight (SQS D.1).

80 pilots had GPS navigation capability and 70 utilized GPS during their flights

Sixty-six aircraft were not equipped with weather radar, lightning detector/ stormscope, or weather data link (SQS D.2) and 73 lacked de-ice/anti-ice capability (SQS D.3).

Table 2 shows the range of weather detection, anti-ice/de-ice, communication, and navigation equipment for study aircraft (SQS D.1 – 4).

Mission, Type of Operator, and FAR Part

Mission, as reported on the original ASRS reporting form, provides the reporter's description of type of flight mission during the event. In the study set of 100 reports, the mission was most commonly reported was pleasure (51 percent). Some form of business activity accounted for 14 percent. **Figure 2** provides the breakdown of aircraft missions. In addition, the majority of flights (84) were conducted under FAR Part 91 with the balance including Part 135 (12), Part 121 (2), and Part 105 (1) [Parachute operations].

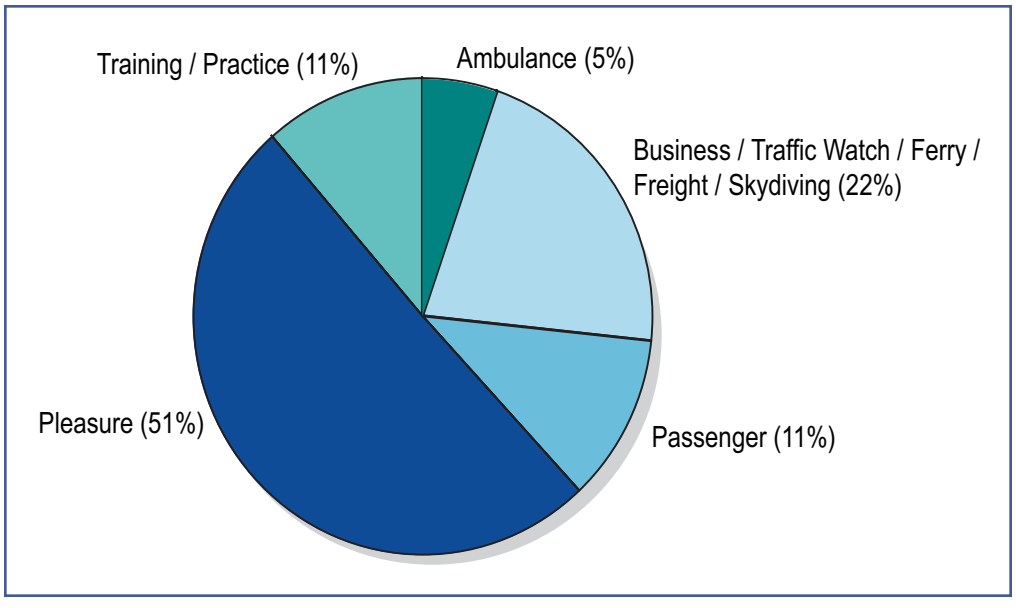

Figure 2. Aircraft Mission (n=97)

Time of Day and Lighting

76% of events occurred between 6 AM and 6 PM

The Time of Day and Lighting data was provided through the original ASRS report. The majority of the events occurred during the time quartiles of 6:01AM to 12:00PM and 12:01PM to 6:00PM (74 of 97 pilots responding). The remaining quarter (23 percent) reported that their event occurred during the time periods of 6:01PM to 6:00AM. The original ASRS report form asks for the pilot's assessment of lighting conditions at time of event (96 pilots responded). Seventy-six events occurred in daylight, 14 occurred at night, and 6 occurred at dusk or dawn. Although a direct question in the SQS was not asked concerning the contribution of light conditions, one question about "time pressure" (SQS, C.2) included "approaching darkness" as a choice. Only one pilot responded that this was a reason for the time pressure. Typically, pilots did not claim in their original ASRS pilot report narratives that lighting conditions played a significant role in the weather incidents. However, one pilot described an inadvertent entry into IMC due to darkness. Excerpt below:

> *The dark night conditions were the deciding factor. I could not see the low-level clouds move over the airport as I transitioned from the instrument to visual approach.* (Report Number 20)

PREFLIGHT PLANNING

Weather Sources and Forecasts

In Section A of the SQS, the pilots responded to questions concerning Flight Planning and Weather Briefings. Ninety-nine out of 100 pilots obtained weather information prior to departure (SQS A.1). One pilot reported no attempt to obtain pre-flight weather information due to no telephone available and did not believe pre-departure weather was necessary for the intended 75 mile flight (SQS A.8). Pilot reporters were further asked to identify all sources of weather information they used and whether their attempts were unsuccessful (SQS A.2 - 4). **Figure 3** shows the frequency of use of these sources of weather information from 97 pilots responding. The pilots could select more than one source, so the percentages in this graph are not mutually exclusive. Flight Service Stations (57 percent) were the most commonly cited source for weather information; followed by DUATS (34 percent) and the National Weather Service (26 percent) as second and third highest. Within the "Other" category for weather information (9 percent), the pilots included such activities as monitoring Approach Control, asking other pilots/airport managers about weather conditions, and climbing a local hill to view weather conditions.

71 pilots used 2 or more sources of weather information; 25 pilots received forecasts for VMC for their entire route

Thirty-nine pilots reported using three or more sources, while another 32 reported using two sources of weather information. The following excerpt from a reporter's narrative illustrates the variety of weather sources that were used:

> *I checked weather the previous afternoon and filed IFR. I also checked ADDS, DUATS, NOAA weather online products, and the CNN News weather reports.* (Report Number 37)

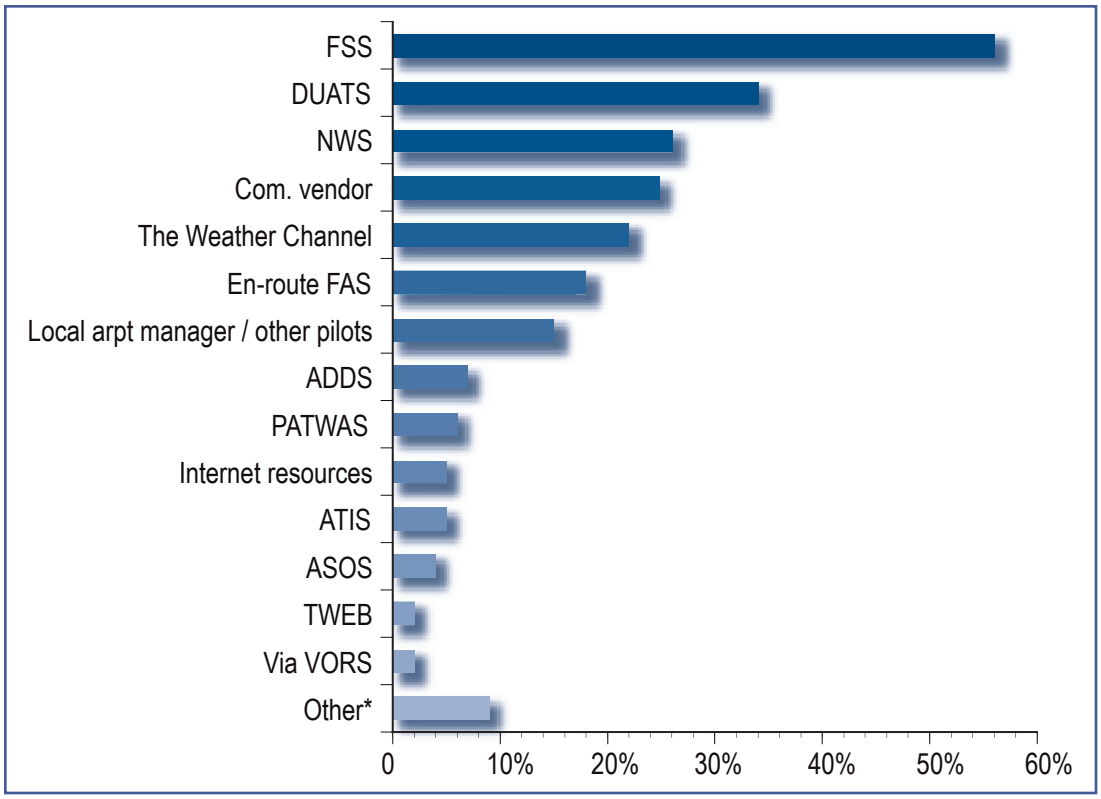

Figure 3. Sources of Weather Information

Not mutually exclusive (n=97). *Other includes: controller/approach, military, WSI, Aviation Sentry, company dispatch, DTN, recorded WX, XM satellite.

Pilot reporters were asked to cite the pre-flight forecast weather conditions (VMC, IMC, or Marginal VMC) for their departure airport, enroute segment, and destination airport (SQS A.5). Twenty-five pilots received weather forecasts for VMC conditions for their entire flight. Seventy-one pilots reported Marginal VMC or IMC conditions for 1 or more flight segments. **Table 3** provides pre-flight forecast conditions.

Table 3. Forecast Weather Conditions (n=100)

	Departure	Enroute	Destination
VMC	70	42	59
MVFR	21	32	24
IMC	4	11	8
Didn't Know	2	6	3
Blank	3	9	6

Filing Flight Plans

53% of pilots did not file a flight plan; 41% of IR filed IFR; 14% non-IR filed VFR

Figure 4 indicates that 55 percent (51 of 96 pilots responding) did not file a VFR or an IFR flight plan (SQS A.9).

Twenty-nine of the 71 instrument rated pilots responding did elect to file an IFR flight plan; and, as analyzed from the original ASRS pilot report narratives and analyst coding fields, 12 filed enroute or obtained "pop-up" flight plans. An additional 11 IFR instrument rated pilots filed VFR flight plans, but one pilot did not activate that plan. Five instrument rated pilots provided some insight in their original ASRS pilot report narratives as to why they did not file IFR flight plans:

- *Decided to go VFR because airways would have been quite a bit longer than direct path and hopefully could beat deteriorating weather forecast for return trip.* (Report Number 6)
- *I elected not to file IFR so as to remain clear of significant weather.* (Report Number 33)
- *Departed VFR to beat the weather.* (Report Number 6)
- One pilot thought that the flight could be beneath a ceiling throughout the flight: *I checked the weather and considered filing IFR, however revised Sigmets now indicated convective activity imbedded in clouds with high tops, high winds and hail...not conducive to no-onboard-radar IFR.* (Report Number 32)
- One pilot chose to file VFR rather than IFR to get off the ground faster. (Report Number 21)

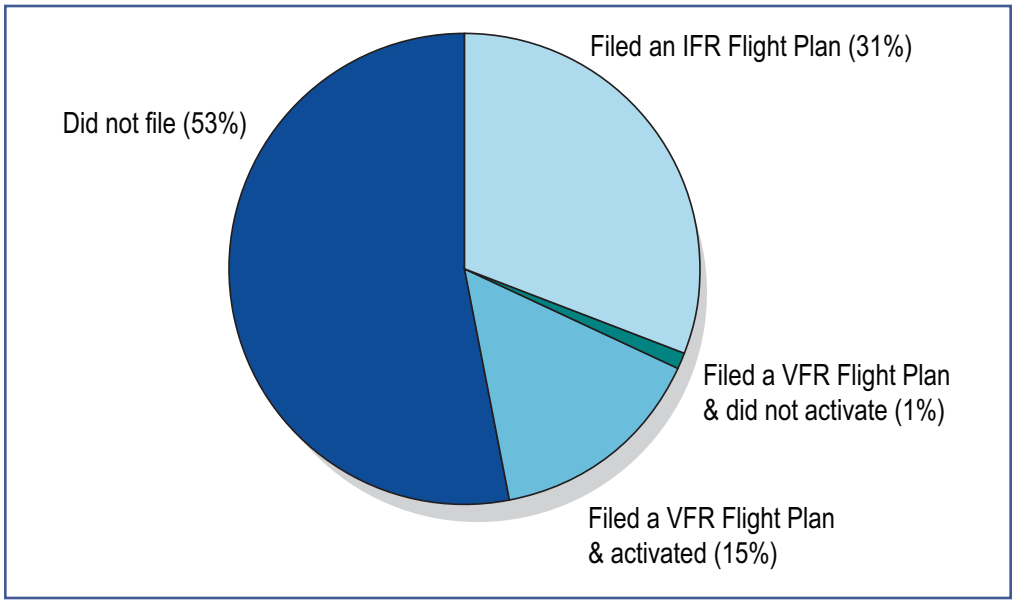

Figure 4. Pilot Responses Concerning Filing of Flight Plans (n=96)

Four of the 29 non-instrument rated pilots responding to this question filed VFR flight plans; however, 23 non-instrument rated pilots did not. One of the 29 non-instrument rated pilots responding to this question actually filed an IFR flight plan. Most non-instrument rated pilots did not provide a clear rationale in their original ASRS pilot report narratives for not filing a VFR flight plan, but a few discussed related circumstances surrounding their flights including comments like:

- Conducting touch-and-goes in the pattern (3 pilots)
- Believed weather was VFR for the entire flight (2 pilots)
- Trusted GPS on board (1 pilot)
- Had weather reporting that destination was VFR, IMC was possibly later in flight (2 pilots)
- Heard destination and departure weather was VFR; did not obtain FSS weather briefing (1 pilot)

In summary, 17 percent of the non-instrument rated pilots filed a flight plan and 56 percent instrument rated pilots filed a flight plan, whether a VFR or IFR flight plan.

In some of these events, flight plans were altered. Five pilots on IFR flight plans stated in their ASRS report that they canceled their IFR flight plans enroute or near their destination, and then encountered weather after canceling their flight plan. One pilot revised the original VFR flight plan, which was not activated, and upgraded the flight plan by requesting an instrument clearance enroute or sometimes referred to as a "pop-up" clearance.

EVENT INFORMATION

Weather Encounters

The pilots in this study were presented with a list of potential weather encounters that are commonly reported to ASRS and asked to select all that applied to their specific weather encounter (SQS B.2). The most frequently cited weather encounter was "lowering ceiling" with 52 responses (see **Figure 5**).

As indicated, the second highest type selected was "flew into clouds or fog" with "reduced visibility" and "deteriorating weather ahead" as the third highest reported encounters. The following descriptions are examples of the top four weather encounters experienced. A typical encounter with "lowering ceilings" is presented below:

> *...Approximately 2 miles [after departure], the ceilings abruptly dropped to 1000 feet MSL and I found myself in the clouds and losing sight of the ground. I immediately turned back.* (Report Number 73)

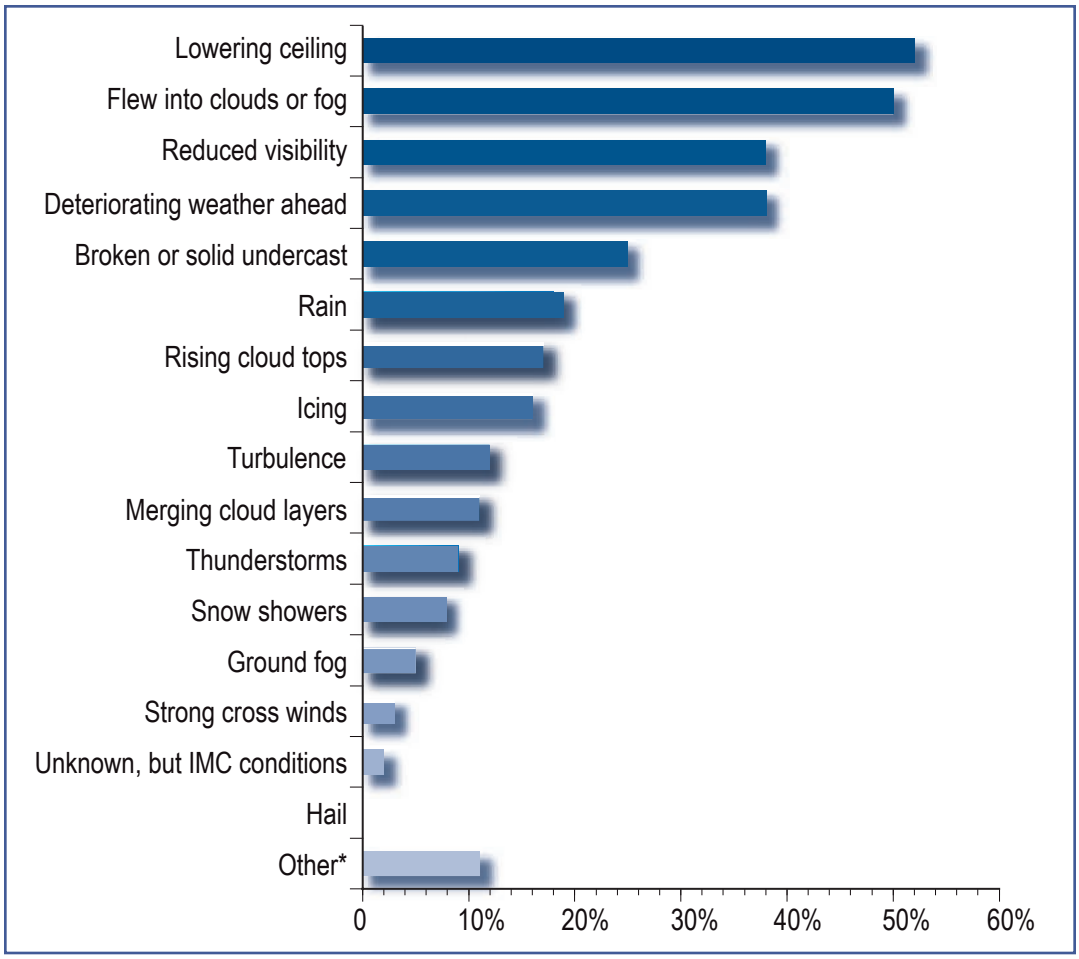

Figure 5. Types of Weather Encountered

Not mutually exclusive (n=100). *Other includes: severe icing, haze, mist, rime ice, or wind shear.

An excerpt from a "flew into clouds/fog" report is described:

> *As soon as I began my climbout, at about 1000 feet (airport elevation is 850 feet), lost sight of runway lights, airport, and ground. Completely engulfed by fog, I leveled off at 1200 feet clear of any obstacles around the airport, and began a standard rate turn around where the pattern should be. I was hoping to find the runway, or anything I recognized to figure out where the airport was.* (Report Number 3)

An excerpt describing an encounter with "reduced visibility" indicates similar problems as lowering ceilings:

> *A beautiful day for flying, until I turned east. When I turned east, I could not see more than maybe a half mile in front of me, but I could see straight up and straight down. I went from clear and 10 miles visibility, to clear (no clouds) and very limited visibility...* (Report Number 85)

In a separate analysis provided by the ASRS Expert Analysts as part of the ASRS coding process, the analysts describe 56 of the 100 events as concerning "Inflight

Encounter/ VFR in IMC". A Cessna 150 private pilot discussed a VFR-in-IMC encounter that provides valuable insight into how such incidents may occur:

> *The weather situation changed slowly enough that I could get used to each change, one at a time. Before today, when I thought about VFR into IMC, I always thought about flying into a vertical wall of cloud, and I figured I was smart enough that such a thing wouldn't happen to me. But, that wasn't how it happened -- the transition happened over a span of several minutes and happened gradually enough that there weren't any surprises big enough to startle me into turning back, and so I delayed my 180 degree turn much longer than I should have.* (Report Number 57)

In SQS B.2, pilots also reported encountering severe conditions such as icing (16) and snow showers (8). Encounters with icing are often dangerous, especially to small General Aviation aircraft that may not have the equipment to mitigate the ice. Sixteen pilots flying single-pilot operations encountered icing; yet only three were informed by weather briefings of potential icing prior to their flights. Nine of these flights were on an IFR flight plan. The icing encounters resulted in some of the following incidents as reported in the original ASRS report narrative:

Some pilots encountered severe conditions such as icing (16) and snow showers (8). Only 3 learned of icing in their forecasts.

- Icing forced five pilots to deviate from assigned altitudes/airways without waiting for ATC clearance. One pilot lost aircraft control and recovered after losing 7500 feet of altitude.
- The icing encounters resulted in three declarations of emergency (one was a VFR in IMC condition).
- Two pilots diverted to an alternate airport and landed.
- One pilot encountered control problems from severe icing and diverted.
- One pilot landed below minimums to avoid additional ice accumulation.
- One pilot stated that the icing condition was distracting and caused a deviation from the ILS heading.

As previously discussed in the aircraft description section, 73 of the 100 aircraft did not have de-ice or anti-ice on board. Twelve of the sixteen pilots who encountered icing used wing/tail de-ice, propeller de-ice, engine inlet anti-ice, windshield de-ice, and/or pitot heat to try to mitigate the icing conditions. Many of the pilots conveyed their surprise at how quickly icing can accumulate on an aircraft. As one pilot stated, *"The mist came from nowhere... iced my wings and propeller in a matter of seconds"* (Report Number 34).

Actual Weather Encountered Versus Forecasted Weather

Pilot reporters were asked whether the actual weather they encountered was better than, same as, or worse than the forecasted weather for departure, enroute, and destination for their specific reported event (SQS A.7). Instrument rated pilots were asked more generally about all instrument flights and their experience with actual vs. forecasted weather (SQS E.8). **Table 4** summarizes these findings. In general, total responses to all three phases indicated that forecasted weather was accurate approximately half the time compared to actual conditions experienced; both for the pilot's specific incident (56 percent of time) and generally for all IFR flights (57 percent of the time). If the responses to "better than" forecasted are added to the previous results for all three phases, higher proportions of success are noted with 65 percent for the study events and 90 percent for overall experience with IFR flights.

Table 4. Actual Weather vs. Forecasted Weather

Question A.7 For this event, how was the actual weather versus the forecasted weather?			
	Better	**Same As**	**Worse**
Departure (n=93)	8 (9%)	66 (71%)	19 (20%)
Enroute (n=85)	5 (6%)	45 (53%)	35 (41%)
Destination (n=85)	10 (12%)	37 (43%)	38 (45%)
Question E.8 In majority of your instrument flights, how was the actual weather versus the forecasted weather?			
	Better	**Same As**	**Worse**
Departure (n=79)	23 (29%)	51 (65%)	5 (6%)
Enroute (n=76)	22 (29%)	43 (57%)	11 (14%)
Destination (n=77)	32 (42%)	38 (49%)	7 (9%)

Not surprisingly in the evaluation of each phase separately, the results indicate that as time progressed from departure to arrival at destination, the accuracy of forecasted weather deteriorated. This is most likely due to the time elapsed between the obtained weather briefing and arrival at destination. Therefore, the responses concerning the departure phase indicated that the actual weather was "the same as" or "better than" forecast weather for their departure airport 80 percent of the time. This result was also consistent with responses from pilots who reported, in their overall experience with instrument flight operations, that departure conditions for their flights were routinely 94 percent "better" or "same as" forecasted (SQS E.8).

In contrast, and possibly more importantly, "worse than" conditions were reported for all three phases in 35 percent of events in this study and 10 percent for their overall flight operations. Of all the three separate phases, responses indicate that 41 percent of pilot reporters said that actual weather was "worse than" forecasted weather during the enroute phase of flight for their study event, and 45 percent responded that the weather was "worse than" forecast at their destinations. When compared to the responses from pilots describing their overall experience with instrument flight operations, the results improved; with only 9 percent experiencing "worse than" conditions at their destination.

45% of pilots stated weather was worse than forecast at their destination

Consequences of Weather Encounters

The consequences of the weather encounters are shown in **Table 5** (SQS C.4). Pilot reporters were asked to select from a pre-defined list of potential consequences and to check all that might have applied to their event. Forty-one pilots cited more than one consequence. The most frequently reported consequence was "VFR flight into IMC" (45 percent of 99 pilots responding). Second and third most frequent consequences were "unable to maintain altitude" (21 percent) and "lost/unsure of position" (15 percent), respectively.

Lost/unsure of position affected IR & non-IR pilots

Table 5. Consequence of Weather Encounters

Consequences	Percentage
VFR flight in IMC	45%
Unable to maintain altitude	21%
Lost / unsure of position	15%
Penetrated controlled airspace	11%
Precautionary landing or off-airport landing	9%
Landed VFR in IMC	8%
Controlled flight toward terrain	6%
Landed below published IFR minimums	5%
Loss of aircraft control	5%
Made IFR approach without an IFR rating	3%
Landed without clearance	2%
Runway excursion	1%
Other*	31%

Not mutually exclusive (n=99). *Other includes: missed approaches, 180 degree turns, icing accumulation, deviations from ATC instructions.

It is notable that becoming "lost/unsure of position" affected both instrument rated and non-instrument rated pilots. Six of the fifteen pilots who reported this consequence had an instrument rating, and four were non-instrument rated pilots who were in training for their instrument ratings.

Four additional consequences cited by pilot reporters, in order of prevalence, included "penetrated controlled airspace" (11 percent), "precautionary landing or off-airport landing" (9 percent), "landed VFR in IMC" (8 percent), and "controlled flight towards terrain" (6 percent) (SQS C.4). Five pilots described "losing aircraft control" (5 percent of 99). This varies slightly from the independent analysis provided by ASRS Analysts that classified 7 events under the ASRS Anomaly for "Loss of Aircraft Control". One private pilot flying a PA-34 lost altitude from 10,500 feet to 3,000 feet due to icing and described the event below:

> *I was on a VFR flight ...at 10500 ft MSL, clear skies, and all of a sudden a mist came from nowhere. Within seconds, my wings iced up. I lost my airspeed indicator. The plane went into a right stall bank [stalled and banked to the right]. At about 3000 ft, the ice broke loose. I got control of the plane. I lost all nav and com. I reset my circuit breakers and put pitot heat on. Everything went back to normal. I resumed my flight. This whole situation took about 20 minutes to 1/2 hr.* (Report Number 34)

RECOVERY FACTORS

46 of the pilots landed as soon as possible

Pilot reporters were asked to select from a pre-defined list of potential factors that enabled their recovery from the weather encounter and to check all that might have applied to their event (SQS C.5). **Figure 6** presents the results. Forty-six pilot reporters out of 99 pilots responding chose to land as soon as possible (i.e., "land enroute" at other than alternate, "land at alternate", or "land at destination"). One reporter describes a "landed enroute" event below:

> *I made a precautionary landing on the remote and lightly traveled highway without difficulty, before fuel got too low. Was able to take off the following day in much clearer weather with the Highway Patrol blocking the road from each direction for about five minutes.* (Report Number 90)

Other pilots maneuvered around weather using tactics such as "descended to stay below weather" (33%), "deviated around weather" (20%), "180 degree turn" (19%), or "climbed above the weather" (12%). One pilot describes his recovery maneuver in the following excerpt:

> *As I proceeded toward the clearly visible lights, they quickly vanished and I realized through a combination of unconscious pulling on the stick and a falling ceiling, I'd entered the bases of the clouds. I immediately executed a 180-degree right turn.* (Report Number 60)

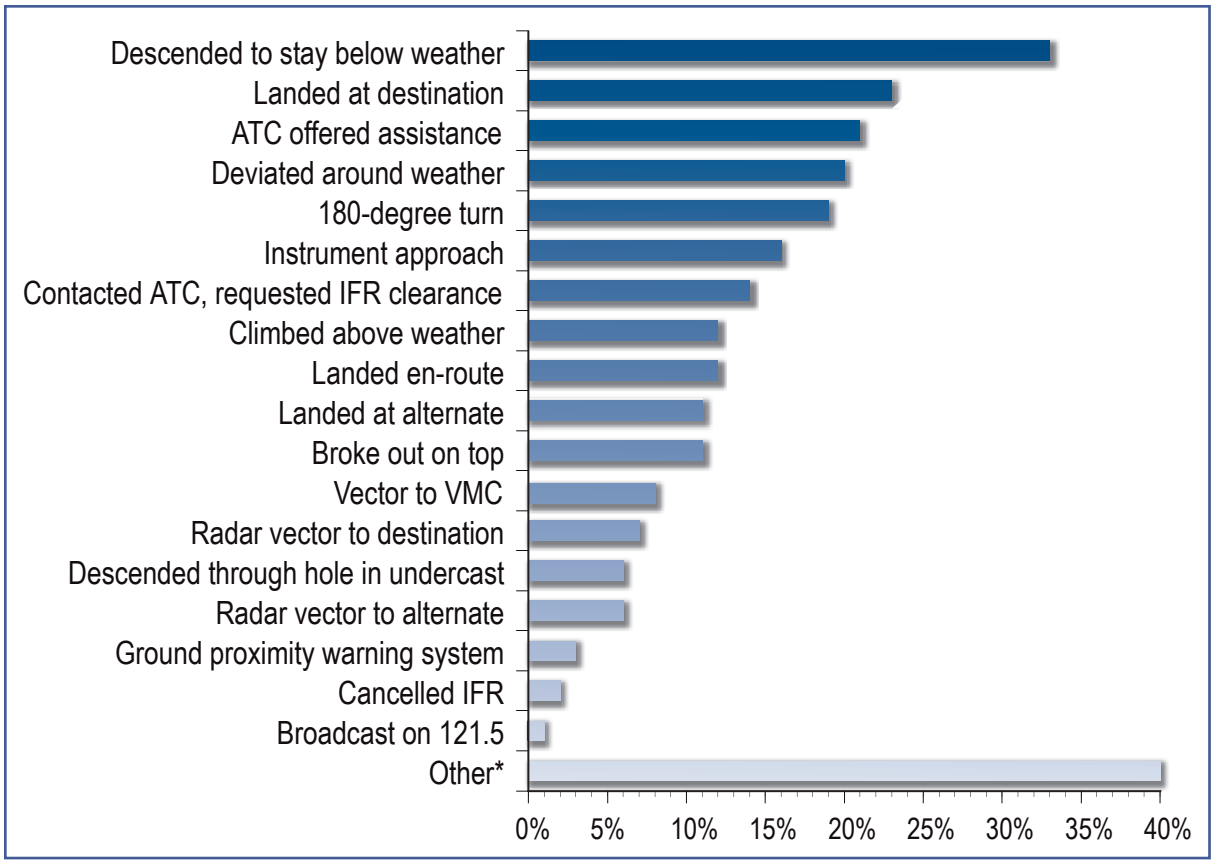

Figure 6. Recovery Factors

Not mutually exclusive (n=99). *Other includes: weather, improved conditions, changed altitude enroute, used GPS, informed ATC of inability to comply.

Additional weather recovery maneuvers included "broke out on top" (11%) which was mostly due to the pilot initiating a climb, or "descended through a hole in undercast" (6%). An "Other" category was provided and received a variety of textual entries. In five events, the pilots described some factors that enabled them to recover from the weather encounter including utilizing their instrument training, hood time, or a hand held GPS.

Services Requested from ATC

Fifty-eight pilot reporters stated that they requested enroute assistance from ATC at some point during their weather event in order to support their recovery maneuvers (SQS B.3). The pilots were further asked to "check all that apply" from a list of potential services that could have been requested (SQS B.4, 56 pilots responded). **Figure 7** shows the types of services requested. The three services used most frequently were "IFR clearance" (29 percent), "instrument approach procedures" (29 percent), and "vectors to an airport" (18 percent). Another choice was "vectors to VMC" in which 7 percent of the 56 pilots used this service. Additional requests for vectoring services were reported in the "Other" category and included two responses for "obtaining vectors around thunderstorms" and one response for "obtaining vectors for terrain clearance".

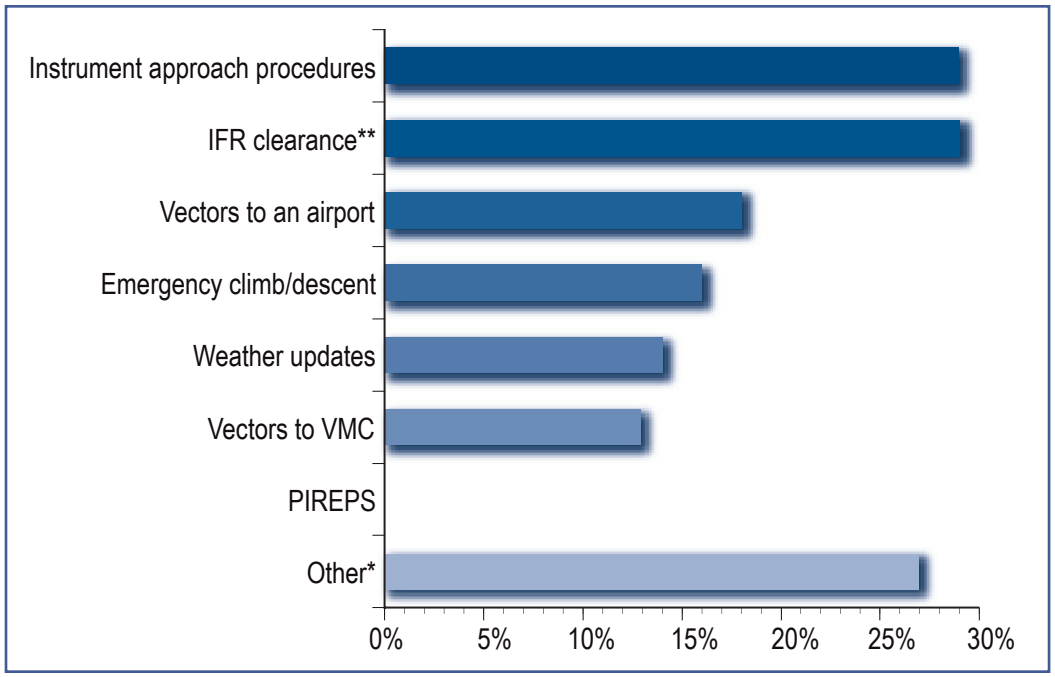

Figure 7. ATC Services Requested

Not mutually exclusive (n=56). *Other includes: traffic advisories, block altitude, immediate landing, flight following, SVFR, vector for terrain clearance, declare emergency, deviate from flight plan. **Includes 4 pilot reporters that attempted to reach ATC, but experienced a delay or were unable to contact ATC

Although pilots commented on the professionalism and helpfulness of ATC during the weather encounters in their original ASRS pilot report narratives, the pilots who were unable to obtain ATC services, or unable to obtain services in a timely manner, responded to SQS B.5 that the reasons were "there was a delay in ATC providing clearance" (11 responses), "unable to contact ATC" (6 responses), "too low for radar coverage" (4 responses), or "ATC would not provide clearance" (4 responses). There were 11 responses in the "Other" category provided and 3 of those described ATC as being too busy.

In 42 occurrences, pilots did not request enroute assistance from ATC (SQS B.3). These pilots were subsequently asked about the primary reason that no attempt was made to obtain ATC assistance (SQS B.6). In 19 of these incidents, pilots "did not feel ATC services were required". Three pilots chose "knew communications would not be possible at my altitude or location", and six pilots selected from the list "afraid of a reprimand or certificate action". An "Other" category was provided in the list of choices and 3 pilots that they were focused on flying the aircraft. The "Other" responses included losing electrical power, unable to receive communications on the radio, events happening too quickly, the pilot seeing a suitable runway for landing, and the pilot obtaining weather on ASOS.

Of the 6 pilots that did not contact ATC because they feared reprimand, one stated in his original report narrative that he decided to fly VFR without a flight plan because the *"airways would have been quite a bit longer than a direct path*

and hopefully could beat deteriorating weather forecast for return trip" (Report Number 6). This pilot subsequently encountered snow showers and VFR in IMC, but stated *"I tuned in Center frequency to listen if there was anyone else near me, but did not call. Didn't want to get into trouble being without a flight plan. Not quite sure what I should have done, but now I think calling would have been a better idea."* (Report Number 6)

CONTRIBUTING FACTORS

Pilot reporters were asked if there were other factors in addition to weather that contributed to their event (SQS C.1). Of the 99 who responded to this question, 65 of the pilots responded "Yes" to this question. If the response was 'Yes', the pilots were further asked to choose from a list of potential non-weather related factors that may have applied to their event (SQS C.2, 64 pilots responded). **Figure 8** illustrates the frequency of responses for this question. The highest frequency was "decision making" which was cited in 39 percent of the time. The original ASRS pilot report narratives referenced non-weather related decisions related to:

Decision making and time pressure were the most frequently cited contributing factors

- Resistance to call ATC or waiting too long to contact ATC
- Not anticipating where to land if in trouble
- Not turning around soon enough

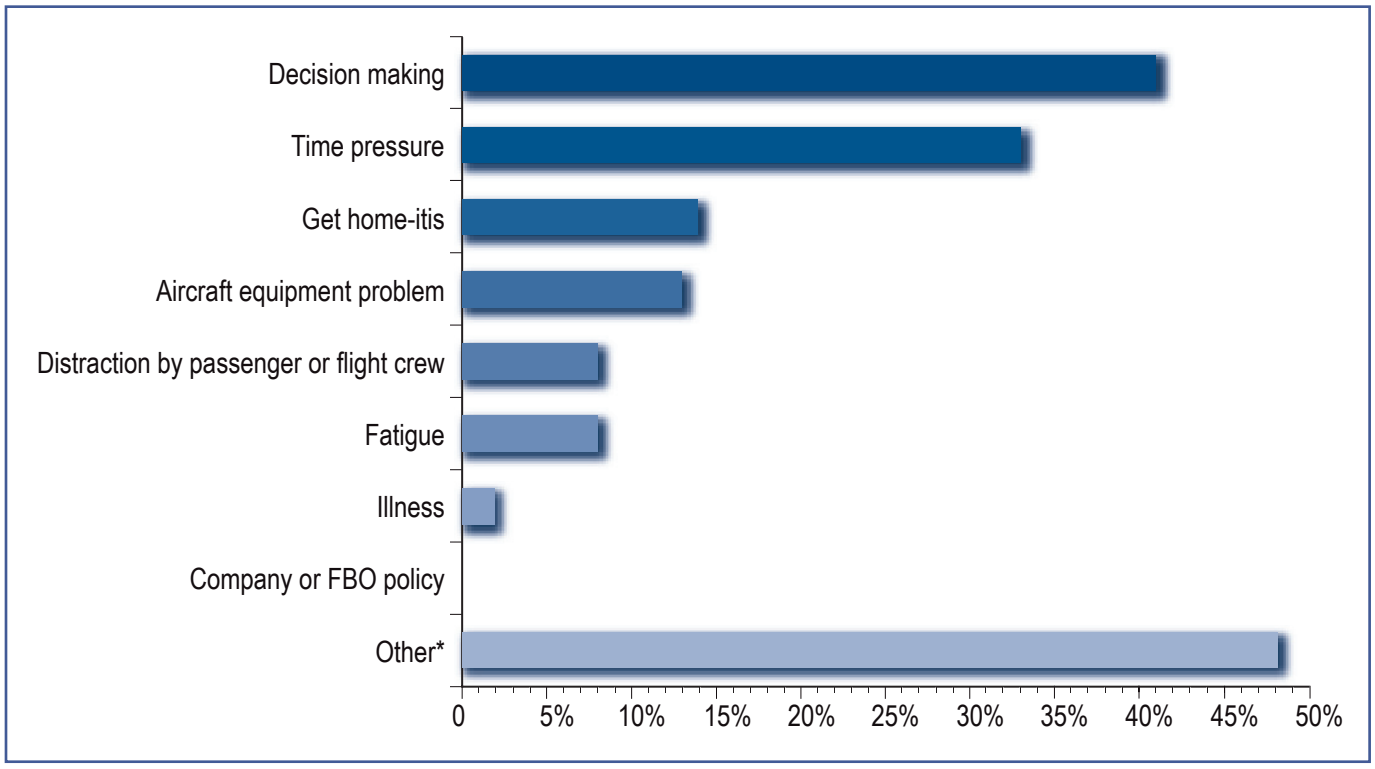

Figure 8. Contributing Factors

Not mutually exclusive (n=64). *Other included: ATC too busy, critically ill patient, management pressure, not enough training or insufficient preparation, unfamiliar with new GPS, lack of SVFR or IMC training, anti-ice equipment not handling icing, aircraft holding, confusion with VFR sectional, FBO wx system down, lack of weather reporting stations enroute, lack of IMC experience, vectored off course for traffic, aircraft VFR only.

"Time pressure" was the second most common non-weather related contributory factor chosen by pilots. "Get-home-itis" and "aircraft equipment problem" were the third and fourth highest responses to this question. The selection "get-home-itis" was reflected by one pilot by stating:

> [The weather] *was well below my personal minimums, but I felt like I needed to get home.* (Report Number 21)

Additionally, in SQS C.2, "distraction by passenger or flight crew" (7 percent of responses), "fatigue" (7 percent of responses), and "illness" (2 percent of responses) were lower frequency factors in the weather encounters data set. But as evidenced by the large "Other" category of responses (48 percent), there were many diverse factors influencing these pilots during these events.

The SQS asked a follow-on question for those pilots who selected "time pressure" as a non-weather related contributing factor (SQS C.3). As shown in **Figure 9**, "personal pressure to reach a destination on time" was the most frequently cited factor (11 of 22 responses). An example description of this influence is presented in the narrative excerpt below:

> *Conditions changed from the time I received the ATIS till the time I departed. In addition, I was under personal time constraints and departed in marginal conditions rather than wait for VMC conditions. (*Report Number 29)

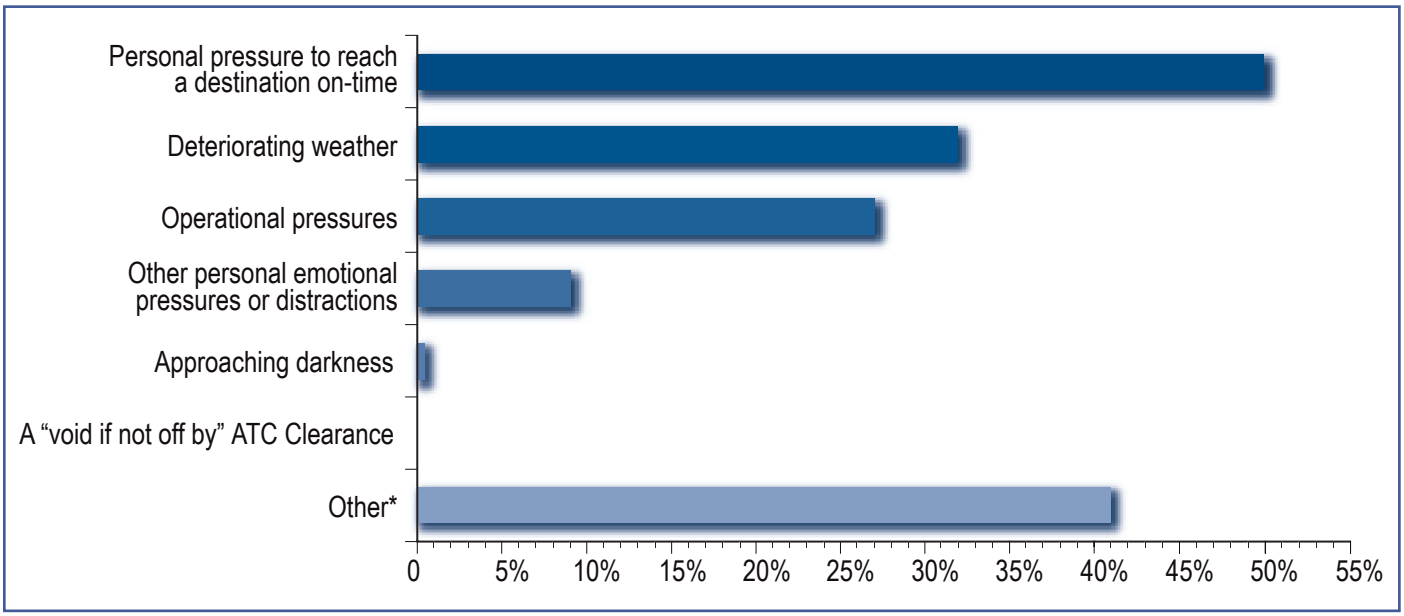

Figure 9. Contributing Factors: Time Pressure

Not mutually exclusive (n=22). *Other included: concern over fuel, ill patient, improving weather at destination, need to get to FBO before closing and operational pressure.

"Deteriorating weather" was another frequently cited time pressure factor. In one instance, a pilot canceled IFR to accommodate another aircraft on approach, only to become trapped by deteriorating weather conditions.

The third highest frequency response was "operational pressures". These were described in the original ASRS pilot report narratives and mentioned critically ill patients on board, pressure to get the boss home, or pressure to conduct a flight for the company. One pilot reflected on company pressures:

> *My initial reaction was to not take the flight in the first place, but management pressure ...led to me going ahead and at least trying the trip. I would have stuck with my instinct and said no, (if it were to happen again). If you're flying a VFR airplane and there's a possibility of ice or IMC conditions leave it up to the company to assign another more capable airplane to get the job done. Example: One that can handle the conditions that you're gonna face. It's not worth your life or anyone elses to make your company the extra dollar.* (SQS F.2 & F.3, Report #50)

REPORTER SELF ASSESSMENTS

In Section F of the SQS, pilots were provided the opportunity to answer three questions as a summary of the description of their event. One question concerned the pilot's assessment of why the incident occurred (SQS F.1), another asked about what they would have done differently (SQS F.2), and the final question asked for recommendations they would provide to others (SQS F.3). Questions F.1-F.3 responses are presented in Appendix C and provide a general description of each event in the pilot's own words. These responses provide an introspective view of each pilot's assessment. Each response is instructive in that it provides an overview of the multiple factors apparent in each event. Textual responses to question F.2 were summarized and grouped into the general topic areas shown in **Figure 10**. When asked, "In retrospect, is there anything you would have done differently?" (SQS F.2), pilots evaluated their actions, retrospectively.

Pilot's comments included:

- Weather reporting (getting better weather reports, get enroute weather, and call destination for actual weather report)

- Flight plans (filing IFR, not canceling IFR, or cancel IFR and climbed to VFR altitudes) with comments; such as, "*File IFR or wait out the weather.*" (Report Number 33)
- Flight conduct (turn back, not push the IMC margin, delay or advance takeoff time, and divert to an alternate) with comments; such as, "*turn around at rising cloud tops* (Report Number 38)" and "*at the first sign a normal VFR pattern in VMC could not be flown, I would do a 180 degree turn and continue VFR/VMC back towards good VMC.*" (Report Number 13).
- ATC requests or handling (request lower/higher altitude, SVFR, block altitude, flight following, and declare emergency)
- Personal improvements (better training, improved understanding of equipment, strategic approaches to weather, ignore radios when necessary to prevent distraction, and carry flashlights/extra glasses)

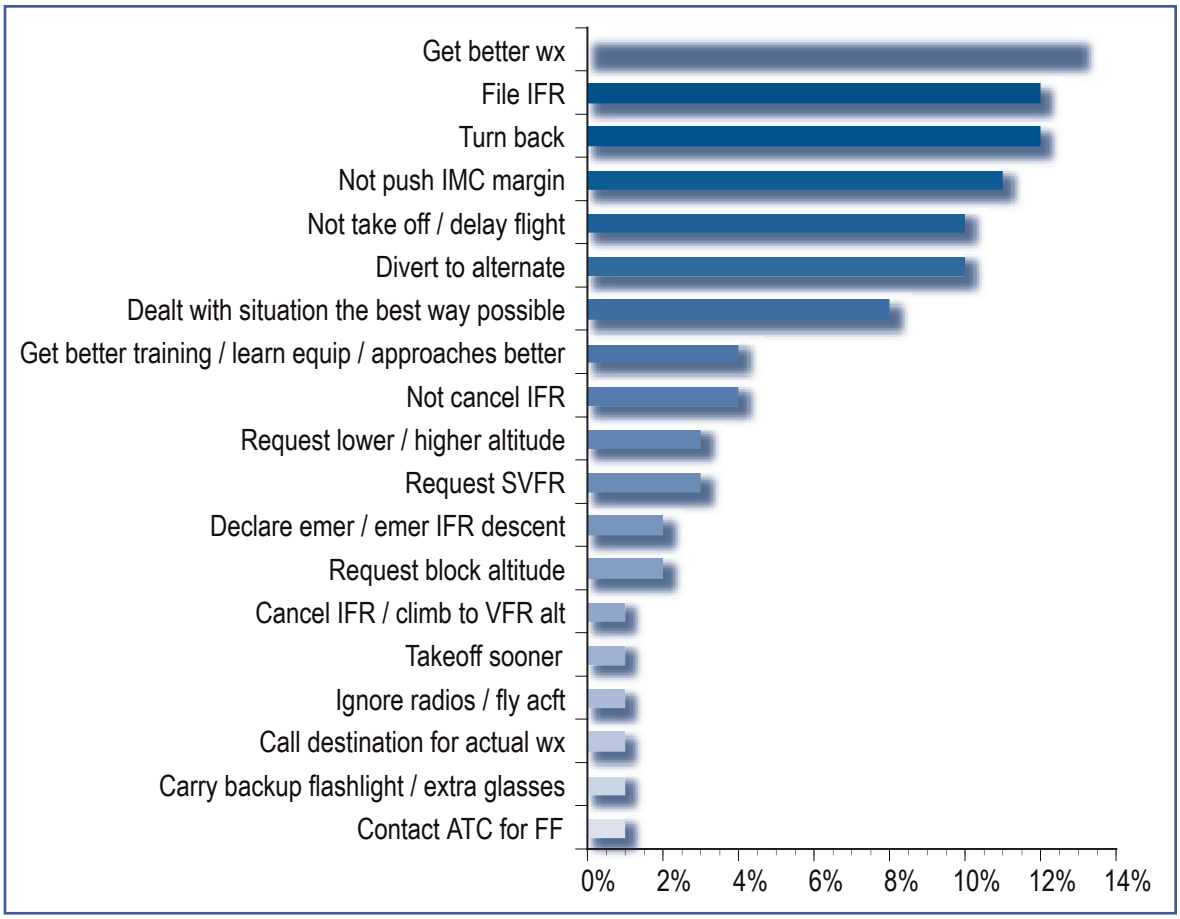

Figure 10. Reporter Self Assessments

Not mutually exclusive (n=99).

Despite the many introspective comments by this group of pilots, there were eight responses stating that the situation was handled the best way possible.

Many pilots' assessments focused on setting and following personal minimums, getting (or keeping) IFR clearances, not pushing the IMC margin, not taking off in marginal VMC conditions, and maintaining better situational awareness. One pilot summarized these types of assessments by stating:

> *The bottom line is that every pilot needs limits and needs to stick to those limits.... Currency and training is very, very important. In the future, I plan to spend more time working on unusual and emergency situations.* (Report Number 21)

DISCUSSION AND CONCLUSION

The General Aviation Weather Encounters Study was a unique opportunity to utilize first hand pilot narratives from original ASRS reports, to benefit from ASRS expert analysis, and to obtain specific supplemental information. This approach created a methodology that resulted in the collection of consistent and specific data on each event. Gaining insight into GA flight operations, unlike commercial aviation, is often more difficult because these aircraft are typically not equipped with flight recorders and other recording technology. The ASRS Database, coupled with the SQS, offered an excellent method for learning about human factors issues in GA weather events from first hand pilot data. The following discussion will present observations from the analysis of the ASRS 100-report data set.

TYPICAL PILOT PROFILE

During ASRS's analysis of General Aviation Weather Encounters data, a "profile" emerged of the typical pilot/reporter who participated in this study. The typical pilot could be described as an instrument rated pilot flying a single-pilot operation with less than 2,000 hours in a light single engine aircraft equipped with basic communication and navigation equipment (dual VHF transceivers, combination nav/com radios, dual VOR receivers, ILS receivers, DME, and ADF, including GPS). It was unlikely that the pilot had weather avoidance radar or anti-icing equipment onboard. Although instrument rated, the pilot had likely not flown an instrument approach in actual conditions in the last 90 days. The typical pilot was also less likely to have filed a VFR or IFR flight plan prior to the flight. Most often, the pilot stated their mission was for pleasure rather than business, passenger operations, or training.

Typical pilot in this study: IR, less than 2,000 hours, with no flight plan

The typical pilot, prior to flight, checked two or three sources of weather information; most commonly reported sources were Flight Service Stations (FSS's), DUATS, and the National Weather Service (NWS). It was unlikely that

the pilot received a forecast of VMC conditions for the entire route of flight. It was more likely that the pilot found actual weather conditions to be the same as, or better than forecasted weather conditions for the entire route of flight. However, on average, 35% of actual weather was worse than forecasted. After departure, pilots most likely encountered lowering ceilings, clouds and fog, reduced visibility, deteriorating weather, broken or solid undercast, or rain and rising cloud tops enroute. When pilots encountered adverse weather conditions, they most likely descended or landed, and/or received assistance from ATC. Decision making, time pressure, get-home-itis and aircraft equipment problems were factors that frequently contributed to the incident. **Table 6** presents an overview of the results.

DESCRIPTIVE INFORMATION

The qualifications of the 100 pilots who comprise the GA Weather Encounters Study group are generally representative of the overall aviation community.[2] Forty-two percent of these pilots held a Private Pilot Certificate vs. 46.5 percent for active pilots in the U.S., and 53 percent of study participants held either a Commercial or Airline Transport Pilot Certificate, compared to a combined 53.5 percent for the general community in 2005. The number of Instrument Rated pilots for this data set (71 percent) was just slightly higher than for the U.S. community (63.5 percent). Information about typical pilot flight time for the general population as a whole was not available.

The amount of flight time, both average and median, reflected a relatively low level of experience. ASRS Expert Analysts also indicated in their evaluations that this may have been a contributor to these undesirable weather encounters. A similar conclusion can be drawn from the results concerning pilot experience in actual instrument conditions. The following report provides a description of the impact of minimal instrument experience:

> *Although I am instrument rated and IFR current, I am a pilot from the desert Southwest with little actual IMC experience. Most of my experience has been 'hood time.' I believe this lack of IMC training/experience was a contributing factor to my experiencing vertigo. As a pilot unfamiliar with the area, I was surprised at how rapidly the weather can change...This was a contributing factor to finding myself in IMC on a VFR flight plan. Contributing factors to my loss of situational awareness included the fact that during my vertigo event, I had made descending turns after having been given vectors for the approach.* (Report Number 52)

[2] Comparison data from the *2006 General Aviation Statistical Databook*, General Aviation Manufacturers Association.

Table 6. GA Weather Encounters Overview*

Descriptors	Highlights	
Study Set	100 Reports involving General Aviation Weather Encounters	
Pilot Certificates	ATP (16); Commercial (39); Private (42); Unknown (3)	Table 1
Instrument Experience	29 reporters were not instrument rated; 71 were instrument rated 79 pilots had between 5 to 100 actual instrument hours 18 had 0 hours of flying in IMC 37 pilots had never flown an instrument approach in IMC	Table 1
Aircraft	94 incidents involved the following aircraft : 79 light single-engine airplane, 6 light twins, 5 turboprops, 3 corporate jets, 1 sailplane; 6 incidents involved helicopters	Table 2
Mission	Pilots were flying for Pleasure (49); Passenger (11), Business (14), and Training (10) [Remaining Responses (16)]*	Figure 2
FAR Part	Part 91 (84); Part 135 (12); Part 121 (2); Part 105 (1); Left Blank (1)	Analyst Coding
Time and Lighting Conditions	74 of 97 events occurred between 6AM and 6PM. Lighting included: Daylight (76); Night (14); Dusk (4); Dawn (2); Left Blank (4)	Analyst Coding
Weather Information	99/100 pilots stated they attempted to get weather information prior to flight. 32 used two sources for weather information and 39 used three or more sources.	Figure 3
Flight Plan	Did not file a flight plan (51); Filed a VFR Flight Plan & Activated it (14); Filed a VFR Flight Plan & Did not Activate (1); Filed an IFR Flight Plan (30); Left Blank (4).	Figure 4
Types of Weather Encountered	The majority of flights encountered lowered ceilings (52 responses); flight into clouds (50 responses); reduced visibility (38 responses); es); broken or solid undercast (25 cing (16 responses) [Remaining	Figure 5
	o maintain altitude (21); aining Responses (81)]	Table 5

*Top categories are displayed. Those not displayed are summed under [Remaining Responses].

In SQS, Section F, the pilots provided recommendations to others for avoiding similar occurrences. In fact, several pilots provide instructive comments related to actual IMC experience including: "*get as much IMC experience as possible (hood time alone is insufficient)*" (Report Number 52), "*training in actual conditions*" (Report Number 45), and "*keeping better currency with instrument procedures and maneuvering the aircraft in IMC would have made my situation easier to handle*" (Report Number 35).

Many pilots had some instrument experience which may have helped during their weather encounter

However, the exposure to some level of instrument experience may have prevented these incidents from progressing to more serious outcomes. In this study, a high number of pilots had instrument ratings or were working on their rating. In fact, it is possible that even with the minimum three hours of hood time required by FAR 61.103 to obtain the private pilot certificate may have proven useful. A small amount of instrument training was able to help one pilot mitigate his weather encounter as described in excerpt below:

> *When I got to [destination] it was covered with a low layer of freezing fog. I had more than an hour and a half worth of fuel remaining, so I continued on to my alternate [airport] 50 miles away. When I got there it was also fogged in. The next closest airport was 70 miles away. The AWOS was reporting 200-foot ceilings and 2 miles visibility. I didn't have enough fuel left to make it there, so I had to land. I'm currently working on my instrument rating, so I had the training to make it through the fog, but I've never flown in IMC and I was terrified to do so. However, there was nothing else I could do.* (Report Number 4)

PREFLIGHT PLANNING

Most pilots in the study appeared to be conscientious about obtaining weather data prior to departure—(72 percent of pilots utilized two or more sources for weather information). However, when asked to rate the accuracy of forecasts for the incident flight, pilots indicated that the weather was "worse than" forecasted for the departure airport 20 percent of the time, for the enroute segment 41 percent of the time, and for their destination airport 45 percent of the time. Predictably, the accuracy of forecasts diminishes with time, thus a forecast for a departure airport can be expected to be more accurate than for the destination. Nonetheless, pilots' expectations of weather conditions were not met in a relatively high number of incidents, particularly for the enroute and destination flight segments. This may indicate that a number of the pilots in the data set did not, or were not able to, effectively update their weather data while in flight. Emphasis on the value of, and methods for, obtaining weather updates in flight during initial flight training may be effective.

WEATHER EVENT INFORMATION

In summary, pilots frequently encountered lowering ceilings, clouds and fog, reduced visibility, deteriorating weather, broken or solid undercast, or rain and rising cloud tops enroute after departure. In this study, the majority of pilot reporters consulted more than one weather source during preflight, yet pilots still made the decision to depart. Over half of the pilots chose to take off knowing that their forecast for the flight included at least one of the following conditions: marginal VMC, rain, turbulence, fog, icing, snow, or thunderstorms. Thirteen of those pilots were not instrument rated. Interestingly, when pilots were asked about what they would have done differently, only a small number mentioned that they would not have taken off in the first place.

Over half (59) of the pilots chose to take off with marginal or poor forecasted conditions

Pilots were asked to evaluate the previous weather forecasts vs. actual weather in the majority of past instrument flights. In general, the actual weather encountered at their destination was "worse than" forecasted in only 9 percent of those flights. In contrast, for the events in this study, 45 percent of pilots stated that the weather at the destination airport was "worse than" forecasted. This appears to reveal an increase of 36 percent[3] from past experiences compared to this particular event. This finding may indicate that some of the ASRS study pilots were "primed" by past experience that destination forecasts of marginal VFR or IMC conditions have in general been "better" or "same as" forecasted, so they made the decision to fly and, thus, were surprised by the actual weather upon arrival. This is one potential explanation for why these pilots chose to depart under these adverse forecasts.

The most frequently reported consequence of a weather encounter for the study was VFR flight into IMC. Similarly, in the 2007 Nall report, three-fourths of the fatal weather related accidents for single-engine fixed-gear aircraft were due to pilots' decisions to continue VFR into IMC weather conditions.[4] One of the more serious hazards to pilots flying at low altitude and encountering IMC is the proximity to the ground or obstacles, which may increase the possibility of a Controlled Flight Into Terrain (CFIT) accident. However, in this study, a Controlled Flight Toward Terrain (CFTT) event occurred in 6 instances, but inability "to maintain altitude" occurred 21 percent of the time. In this context, this could be considered a precursor to the more serious CFIT accident. It did appear that at least some level of basic instrument training, specifically attitude control, was effective at mitigating the consequences of these events.

[3] See SQS A.7 and E.9

[4] 2007 Nall Report, Accident Trends and Factors for 2006, AOPA Air Safety Foundation, p. 9

RECOVERY FACTORS

One of the more interesting questions in this study involved recovery factors, or interventions by either pilot and/or ATC. Incident data is an excellent source of information to gain insight into the precursors of the more serious events or accidents. Dr. James Reason[5] presents a concept for explaining human performance from a systems perspective (see **Figure 11**). Dr. Reason states that:

> *Defenses, barriers, and safeguards occupy a key position in the system approach. In an ideal world each defensive layer would be intact. In reality, however, they are more like slices of Swiss cheese, having many holes- though unlike in the cheese, these holes are continually opening, shutting, and shifting their location. The presence of holes in any one "slice" does not normally cause a bad outcome. Usually, this can happen only when the holes in many layers momentarily line up to permit a trajectory of accident opportunity-bringing hazards into damaging contact with victims. (*p. 395)

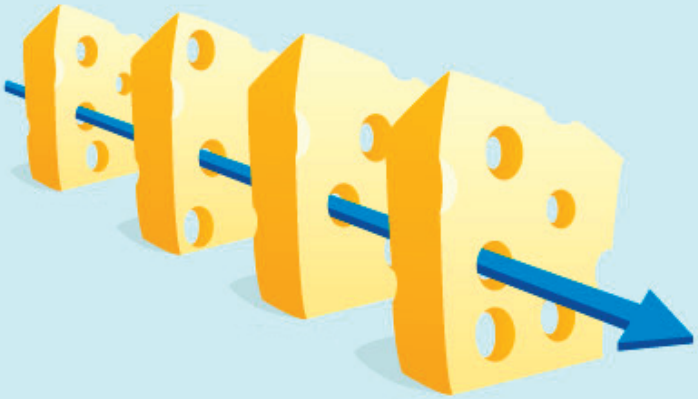

Figure 11. Model of Accident Causation

In this current study, it is interesting to consider who or what "blocked" the hole in the layers of the Swiss cheese to prevent these incidents from resulting in accidents. An examination of each pilot's responses concerning recovery factors can illuminate who or what may have broken the chain of events.

All of the pilots employed a proactive mitigation strategy to break the chain of events

All the pilots responding to these questions reported employing some sort of proactive mitigation strategy to break the chain of events. No pilot was just "lucky enough" for the weather to subside. Nearly half of the pilot reporters chose to land as soon as possible (i.e., "land enroute" at other than alternate, "land at alternate", or "land at destination"). Pilots also reported that they took some sort of inflight action, such as "descended to stay below weather", "deviated around weather", made a "180 degree turn", or "climbed above the weather". It is also noteworthy that nearly 60 percent chose to ask for help from ATC to recover from a weather encounter.

[5] Reason, James. Human error models and management. West J Med. 2000 June; 172(6): 393–396.

A majority of pilot recovery strategies involved the use of navigation equipment, specifically panel-mounted or portable GPS units. The reports described both the advantages and disadvantages of using GPS. Some pilots reported that GPS equipment was extremely helpful in recovering from their weather encounter. The following are brief summaries where GPS equipment was helpful in overcoming these adverse situations:

- A non-instrument rated pilot managed to program a GPS unit in which he had minimal training and reorient to the airport location for landing. (Report Number 89)
- A PA28 non-instrument rated pilot who encountered deteriorating weather stated: *using my hand held GPS, I located the closest airport to my position. Seeing thunderstorms and lightning directly ahead, I decided to turn around and land.* (Report Number 69)

However, original ASRS pilot report narratives contained some comments related to over-reliance on GPS panel-mount or portable units. One pilot with a GPS handheld stated: *It was a lifesaver, provided great situational awareness, and a great check for the gyro instruments in the aircraft. However, I would have turned back much earlier if I hadn't had it.* (Report Number 57) Another pilot expressed concern that with more GPS systems in small aircraft, other pilots may not file detailed flight plans or obtain weather briefings, as stated in the following excerpt:

> *Another factor was my GPS system, which makes navigation a no- brainer. If I didn't have the GPS system, I would have (and should have even with it) prepared and filed a very detailed flight plan and when FSS gave me the weather briefing I would have discovered the fog. So I learned that fog is something you have to take very seriously. ...As GPS systems become more common in small aircraft, I think more and more pilots will make the same mistake I made.* (Report Number 4)

These descriptions are consistent with ASRS Expert Analyst observations that recent GA incident reports to ASRS have demonstrated an over-reliance on advanced technology systems by some pilots. GPS, moving maps, satellite weather displays, and other technology are important tools for enhancing a pilot's situational awareness. Yet, the potential interaction effects of high tech devices and human performance, including distraction from other flight duties and possible over-dependence on technology, must be recognized.

CONTRIBUTING FACTORS

Pilot responses concerning non-weather related contributing factors indicated that decision making, time pressure, and get-home-itis were top factors. Pilots further reported their reasons for feeling time pressured, which included operational and personal pressures. It is noteworthy that eight pilots also cited deteriorating weather or approaching darkness (e.g., pressure to get ahead of

the weather) as reasons for these time pressures. Interestingly, weather did not discourage these pilots from departing; but instead, they reported that it made them rush to get off the ground. Some pilots also noted in their original ASRS pilot report narratives that they did not file an IFR flight plan because they felt that they would have more flexibility over their route and would not be further delayed while waiting for a departure time.

Interestingly, the 2007 Nall report reminds pilots of the potential lethality of these contributing factors, noting that:

> *Three-fourths of the fatal single engine fixed gear weather related accidents were due to pilot decisions to continue VFR flight into IMC weather conditions...Pilots must effectively assess weather-related risks to avoid these situations. In many cases, this means canceling the flight.* (p. 8 & 9)

STRATEGIES GATHERED FROM REPORTER SELF ASSESSMENTS

The following checklist is a summary of pilot reported strategies that could be used as a valuable resource when encountering marginal VMC or IMC conditions. These strategies were assembled by the ASRS research staff from comments made in the original ASRS pilot report narratives and from qualitative information in the current study. These strategies were not only derived from what pilots stated they would have done differently, but also strategies they actually employed prior and during their reported events.

Enhancing Training

- Understand information available from FSS including PIREPS, freezing levels, NOTAMS, and turbulence reports. Realize that weather can deteriorate or materialize rapidly whether or not it is forecast.
- Know your obstacles and their elevations along your route.
- Understand the limits of radar coverage and ATC availability at some altitudes.
- Know your alternate frequencies and carry your approach plates, even if intending to fly VFR.
- Maintain awareness of whether or not time pressure is a negative factor in making the decision to fly in poor weather.
- Plan ahead and carry an extra flashlight/batteries (for GPS, handheld radios, and flashlights).
- Include the following in your instrument training and practice:
  - » Practice of IFR operations in actual IMC conditions
  - » Practice using GPS equipment
  - » Obtain instruction in how to get an enroute instrument clearance

  - Conduct unusual attitude training
  - Familiarize yourself with aircraft equipment, especially GPS units and other technology in the aircraft. Know that GPS navigation does not replace the need to obtain weather information or file a flight plan.

Enroute Strategies

- Get up-to-date weather information while enroute.
- Think twice before canceling IFR prior to landing because weather can change quickly.
- Acknowledge personal weather minimums and resist pushing these "personal" limits.
- Consider the following strategies if you get into a VFR in IMC situation and become disoriented:
  - Use autopilot or a wing-leveler technology to assist in workload and reduce vertigo/disorientation
  - Squawk 7700, ask ATC for help, and/or consider declaring an emergency
  - Consider requesting an enroute instrument clearance when instrument rated
  - Ask for a block altitude to accommodate altitude changes during turbulent situations or extreme weather
  - Turn back or land at an alternate airport, if weather deteriorates

PROPOSED FUTURE STUDIES

Analysis of the data in this study has highlighted other areas that could produce additional insights into pilot training and resource/technology utilization. Outlined below are some of these proposed future studies.

Training

- A majority of the respondents in this study were instrument rated. Some pilots commented on strategies they learned after obtaining their rating. A future focus might explore original instrument training practical test standards versus new insights, or intervention strategies learned after obtaining the instrument rating. For example, block altitude requests may not be a common training technique, but pilots may indicate its usefulness from their experience.

- Although this study did not ask instrument currency questions specific to FAR 61.57 (c) (1), this would be an important consideration for a future study. Any future investigation should seek to acquire that information.
- Some pilots commented that their lack of actual IMC experience was a contributing factor to their incident (e.g., not realizing that weather might build gradually so that they tended to become "accustomed" to it rather than encountering an immediate "wall of clouds"). It is notable that vertigo and disorientation affected both instrument rated and non-instrument rated pilots. A continuing question in the area of weather education is what type of training is most effective. Instrument training may be conducted in part in actual IMC, simulated by utilizing a vision-restrictive hood (or "foggles"), and/or by flying instrument procedures in a simulator. Pilot evaluation regarding the relative merits of each approach could be solicited.

Resource and Technology Utilization

- Pilots participating in this study were conscientious about obtaining weather forecasts and briefings. It was clear that they consulted a variety of weather information sources. It would be informative to gain a clearer understanding of how pilots utilize the wide variety of weather information sources; including Flight Service Stations (e.g., requesting abbreviated clearances or standard briefings, etc.) and other automated weather reporting.
- Pilots stated that decision making was the leading contributor to their weather related incidents. Some pilots consulted friends, relatives, Airport Managers, other pilots, or Certified Flight Instructors for weather information and guidance prior to undertaking a flight. It would be useful to determine the qualitative impacts of qualified mentorship on pilot decision making.
- While almost three-quarters of the pilots in this study used either panel-mounted or portable GPS units during the incident flight, an undesirable weather encounter still occurred. It would be helpful to determine what pilots expected of these GPS systems and what training and educational strategies might be utilized to address human interfaces with these systems.

Appendix A
Example Supplemental Question Set

A – 1

**National Aeronautics and
Space Administration
Ames Research Center
Mail Stop 262-4
Moffett Field, CA 94035-1000**

AVIATION SAFETY REPORTING SYSTEM

General Aviation Weather Encounters

Dear Project Participant,

Thank you for participating in the General Aviation Weather Encounters project. NASA, in collaboration with FAA, is conducting this research because weather-related accidents account for many General Aviation fatalities. The specific causes for these GA accidents are often unknown. In conjunction with the ASRS Incident Report you submitted to NASA, you have agreed to provide additional information that will assist in developing insights and preventive strategies concerning General Aviation weather encounters.

Section 91.25 of the Federal Aviation Regulations (14 CFR 91.25) prohibits reports filed with NASA from being used for FAA enforcement purposes. This report will not be made available to the FAA for civil penalty or certificate actions for violations of the Federal Air Regulations. ALL identifying information (names, company affiliations, etc.) will be removed from both your original ASRS Report and this Coding Form before ASRS research data are provided to FAA.

Again, thank you for your participation in this project — your willingness to share your experiences and knowledge is important to aviation safety. As discussed in our phone call, if you have any additional questions or input to provide, please call.

Linda J. Connell
NASA ASRS Director
(408) 541-2800

Coding Form Instructions

1. Ensure that the passcode below is correct.
2. Please keep all pages together.
3. Fill out this coding form as completely as possible.
4. Enclose the completed form in the stamped and addressed return mailing envelope provided, and drop in a mail box.

Passcode

Section A — Flight Planning and Weather Briefings

A.1 ..... Did you attempt to obtain pre-flight weather information? *(Check one only)*

○ Yes (Go to Question A.2)
○ No (Skip to Question A.8)

A.2..... What sources of weather information did you utilize? *(Check all that apply)*

☐ National Oceanic & Atmospheric Administration (NWS)
☐ (Automated) Flight Service Station (FSS)
☐ Direct User Access Terminal (DUATS)
☐ Commercial Vendors
☐ Hazardous In-flight Weather Advisory Service (via VORs)
☐ Transcribed Weather Broadcast (TWB)
☐ Pilots Automatic Telephone Weather Answering Service
☐ En-route Flight Advisory Service
☐ The Weather Channel
☐ Other pilots
☐ Other (please specify): _____

A.3..... Were any of your attempts to obtain pre-flight weather information unsuccessful? *(Check one only)*

○ Yes
○ No

A.4..... If you answered "Yes" to Question A.3 above, what were the reasons your attempts were unsuccessful? *(Check all that apply)*

TELEPHONE

☐ Did not know or were unable to find telephone or access numbers
☐ No telephone available
☐ No answer on telephone
☐ Telephone briefer did not have all requested information available
☐ Telephone briefer denied service

COMPUTER

☐ No online access available
☐ Could not connect online
☐ Could not maintain online connection
☐ Required information not available on computer
☐ Experienced difficulty with computer interface

OTHER

☐ Other (please specify): _____

A.5..... What was the preflight weather forecast for the following? *(Check one only in each category)*

a) Departure airport..... ○ VMC • ○ Marginal VMC • ○ IMC • ○ Don't know/don't recall
b) En-route ..... ○ VMC • ○ Marginal VMC • ○ IMC • ○ Don't know/don't recall
c) Destination airport..... ○ VMC • ○ Marginal VMC • ○ IMC • ○ Don't know/don't recall

A.6..... What were the forecast conditions for the following? *(Check all that apply)*

a) Departure .....☐ Fog • ☐ Ice • ☐ Rain • ☐ Snow • ☐ Tstorm • ☐ Turbulence
b) En-route.....☐ Fog • ☐ Ice • ☐ Rain • ☐ Snow • ☐ Tstorm • ☐ Turbulence
c) Destination.....☐ Fog • ☐ Ice • ☐ Rain • ☐ Snow • ☐ Tstorm • ☐ Turbulence

A.7..... Was the actual weather better than, the same as, or worse than forecast?
(Check one only in each category)

a) Departure .....○ Better than… • ○ Same as… • ○ Worse than…
b) En-route .....○ Better than… • ○ Same as… • ○ Worse than…
c) Destination .....○ Better than… • ○ Same as… • ○ Worse than…

A.8..... If you answered "No" to Question A.1 above, why did you NOT attempt to obtain pre-flight weather information prior to departure? *(Check all that apply)*

☐ Did not believe pre-departure weather was necessary for the intended flight
☐ Was intimidated by process of obtaining weather
☐ Did not know or was unable to find telephone or access numbers
☐ No telephone available
☐ No online access available
☐ Other (please specify): _____

A.9..... Did you file a flight plan, and if so what type? *(Check one only)*

○ Did NOT file a Flight Plan
○ Filed a VFR Flight Plan and activated it
○ Filed a VFR Flight Plan, but did not activate it
○ Filed an IFR Flight Plan

Section B — Incident Information

B.1 ..... Were you (the pilot) deviating from your planned route because of weather when the incident occurred? *(Check one only)*

○ Yes
○ No

B.2..... What type of weather did you encounter? *(Check all that apply)*

☐ Broken or solid undercast
☐ Deteriorating weather ahead
☐ Flew into clouds or fog
☐ Ground fog
☐ Icing
☐ Lowering ceiling
☐ Merging cloud layers
☐ Snow showers
☐ Reduced visibility
☐ Rising cloud tops
☐ Strong cross winds
☐ Thunderstorms
☐ Turbulence
☐ Unknown, but IMC conditions
☐ Rain
☐ Hail
☐ Other (please specify): _____

B.3..... Did you attempt to obtain en-route assistance from ATC? *(Check one only)*

○ Yes (go to Question B.4)
○ No (go to Question B.6)

B.4..... If you answered "Yes" to the Question B.3, what services did you request? *(Check all that apply)*

☐ Emergency climb/descent
☐ IFR clearance
☐ Vectors to an airport
☐ Vectors to VMC
☐ PIREPS
☐ Weather update
☐ Instrument approach procedure
☐ Other (please specify): _____

B.5..... If you were unable to obtain ATC services, or could not obtain them in a timely manner, what were the reason(s)? *(Check all that apply)*

☐ ATC would not provide clearance
☐ There was a delay in ATC providing clearance
☐ Request for an IFR or SVFR clearance was denied
☐ Too low for radar coverage
☐ Unable to contact ATC
☐ Other (please specify): _____

B.6..... If you answered "No" to Question B.3, what was the primary the reason you did not attempt to obtain assistance from ATC? *(Check one only)*

○ Did not feel ATC services were required
○ Did not know that ATC services were available
○ Did not know the frequencies to contact ATC
○ Did not know what services to ask ATC for
○ Knew that communications would not be possible at my altitude or location
○ Was afraid of a reprimand or certificate action
○ Other (please specify): _____

Section C — Contributing Factors and Consequences

C.1 ..... Were there factors other than weather that contributed to the incident? *(Check one only)*

○ Yes (Go to Question C.2)
○ No (Skip to Question C.4)

C.2..... If you answered "Yes" to Question C.1, what non-weather related factors contributed to the incident? *(Check all that apply)*

- ☐ Company or FBO policy
- ☐ Get-home-itis
- ☐ Aircraft equipment problem
- ☐ Fatigue
- ☐ Decision making
- ☐ Distraction by passenger or flight crew
- ☐ Time pressure
- ☐ Illness
- ☐ Other (please specify): _____

C.3..... If you answered "Yes" to "Time Pressure" in Question C.2, what were the reasons for the time pressure? *(Check all that apply)*

- ☐ A "void if not off by…" ATC clearance
- ☐ Approaching darkness
- ☐ Deteriorating weather
- ☐ Operational pressures
- ☐ Personal pressure to reach a destination on-time
- ☐ Other personal emotional pressures or distractions
- ☐ Other (please specify): _____

C.4..... What were the consequences of your weather encounter?
(Check all that apply)

- ☐ Unable to maintain altitude
- ☐ Lost/unsure of position
- ☐ Landed below published IFR minimums
- ☐ VFR flight in IMC
- ☐ Made IFR approach without an IFR rating
- ☐ Landed VFR in IMC
- ☐ Landed without clearance
- ☐ Penetrated controlled airspace
- ☐ Loss of aircraft control
- ☐ Controlled flight toward terrain
- ☐ Precautionary landing or off-airport landing
- ☐ Runway excursion
- ☐ Other (please specify): _____

C.5..... What factors enabled you to recover from the weather encounter?
(Check all that apply)

- ☐ Aircraft warning system
- ☐ Ground proximity warning system
- ☐ Broadcast on 121.5
- ☐ ATC offered assistance
- ☐ Contacted ATC, requested IFR clearance
- ☐ Instrument approach
- ☐ Radar vector to destination
- ☐ Radar vector to alternate
- ☐ Vector to VMC
- ☐ Cancelled IFR
- ☐ 180-degree turn
- ☐ Climbed above weather
- ☐ Broke out on top
- ☐ Descended to stay below weather
- ☐ Descended through hole in undercast
- ☐ Deviated around weather
- ☐ Landed enroute (at other than alternate)
- ☐ Landed at alternate
- ☐ Landed at destination
- ☐ Other (please specify): _____

Section D — Aircraft Equipment

D.1 ..... What type(s) of of navigation and communication equipment were onboard the aircraft at the time of the incident, did you use it, and if equipped was any of it UN-serviceable? *(Check all that apply)*

COMMUNICATION	EQUIPPED	USED	UNSERVICEABLE
☐ NO communication equipment			
Single VHF transceiver	☐	☐	☐
Dual VHF transceiver	☐	☐	☐
Combination NavCom	☐	☐	☐
HF transceiver	☐	☐	☐
ACARS	☐	☐	☐
Skyphone	☐	☐	☐
Cell phone	☐	☐	☐
Other (specify) _____	☐	☐	☐

NAVIGATION/FLIGHT MANAGEMENT	EQUIPPED	USED	UNSERVICEABLE
☐ NO navigation equipment			
Single VOR receiver	☐	☐	☐
Dual VOR receiver	☐	☐	☐
ILS	☐	☐	☐
ADF	☐	☐	☐
DME	☐	☐	☐
GPS	☐	☐	☐
INS/IRS	☐	☐	☐
Integrated area navigation	☐	☐	☐
Moving Map	☐	☐	☐
Terrain Warning System	☐	☐	☐
Other (specify) _____	☐	☐	☐

D.2 ..... Was the aircraft equipped with any of the following weather-avoidance equipment, and if it was, what equipment was used during the incident? *(Check all that apply)*

EQUIPMENT	EQUIPPED	USED	UNSERVICEABLE
☐ NO weather avoidance equipment			
Weather radar	☐	☐	☐
Lightning Detector/Stormscope	☐	☐	☐
Weather Data Link (NEXRAD/METARS,etc.)	☐	☐	☐
Other (specify) _____	☐	☐	☐

D.3 ..... What type of de-ice or anti-ice or other equipment did the aircraft have at the time of the incident, did you use it, and if equipped was any of it UN-serviceable?
(Check all that apply)

EQUIPMENT	EQUIPPED	USED	UNSERVICEABLE
☐ NO de-ice, anti-ice or other related equipment was installed			
Wing/tail De-icing boots	☐	☐	☐
Wing/tail Bleed-air anti-ice	☐	☐	☐
Wing/tail electrical anti-ice	☐	☐	☐
Wing/tail TKS (fluid-type anti-ice)	☐	☐	☐
Propeller de-ice or anti-ice	☐	☐	☐
Engine (air) inlet anti-ice	☐	☐	☐
Windshield de-ice or anti-ice	☐	☐	☐
Other (specify) _____	☐	☐	☐

D.4 ..... Did the aircraft have an autopilot or wingleveler, and were you using it at the time of the incident? *(Indicate one type only, and note if used or unserviceable)*

☐ NO, the aircraft did NOT have an autopilot or wing-leveler			
Wing leveler	☐	☐	☐
Basic autopilot	☐	☐	☐
Approach-capable autopilot	☐	☐	☐

Section E — Instrument Experience

E.1 ..... Are you an instrument rated pilot? *(Check one only)*

○ Yes
○ No (If "No," fill out the remainder of this section as fully as possible)

E.2 ..... If you are NOT an instrument rated pilot, are you currently working to obtain an instrument rating? *(Check one only)*

○ Yes
○ No

E.3 ..... How many actual instrument hours have you flown?

_____ (total hours)

E.4 ..... How many simulated (under the hood) instrument hours have you flown?

_____ (total hours)

E.5 ..... How many simulator hours have you had?

_____ (total hours)

E.6 ..... How many instrument approaches had you conducted in actual instrument conditions in the year prior to the incident?

_____ (number)

E.7 ..... How many instrument approaches had you conducted in actual instrument conditions in the 90 days prior to the incident?

_____ (number)

E.8 ..... In the majority of your instrument flights, has the actual weather been better than, the same as, or worse than the reported weather at the following?
(Check one only in each category)

a) Departure airport..... ○ Better than… ○ Same as… ○ Worse than…
b) En-route ..... ○ Better than… ○ Same as… ○ Worse than…
c) Destination airport..... ○ Better than… ○ Same as… ○ Worse than…

Section F — Summary

(use extra paper if required)

F.1 ..... Why do you think the incident occurred?

F.2..... In retrospect, is there anything you would have done differently?

F.3..... What would you recommend that others do to avoid a similar occurrence?

Appendix B

Data Summary of ASRS Analyst Coding Form and Synopses

Time of Day

0001 To 0600 3
0601 To 1200 32
1201 To 1800 42
1801 To 2400 20
Left Blank 3

Lighting

Dawn 2
Daylight 76
Dusk 4
Night 14
Left Blank 4

Ceiling

150 1
200 1
300 1
400 2
450 1
500 1
550 1
600 4
700 1
800 3
900 2
1000 5
1200 3
1300 1
1400 1
1500 2
2000 5
2100 1
2500 1
3000 7
4000 3
4700 1
4800 1
5000 3
6000 1
6800 1
7000 1
9000 1
10000 1
11000 1
12000 2
13000 1
22000 1
Left Blank 38

Visibility

0 3
0.25 1
1 1
1.5 1
2 7
2.5 1
3 6
4 2
5 9
6 10
7 4
8 2
9 1
10 15
15 1
20 1
30 1
Left Blank 34

Operator

Air Carrier (freight/Caravan 1) 1
Air Taxi 8
Charter 4
Corporate 4
Instructional 5
Personal 75
Skydiving 1
N/A 2

Aircraft Make/Model

A109 1
Aeronca Champion 1
Aircoupe A2 1
Aircraft Unlisted or Undifferentiated 1
Airliner 99 1
AS 350 Astar/Ecureuil 2
Baron 55/Cochise 1
Beechcraft Twin Turboprop Jet Undifferentiated or Other Model 1
Bonanza 33 2
Bonanza 35 1
Caravan 1 208A 1
Cardinal 177/177RG 2
Cessna 150 7
Cessna 152 1
Cessna 210 Centurion / Turbo Centurion 210C, 210D 3
Cessna 310/T310C 1
Cessna 340/340A 1
Cessna 402/402C/B379 Businessliner/ Utiliner 1
Cessna Single Piston Undifferentiated or Other Model 1
Cessna Stationair/Turbo Stationair 7/8 1
Challenger Jet Undifferentiated or Other Model 1
Cheetah, Tiger, Traveler 2
Christen Eagle II 1
Citation V 1
Duchess 76 1
Experimental Aircraft 2
Gulfstream V 1
Helicopter 2
Jet Ranger Undifferentiated or Other Model 1
M-20 B/C Ranger 1
M-20 K (231) 1
PA-28 Cherokee Arrow IV 1
PA-28 Cherokee/Archer II/Dakota/ Pillan/Warrior 14
PA-31 Navajo Chieftan/Mojave/Navajo T1020 1
PA-32 Cherokee Six/Lance/Saratoga 2
PA-34-200 Seneca I 1
Piper Twin Piston Undifferentiated 1
Sail Plane 1
Skyhawk 172/Cutlass 172 16
Skylane 182/RG Turbo Skylane/RG 9
Skylark 175 1
Skywagon 185 1
Small Aircraft, High Wing, 1 Eng, Fixed Gear 1
Small Aircraft, Low Wing, 1 Eng, Fixed Gear 1
Small Transport 1
SR20 1
SR22 1
Twin Otter DHC-6 1
Viking 1

Crew Size

1 93
2 7

FAR Part

Part 105 1
Part 121 2
Part 135 12
Part 91 84
N/A 1

Mission

Ambulance 5
Business 14
Ferry 2
Freight 3
Passenger 11
Pleasure 49
Practice 1
Sky Diving 1
Traffic Watch 1
Training 10
Left Blank 3

Route in Use

Approach.Instrument Non Precision 1
Approach.Instrument Non Precision, Arrival.On Vectors 1
Approach.Instrument Precision 1
Approach.Instrument Precision, Arrival.On Vectors 1
Approach.Traffic Pattern 2
Approach.Visual, Arrival.On Vectors 1
Arrival.On Vectors 4
Arrival.On Vectors, Enroute.On Vectors 1
Departure.On Vectors 1
Departure.VFR 1
Enroute.Airway.V121.Airway 1
Enroute.Airway.V159.Airway 1
Enroute.Airway.V3.Airway 1
Enroute.Airway.V611.Airway 1
Enroute.Airway.V85.Airway 1

Enroute.On Vectors 1
N/A 80

Component Code

Airfoil Ice System 1
Carburetor Heat Control 1
Cockpit Lighting 1
Compass (HIS/ETC) 1
Ice/Rain Protection System 1
ILS/VOR 1
Navigational Equipment and Processing . 1
Vacuum System 1
VHF 1
Wing Leading Edge 1
N/A 90

Problem

Design Deficiency 1
Failed 3
Improperly Operated 3
Malfunctioning 2
Not Installed 1
N/A 90

Reporter 1

Instructing 1
Instructing, Pilot Flying 1
Instructing, Pilot Not Flying 2
Pilot Flying 94
Pilot Not Flying 2

Reporter Affiliation

Air Carrier 1
Air Taxi 7
Charter 5
Corporate 5
Instructional 9
Personal 71
Skydiving 1
Left Blank 1

Function

Captain, PIC 3
First Officer 1
Instructor 4
Relief Pilot 1
Single Pilot 89
Single Pilot, PIC 1
Left Blank 1

Qualification

ATP
Instrument 16
Multi Engine 7
CFI 6
Flight Engineer 4
Number of Pilots Responded 16

Commercial
Instrument 37
Multi Engine 24
CFI 21
Flight Engineer 0
Number of Pilots Responded 39

Private
Instrument 17
Multi Engine 3
CFI 0
Flight Engineer 0
Number of Pilots Responded 42

Unknown
Instrument 1
Multi Engine 1
CFI 2
Flight Engineer 0
Number of Pilots Responded 3

Flight Time

15 1
63 1
81.1 1
102 1
117.6 1
119 1
120 1
130 1
144 1
149 1
165 1
195 1
200 1
217 1
222 1
230 1
255 1
286.9 1
302.5 1
320 1
325 1
330 1
350 2
351.9 1
353 1
360.2 1
400 2
475 1
480 2
487 1
520 1
522 1
530 1
587.6 1
595 1
600 1
630 1
656.1 1
687 1
700 1
750 1
800 3
830 1
877 1
900 2
935 1
980 1
1000 2
1100 1
1119.3 1
1235 1
1300 1
1350 1
1418 1
1500 2
1580 1
1648 1
1649 1
1750 1
1805 1
1875 1
1900 3
2000 1
2115 1
2200 1
3000 1
3700 1
4000 1
4457 1
6000 1
6200 1
6300 1
6450 1
6600 1
7100 1
7500 1
9900 1
10000 1
11000 1
13500 1
16000 1
16700 1
17000 1
20000 2
24000 1
29000 1
Left Blank 3

Primary Problem

Aircraft 2
Ambiguous 1
ATC Human Performance 1
Company 1
Flight Crew Human Performance 46
Weather 48
Left Blank 1
Left Blank 1

Anomolies

Inflight Encounter / Weather 85
Non Adherence / FAR 65
Inflight Encounter / VFR In IMC 56
Non Adherence / Clearance 24
Airspace Violation / Entry 13
Non Adherence / Published Procedure .. 13

Other Spatial Deviation / Track Or Heading Deviation 10
Inflight Encounter / Turbulence 9
Altitude Deviation / Excursion From Assigned Altitude 8
Inflight Encounter / Ice 9
Other Anomaly / Loss Of Aircraft Control 7
Other Anomaly / Unstabilized Approach . 6
Aircraft Equipment Problem / Less Severe 5
Aircraft Equipment Problem / Critical ... 2
Altitude Deviation / Crossing Restriction Not Met 2
Altitude Deviation / Overshoot 2
Incursion / Landing Without Clearance 2
Incusion / Runway 2
Other Spatial Deviation / Uncontrolled Traffic Pattern Deviation 2
Conflict / Airborne Less Severe 1
Conflict / Ground Less Severe 1
Conflict / NMAC 1
Ground Excursion / Runway 1
Ground Encounters / Landed At Private Arpt Without Authorization 1
Ground Encounters / Tree 1
Inflight Encounter / TSTSM 1
Non Adherence / Company Policies 1
Other Anomaly / Speed Deviation 1
Other Anomaly / Management Pressure .. 1
Other Anomaly / Spatial Disorientation ... 1
Other Anomaly / Student Plt Maintains Acft Ctl In IMC 1
Other Anomaly / Vertigo 1
Other Spatial Deviation / Altitude Heading Rule Deviation 1
Number of Reports 100

Resolutory Action

Flight Crew Exited Adverse Environment 52
Controller Issued New Clearance 24
Controller Provided Flight Assist 16
Flight Crew Landed As Precaution 13
No Action Taken / Anomaly Accepted ... 12
Flight Crew Diverted To Another Airport 11
Flight Crew Declared Emergency 10
Controller Issued Advisory 7
Flight Crew Regained Aircraft Control .. 6
Flight Crew Took Precautionary Avoidance Action 5
Flight Crew Diverted To Alternate 4
Flight Crew Became Reoriented 4
No Action Taken /Unable 3
Flight Crew Took Evasive Action 3
No Action Taken / Detected After The Fact 2
Flight Crew Returned To Intended or Assigned Course 2
Flight Crew Executed Go Around 2
Return/Land 1
No Action Taken / Insufficient Time 1
Made PAR Apch 1
Flight Crew Returned To Original Clearance 1
Flight Crew Returned To Assigned Altitude 1
Flight Crew Landed In Emergency Condition 1
Flight Crew Exited Penetrated Airspace ... 1
Flight Crew Executed Missed Approach .. 1
Filed IFR 1
Exercised Command Authority 1
Number of Reports 96

ASRS ANALYST SYNOPSES

Report Number 1

A medical transport helicopter entered IMC on a VFR flight plan and continued to destination.

Report Number 2

A PA28 pilot with an unreliable VOR and a handheld GPS was IMC while VFR. The pilot declared an emergency and was given an IFR approach clearance.

Report Number 3

An inexperienced private pilot took off for a pleasure flight in a C172 in marginal visibility and entered solid IFR conditions. The pilot ultimately was talked down during a PAR approach.

Report Number 4

A non-instrument rated Q200 pilot encountered unexpected fog and descended in IMC to a non-towered alternate airport due to fuel considerations.

Report Number 5

A C208 pilot encountered severe icing and control problems during a descent for landing. The flight diverted to a warmer airport.

Report Number 6

In an effort to save time and avoid developing weather, a Bellanca pilot filed VFR direct and ended up in adverse weather conditions. Fear of getting into trouble prevented this pilot from calling ATC. Eventually the pilot returned to the departure airport after a period of confusion.

Report Number 7

A C172 pilot encountered unforecast severe turbulence, declared an emergency, and diverted to another airport.

Report Number 8

A PA28 pilot departed VFR, but encountered IMC. The pilot advised ATC and returned to land.

Report Number 9

A VFR flight of 2 trainers diverted because of low ceilings. One aircraft was squawking a previously assigned ATC code during the entire flight.

Report Number 10

The pilot of a PA34 lost cockpit lighting, flashlight, glasses and control of the airplane during a night IFR flight. An alert departing controller assisted the pilot in a safe return to his departure airport.

Report Number 11

Departing an uncontrolled airport intending to pick up a filed IFR clearance, a PA31 pilot encountered deteriorating weather. Unable to return to the departure airport or receive clearance, the pilot completed several minutes IMC climb before receiving clearance.

Report Number 12

Arriving on a VFR flight plan, a pilot encountered deteriorating weather in the traffic pattern and diverted to another airport.

Report Number 13

Canceling IFR as requested on the ATIS, a Gulfstream V crew encountered weather worse than reported, resulting in an abandoned approach and climbing VFR through the overcast before being issued a new clearance.

Report Number 14

A PA28 flight instructor with a student reported entering snow showers and possible icing conditions during a training flight.

Report Number 15

An IFR C172 pilot encountered moderate icing at 12,000 feet and requested a turn back with a descent and diversion to an alternate airport.

Report Number 16

A C210 pilot landed below minimums in a high crosswind after the aircraft accumulated ice.

Report Number 17

A helicopter pilot encountered ice and fog after takeoff. IMC forced the pilot to land off field. The pilot declared an emergency.

Report Number 18

A CI560 crew approaching the airport executed a missed approach after canceling IFR and subsequently entering IMC.

Report Number 19

A helicopter was not IFR certified and pilot was not instrument current. The pilot encountered IMC, declared an emergency, and received vectors for an ILS approach at another airport.

Report Number 20

A BE76 pilot cancelled IFR while VMC, then entered IMC. The pilot became disoriented, regained control of the aircraft, and made an IFR approach under VFR.

Report Number 21

Two commercial pilots in a C172 encountered deteriorating weather, opened an IFR flight plan and continued into an encounter with icing conditions that required the declaration of an emergency.

Report Number 22

A Mooney M20C pilot encountered unforecast icing while IFR and changed cruise altitude when the pilot was unable to contact ATC.

Report Number 23

A BE20 completed a VFR approach to an airport with a reported one quarter mile visibility. The actual visibility was greater than 3 miles.

Report Number 24

A VFR PA28 pilot in the landing pattern entered IMC at 600 feet in an upwind cloud layer and landed.

Report Number 25

A Mooney M20K pilot, vectored and kept high on a localizer approach, executed a late go-around near terrain.

Report Number 26

A VFR PA28 pilot entered Class B airspace above an overcast when the pilot was unable to determine the aircraft's position visually.

Report Number 27

A VFR PA32 pilot encountered IMC while descending into his destination airport and diverted, receiving VFR vectors to an alternate.

Report Number 28

An IMC C182 pilot, unable to talk with a busy ATC, went beyond the clearance limit. The pilot then discovered that a needed approach plate was missing.

Report Number 29

A Luscombe 8 pilot reported encountering IMC while at 700 feet on a VFR trip between local airports.

Report Number 30

A VFR C182 pilot on top of an overcast requested a GPS approach, but the controller did not authorize the approach. As a result, the pilot descended through the overcast and landed.

Report Number 31

An Express S2000 pilot requested a lower IFR altitude from ATC because of icing. The pilot's descent was delayed for a period of time.

Report Number 32

A VFR C185 pilot encountered IMC and continued at a low altitude, finally clearing weather to land VMC at the home base.

Report Number 33

With no flight plan, the pilot of a well-equipped SR22, including onboard satellite weather capability, entered IMC for several minutes.

Report Number 34

A PA34-200T pilot encountered ice while VFR at 10,500 feet, lost control of the aircraft, and recovered control at 3,000 feet.

Report Number 35

A C172 pilot flying an ILS approach in IMC experienced spatial disorientation with an altitude loss. The pilot recovered and completed the approach.

Report Number 36

A C172 pilot departed into deteriorating weather and returned to the departure airport when unable to maintain VFR.

Report Number 37

An IFR C182RG pilot encountered ice at the filed 8,000 foot altitude and diverted off airways while descending in conditions that were clear of ice.

Report Number 38

A BE33 pilot climbed above 17,500 feet in order to remain VMC and above the icing layer. ATC assisted the pilot in VMC descent planning.

Report Number 39

A PA28 flight instructor with a student reported avoiding fast-moving clouds in the landing pattern.

Report Number 40

A C172 landed at an alternate airport in decreasing visibility, near sunset.

Report Number 41

A C402 freight pilot had 3 altitude deviations on the same trip: icing diversion, accidental autopilot disconnect, and altitude alert missetting.

Report Number 42

Upon deciding to return to his departing airport, pilot of a C182 encounters deteriorating weather conditions which force his immediate landing at a nearby apparent gravel airstrip.

Report Number 43

Instructor and student pilot aboard sailplane are soaring at FL220 when strong rising winds lift them into IMC conditions. Exit using benign spiral technique.

Report Number 44

Pilot of C182 on VFR part 135 passenger flight encounters deteriorating weather en-route. Forced to file IFR to continue to destination safely.

Report Number 45

Newly minted IFR pilot busts crossing restrictions on hurried, unstable GPS IAP.

Report Number 46

DHC8 pilot on skydiving drop inadvertently flies into base of overcast.

Report Number 47

PA28 pilot on VFR flight plan climbs briefly into IMC before descending out of clouds. Less severe encounter with flight of 2 military aircraft occurred during the recovery maneuver.

Report Number 48

Heli pilot VFR en-route inadvertently enters IMC. Declared emergency, obtains IFR clearance until once again in VMC and continues to destination.

Report Number 49

Single pilot of IFR PA38 is forced to climb above cleared altitude due to icing conditions and inoperable carburetor heat.

Report Number 50

A C207 pilot was pressured into flying a charter flight in marginal weather, and encountered freezing rain.

Report Number 51

A C210 pilot distracted by a navigation task entered IMC and was unable to contact ATC. The pilot completed a 180-degree turn to VMC and called ATC on 121.5.

Report Number 52

The pilot of a PA28 encountered worse-than-forecast weather, entered IMC, and suffered vertigo. The pilot salvaged the situation by strict adherence to aviating and communicating with ATC.

Report Number 53

A C150 pilot, seeking transit through Class D airspace in less than VMC, failed to request a special VFR clearance. Some confusion ensued.

Report Number 54

A C172 pilot departing a grass strip VFR, encountered IMC and filed an IFR flight plan airborne with CTR for an ILS approach.

Report Number 55

A highly experienced ATP pilot of a C177 opted to press on to destination VFR, and was driven to an altitude of 500 feet AGL by lowering ceilings.

Report Number 56

A no-radio C150 pilot skirted unexpected thunderstorms and landed to avoid the severe weather.

Report Number 57

A VFR C150 pilot encountered IMC and completed an unscheduled landing.

Report Number 58

A C310 pilot refused an ATC traffic vector when it appeared the vector would place the pilot in severe weather.

Report Number 59

A corporate jet entered the top of a thunderstorm and was unable to control altitude, climbing 1,400 feet above the clearance altitude.

Report Number 60

A VFR RV6A pilot entered IMC near mountains and executed a turn to return to VMC while attempting unsuccessfully to contact ATC.

Report Number 61

A C182 encountered turbulence in IMC, resulting in an altitude excursion that was required to avoid exceeding airspeed limits.

Report Number 62

Deteriorating weather prompted a private pilot to land and re-file for a different route. Continued deterioration of the weather on the new route prompted the pilot to turn back, followed by inadvertent entry into Class D airspace without a clearance.

Report Number 63

Deteriorating weather conditions below Class C airspace, as well as communication difficulty, prompted a pilot to make a 180-degree turn to maintain visual conditions while obtaining an IFR clearance to proceed.

Report Number 64

An instrument-rated C150 pilot flying VFR entered IMC conditions and landed.

Report Number 65

A PA28 pilot reported moderate to severe turbulence with wind gusts. The pilot terminated flight and returned to the departure airport.

Report Number 66

A PA28 pilot flew under a cloud deck, entered IMC, and during a turn back to VMC became disoriented. The pilot recovered by landing at an alternate airport.

Report Number 67

An instrument-rated, but non-instrument current C172 pilot, flew at very low altitude to conduct a flight home in IMC.

Report Number 68

A VFR PA28 pilot in the vicinity was caught in IMC. The pilot declared an emergency and was given a vector to a VFR airport.

Report Number 69

A VFR PA28 pilot trying to avoid severe weather, reversed course and decided to land. The aircraft's left wing leading edge was damaged by a tree strike during landing.

Report Number 70

A VFR pilot exited the ADIZ VFR then entered the ADIZ without clearance while avoiding weather.

Report Number 71

A touring AS350 entered IMC. Unable to exit IMC, the pilot declared an emergency and received vectors for descent and landing on an island that was VMC.

Report Number 72

A VFR BE35 pilot entered IMC conditions and Class D airspace while attempting to avoid weather. The pilot obtained Class D landing clearance to avoid approaching weather.

Report Number 73

A VFR C182 pilot departing Oshkosh, WI entered IMC while attempting to reach VMC. The reporter lost situational awareness and entered Class D airspace.

Report Number 74

An IFR Grumman AA5B pilot became spatially disoriented, situationally confused, and had trouble completing the approach.

Report Number 75

An experienced pilot of a C172 encountered deteriorating weather during pattern work to maintain night qualification.

Report Number 76

A C172 pilot reported getting caught above an overcast, calling ATC for assistance, and after finding a hole in the overcast descending VFR to an alternate airport.

Report Number 77

A private pilot departed west in hazy conditions and encountered IMC during climb-out.

Report Number 78

A traffic watch C172 pilot encountered a low ceiling and remained at 500 feet below the clouds, but not 1,000 feet above obstacles.

Report Number 79

A C172 instructor with a student entered IMC at 200 feet after takeoff. The student did not release aircraft control, requiring the instructor to climb in IMC and request an IFR return.

Report Number 80

A C150 pilot encountered IMC at 400 feet after taking off in what appeared to be VMC.

Report Number 81

In the process of avoiding clouds, a C177 pilot entered Class C airspace without a clearance.

Report Number 82

A VFR BE55 pilot at 17,500 feet entered clouds and encountered icing.

Report Number 83

A BE56 pilot on an ILS approach, broke off the approach because of a thunderstorm on final, and descended below the final approach altitude to remain clear of weather.

Report Number 84

A C182 pilot at 9000 feet encountered icing and climbed while requesting a higher altitude. The request was denied, so the pilot declared an emergency and received CLB clearance.

Report Number 85

An Ercoupe pilot encountered IMC while navigating to home base and violated another airport's airspace.

Report Number 86

A C150 pilot crossing a mountain range encountered IMC and attempted to land at a closed airport for fuel. The airport manager opened the airport temporarily to accommodate the pilot.

Report Number 87

A pilot, attempting to remain VFR, descended to a low altitude, encountered IMC, reversed course, and landed.

Report Number 88

A VFR Aeronca 7AC pilot encountered IMC and diverted into an IMC CTAF field, only to land opposite a business jet that executed a go-around to avoid a collision.

Report Number 89

A low-time VFR C182 pilot encountered IMC after departure and was able to program a GPS system for an approach to home base.

Report Number 90

A VFR C152 pilot encountered unexpectedly poor weather conditions on a cross-country flight and landed on a highway.

Report Number 91

A C340 conducted a VOR approach and when VFR cancelled IFR and proceeded to Chehalis, WA. However, the pilot operated in Class D without clearance.

Report Number 92

A C172 pilot went IMC in a VFR pattern and diverted to a nearby field because a panicked student pilot was also in pattern.

Report Number 93

A C210 at 16000 ft encountered unexpected icing and descended to 12000 ft. Pilot landed before his destination to check for further icing conditions.

Report Number 94

A PA28 pilot departed Worcester, MA VFR with a 500 ft broken ceiling and obtained IFR after takeoff.

Report Number 95

A C150 pilot became distracted by icing and deviated from the assigned ILS intercept heading.

Report Number 96

The pilot of an EMS VFR heli experienced IMC conditions and requested vectors above the cloud deck to VMC.

Report Number 97

A VFR pilot in a C172 encountered clouds while receiving flight following traffic vectors and became disoriented causing a descent out of the clouds. He recovered and proceeded with flight following.

Report Number 98

A VFR single-engine aircraft pilot entered a thunderstorm and experienced icing, severe turbulence, and loss of the airspeed indicator.

Report Number 99

A VFR C172 pilot diverted to an en-route airport after deteriorating weather conditions prohibited VMC flight. ATC attempted to give the pilot IFR vectors into IMC.

Report Number 100

A VFR Piper Cherokee pilot encountered a snow storm, and entered IMC while attempting to avoid the weather and divert.

Appendix C

Data Summary from Supplemental Question Set

SECTION A: FLIGHT PLANNING AND WEATHER BRIEFINGS

A.1 Did you attempt to obtain pre-flight weather information?

Yes 99
No 1

A.2 What sources of weather information did you utilize?

NWS 25
FSS 55
DUATS 33
Com. Vendor 24
Via VORS 2
TWB 2
PATWAS 6
En-route FAS 17
The Weather Channel 21
Other Pilots 15
Other 9
ASOS 4
ATIS 5
Internet 5
ADDS 7
Number of Pilots Responded 97

A.3 Were any of your attempts to obtain pre-flight weather information unsuccessful?

Yes 2
No 97
Left Blank 1

A.4 If you answered "Yes" to Question A.3 above, what were the reasons your attempts were unsuccessful? (n=2 with multiple answers allowed)

Did not know or were unable to find telephone or access #s, KORH AWOS not on ATIS, Telephone briefer did not have all requested information available 1
Telephone briefer denied service 1

A.5 What was the pre-flight weather forecast for the following?

A.5.a Departure Airport

VMC 70
Marginal VMC 21
IMC 4
Don't Know 2
Blank 3

A.5.b En-route

VMC 42
Marginal VMC 32
IMC 11
Don't Know 6
Blank 9

A.5.c Destination airport

VMC 59
Marginal VMC 24
IMC 8
Don't Know 3
Blank 6

A.6 What were the forecast conditions for the following (Citations)?

A.6.a Departure

Fog 6
Fog/Rain 2
Snow/Turb 1
Ice 0
Ice/Rain 0
Rain 14
Turbulence 4
Rain/T-Storm 0
Rain/Turb 0
Snow 0
Thunderstorm 0

A.6.b En-route

Fog 3
Fog/Rain 3
Snow/Turb 1
Ice 4
Ice/Rain 3
Rain 11
Turbulence 4
Rain/T-Storm 7
Rain/Turb 3
Snow 2
Thunderstorm 3

A.6.c Destination

Fog 5
Fog/Rain 1
Snow/Turb 1
Ice 0
Ice/Rain 0
Rain 15
Turbulence 2
Rain/T-Storm 4
Rain/Turb 0
Snow 1
Thunderstorm 4

A.7 Was the actual weather better than, the same as, or worse than forecast?

A.7.a Departure

Better 8
Same as 66
Worse 19
Number of Pilots Responded 93

A.7.b En-route

Better 5
Same as 45
Worse 35
Number of Pilots Responded 85

A.7.c Destination

Better 10
Same as 37
Worse 38
Number of Pilots Responded 85

A.8 If you answered "No" to Question A.1 above, why did you NOT attempt to obtain pre-flight weather information prior to departure?

Did not believe pre-departure weather was necessary for the intended flight ... 1
No telephone was available 1
No radio 1
Number of Pilots Responded 2

A.9 Did you file a flight plan, and if so what time?

Did not file a flight plan 51
Filed a VFR flight plan and activated it .. 14
Filed a VFR flight plan and did not activate it 1
Filed an IFR flight plan 30
Number of Pilots Responded 96

SECTION B: INCIDENT INFORMATION

B.1 Were you deviating from your planned route because of weather when incident occurred?

Yes 51
No 49

B.2 What type of weather did you encounter?

Broken or solid undercast 25
Deteriorating weather ahead 38
Flew into clouds or fog 50
Ground fog 5
Icing 16
Lowering ceiling 52
Merging cloud layers 11
Snow showers 8
Reduced visibility 38
Rising cloud tops 17
Strong cross winds 3
Thunderstorms 9
Turbulence 12
Unknown, but IMC conditions 2
Rain 19
Other 11

B.3 Did you attempt to obtain en-route assistance from ATC?

Yes 58
No 42

B.4 If you answered "Yes" to the Question B.3, what services did you request?

Emergency climb/descent 9
IFR clearance 16
Vectors to an Airport 10
Vectors to VMC 7
PIREPS 0
Weather Updates 8
Instrument approach procedures 16
Other 15
Number of Pilots Responded 56

B.5 If you were unable to obtain ATC services, or could not obtain them in a timely manner, what were the reason(s)?

ATC would not provide clearance 4
There was a delay in ATC providing clearance 11
Request for an IFR or SVFR clearance was denied 0
Too low for radar coverage 4
Unable to contact ATC..... 6
Other..... 11
Number of Pilots Responded 25

B.6 If you answered "No" to Question B.3, what was the primary reason you did not attempt to obtain ATC assistance?

Did not feel ATC services were required..... 19
Did not know what services to ask for.. 3
Knew that communications would not be possible at my altitude or location .. 3
Was afraid of a reprimand or certificate action 6
Focused on flying acft..... 3
Other..... 8
Number of Pilots Responded 40

SECTION C: CONTRIBUTING FACTORS AND CONSEQUENCES

C.1 Were there factors other than weather that contributed to the incident?

Yes..... 65
No..... 34
Number of Pilots Responded 99

C.2 If you answered "Yes" to Question C.1, what non-weather related factors contributed to the incident?

Get home-itis..... 9
Aircraft equipment problem..... 8
Fatigue 5
Decision Making..... 26
Distraction by passenger or flight crew... 5
Time Pressure 21
Illness 1
Other..... 31
Number of Pilots Responded 64

C.3 If you answered "Yes" to "Time Pressure" in Question C.2, what were the reasons for time pressure?

Approaching darkness 1
Deteriorating weather..... 7
Operational pressures 6
Personal pressure to reach a destination on-time 11
Other personal emotional pressures or distractions..... 2
Other..... 9
Number of Pilots Responded 22

C.4 What were the consequences of the weather encounter?

Unable to maintain altitude 21
Lost/unsure of position 15
Landed below published IFR minimums .. 5
VFR flight in IMC 45
Made IFR approach without and IFR rating..... 3
Landed VFR in IMC 8
Landed without clearance..... 2
Penetrated controlled airspace..... 11
Loss of aircraft control..... 5
Controlled flight toward terrain 6
Precautionary landing or off-airport landing..... 9
Runway excursion..... 1
Other..... 31
Number of Pilots Responded 99

C.5 What factors enabled you to recover from the weather encounter?

Ground proximity warning system..... 3
Broadcast on 121.5 1
ATC offered assistance 21
Contacted ATC, requested IFR clearance..... 14
Instrument approach 16
Radar vector to destination 7
Radar vector to alternate..... 6
Vector to VMC 8
Cancelled IFR..... 2
180-degree turn 19
Climbed above weather..... 12
Broke out on top 11
Descended to stay below weather 33
Descended through hole in undercast.... 6
Deviated around weather 20
Landed en-route 12
Landed at alternate..... 11
Landed at destination 23
Other..... 40
Number of Pilots Responded 99

SECTION D: AIRCRAFT EQUIPMENT

D.1 What type(s) of navigation and communication equipment were onboard the aircraft at the time of the incident, did you use it, and if equipped was any of it unserviceable?

D.1.a No Communication equipment . 0

D.1.b Single VHF transceiver

Equipped..... 18
Used..... 15
Unserviceable 1

D.1.c Dual VHF transceiver

Equipped..... 71
Used..... 59
Unserviceable 0

D.1.d Combination NavCom

Equipped..... 62
Used..... 53
Unserviceable 1

D.1.e HF transceiver

Equipped..... 5
Used..... 2
Unserviceable 0

D.1.f ACARS

Equipped..... 2
Used..... 0
Unserviceable 0

D.1.g Skyphone

Equipped..... 5
Used..... 0
Unserviceable 1

D.1.h Cell phone

Equipped..... 22
Used..... 3
Unserviceable 2

D.1.i Other

Equipped..... 2
Used..... 2
Unserviceable 0

D.1.aa No navigation equipment..... 1

D.1.bb Single VOR receiver

Equipped..... 26
Used..... 16
Unserviceable 1

D.1.cc Dual VOR receiver

Equipped..... 68
Used..... 44
Unserviceable 3

D.1.dd ILS

Equipped..... 65
Used..... 18
Unserviceable 3

D.1.ee ADF

Equipped..... 44
Used..... 9
Unserviceable 7

D.1.ff DME

Equipped..... 42
Used..... 22
Unserviceable 3

D.1.gg GPS

Equipped..... 80
Used..... 70
Unserviceable 0

D.1.hh INS/IRS

Equipped..... 3
Used..... 2
Unserviceable 0

D.1.ii Integrated area navigation

Equipped..... 3
Used..... 1
Unserviceable 0

D.1.jj Moving map

Equipped..... 48
Used..... 43
Unserviceable 1

D.1.kk Terrain Warning System
Equipped 10
Used 6
Unserviceable 0

D.1.ll Other
Equipped 7
Used 6
Unserviceable 0

D.1.aa-ll Totals
No navigation equipment 1
Equipped 396
Used 237
Unserviceable 18

D.2 Was the aircraft equipped with any of the following weather-avoidance equipment, and if it was, what equipment was used during the incident?

D.2.a No weather avoidance equipment 66

D.2.b Weather Radar
Equipped 12
Used 9
Unserviceable 2

D.2.c. Lightning Detector/Stormscope
Equipped 22
Used 10
Unserviceable 1

D.2.d Weather Data Link
Equipped 6
Used 4
Unserviceable 1

D.2.e Other
Equipped 5
Used 4
Unserviceable 0

D.2.a-e Totals
No weather avoidance equipment 66
Equipped 45
Used 27
Unserviceable 4

D.3 What type of de-ice or anti-ice or other equipment did the aircraft have at the time of the incident, did you use it, and if equipped was any of it UN-serviceable?

D.3.a No de-ice, anti-ice or related 73

D.3.b Wing/tail De-icing boots
Equipped 10
Used 3
Unserviceable 0

D.3.c Wing/tail bleed-air anti-ice
Equipped 3
Used 0
Unserviceable 0

D.3.d Wing/tail electric anti-ice
Equipped 2
Used 0
Unserviceable 0

D.3.e Wing/tail TKS (fluid type anti-ice)
Equipped 1
Used 0
Unserviceable 0

D.3.f Propeller de-ice or anti-ice
Equipped 10
Used 4
Unserviceable 0

D.3.g Engine (air) inlet anti-ice
Equipped 15
Used 4
Unserviceable 0

D.3.h Windshield de-ice or anti-ice
Equipped 14
Used 2
Unserviceable 0

D.3.i Other
Equipped 10
Used 8
Unserviceable 0

D.3.a-iTotals
No de-ice, anti-ice, or related 73
Equipped 65
Used 21
Unserviceable 0

D.4 Did the aircraft have an autopilot or wingleveler, and were you using it at the time of the incident?

D.4.b Wing Leveler
Equipped 12
Used 1
Unserviceable 2

D.4.c Basic autopilot
Equipped 21
Used 9
Unserviceable 1

D.4.d Approach-capable autopilot
Equipped 30
Used 19
Unserviceable 0

D.4.a-d Totals
No autopilot or wing-leveler 44
Equipped 63
Used 29
Unserviceable 3

SECTION E: INSTRUMENT EXPERIENCE

E.1 Are you an instrument rated pilot?
Yes 71
No 29

E.2 If not an instrumented rated pilot, are you currently working to obtain an instrument rating?
Yes 12
No 15
Number of Pilots Responded 27

E.3 How many actual instrument hours have you flown?
0 18
0.5 1
2 2
2.6 1
3.3 1
3.5 1
4 1
5-7 8
9-11 4
12 3
15 1
16 1
20 5
25 2
26 1
27 1
30 2
32 1
33 1
35 2
40 1
42 1
48 1
50-60 4
61-99 3
100-300 14
301-500 5
501-800 5
801-1000 0
0ver 1000 6
Left Blank 3

E.4 How many simulated (under the hood) instrument hours have you flown?
0 2
1 1
1.4 1
2 1
3 1
3.2 1
4 2
5 1
10 4
12 1
14 1
15 2
20 2
25 1
29 1
30 3
31.6 1
36 1
36.3 1
38 1
40 3
42.1 1
45 1
50 7

51 1
52 1
53 2
55 2
57 1
60 5
62 1
65 1
66 2
70 1
72 1
73 2
74 1
75 1
78 1
80 2
83 1
85 1
89 1
95 1
97 1
100 3
Over 100 21
Left Blank..... 6

E.5 How many simulator hours have you had?

0 25
1 4
2 2
3 4
4 1
5 3
6 2
10 4
11 1
15 2
16 1
17 1
18 1
20 4
23 1
25 7
26 1
29 2
30 1
31 1
35 1
37 1
40 1
46 1
50 3
61 1
68 1
70 2
80 1
90 1
95 1
100 2
100+ 12
Left Blank..... 4

E.6 How many instrument approaches had you conducted in actual instrument conditions in the year prior to the incident?

0 37
1 1
2 8
3 3
5 6
6 3
7 8
8 4
9 2
10 2
14 1
15 2
16 1
19 1
20 2
23 1
25 2
26 1
30 2
35 2
40 2
50 1
56 1
75 1
80 1
Left Blank..... 5

E.7 How many instrument approaches had you conducted in actual instrument conditions in the 90 days prior to the incident?

0 49
1 7
2 12
3 7
4 2
5 6
6 2
8 1
10 3
12 2
15 2
21 1
30 1
40 1
over 40 1
Left Blank..... 3

E.8 In the majority of your instrumental flights, has the actual weather been better than, the same as, or worse than the reported weather at the following?

E.8.a Departure Airport

Better 23
Same as 51
Worse 5
Number of Pilots Responded 79

E.8.b En-route

Better 22
Same as 43
Worse 11
Number of Pilots Responded 76

E.8.c Destination Airport

Better 32
Same as 38
Worse 7
Number of Pilots Responded 78

KEY:

F.1 Why do you think the incident occurred?

F.2 In retrospect, is there anything you would have done differently?

F.3 What would you recommend that others do to avoid a similar occurrence?

Report Number 1

F.1 I flew into deteriorating ceilings and visibility and could not shift attention between my navigational chart and external visual cues rapidly enough, and while I was concentrating on my chart I wandered into the clouds.

F.2 Yes. As soon as conditions deteriorated to company minimums I would have aborted the transport by turning back to better conditions and finding a suitable place to land and have the patient transport completed by ground.

F.3 1) Turn away from deteriorating conditions before encountering IMC. 2) Land at a suitable site and wait for acceptable conditions before continuing.

Report Number 2

F.1 I made a stupid decision and canceled my IFR clearance expecting to see the airport shortly.

F.2 Yes, I would have quit working for the guy right then and there. I would not have exceeded my limits nor would have I let my boss pressure me.

F.3 Know your limits. Make sure everything in your aircraft is working and be very familiar with it.

Report Number 3

F.1 Poor decision to take off, was never planning on leaving pattern, ceiling looked low, but good enough for pattern work, also being nighttime, it was an illusion as to how high the weather was. Turns out it was 100 ft AGL. Looked to be about 500 - 800 ft AGL.

F.2 Not took off at all.

F.3 Have an extreme amount of respect for weather, especially at night, and always know the weather is 10 times worse when you're in the air than it looks from the ground.

Report Number 4

F.1 Insufficient weather data, no flight plan, lack of ATC experience.

F.2 File a flight plan, get better weather information.

F.3 Ground fog isn't shown on satellite charts. Get detailed weather for every stop, not just destination.

Report Number 5

F.1 Encountered supercooled large droplets in descent, after already accumulating ice en-route. Severity of ice made continued flight to planned airport unsustainable.

F.2 Perhaps diverted to final destination prior to attempting an approach at intermediate stop.

F.3 My 'out' was planned in advance, warmer temps in the 2000 ft just above ground. This planning of an absolute 'out' must be practiced, particularly in non turbojet aircraft flying below flight levels, in winter. In other words, had I not had the 'out' that I ended up using in this case, I would not have launched that day. If surface temps were 2 to 3 degrees colder I would not have launched.

Report Number 6

F.1 Continued into deteriorating conditions VFR thinking conditions would remain VFR and improve towards destination.

F.2 Filed IFR from the get go.

F.3 File if you are rated and current, turn around otherwise right away and call FSS/Flightwatch for some more weather.

Report Number 7

F.1 Lack of preflight information, if I had known the conditions were so bad, I would have never gone.

F.2 Yes, I should have queried the briefer more, too much information was filtered out.

F.3 1) We need weather reporting on the coast, not nearby. 2) Ask for flow control advisories. 3) Get a picture from the web of the actual weather. 4) Use DUATS instead of a phone briefer.

Report Number 8

F.1 Upon flying into IMC and contacting ATC to return to the airport, I followed their vectors as opposed to flying 180 degrees to return to VMC. I was apprehensive about bothering/communicating with ATC because they were busy with other traffic.

F.2 Flown 180 degrees from original heading, returned to VMC, then worry about vectors to the airport.

F.3 As a new pilot, I think there is some hesitation with communications between you and ATC (especially in Class B or C airspace). I would recommend pilots to visit ATC and meet the controllers. I would also like to see more instrument training (actual, not simulated) requirements for receiving your private pilot's license.

Report Number 9

F.1 Attempting to get home before dark and deteriorating weather. Being forced to fly further towards the destination airport due to two jet aircraft rapidly closing from behind. Two aircraft followed by two trainers into not the best of weather is not a good combination.

F.2 Not really. Our flight visibility never got below 5-10 miles, the only problem was ceilings were lowering and we probably pressed the 500 ft over an unpopulated area. The pressure of the trailing jets, when discovered, created the big problem.

F.3 Should have stayed overnight at departure airport. Do your 180 deg turn earlier, if possible. Always have a couple of good alternates. In our case we had flown past our alternate,

so we knew the weather there was excellent. We did all these things, but the only issue that created the discomfort was proceeding a bit further and lower than we had planned.

Report Number 10

F.1 Equipment failure: lost cabin lighting and autopilot malfunction.

F.2 Carry two back up flashlights and two pair of reading glasses.

F.3 Same: Carry two back up flashlights and reading glasses.

Report Number 11

F.1 I felt pressured to get our guests back. Taking off in marginal VFR from an uncontrolled field intending to pick up an airborne clearance equals bad decision making!

F.2 I should have delayed the flight until conditions were improving. The good news is (rumor from ATC) we are going to get a GPS approach at our airport in September. That may mean a departure procedure, void clearance time — YES!!

F.3 When the weather is (hard IFR), I have to ask myself, do I really have to make this flight right now? How uncomfortable is it going to be for me and my passengers?

Report Number 12

F.1 Lack of accurate weather from the FAA. This report was filed because of a pax complaint, i wasn t an incident per say.

F.2 No, not at the time!

F.3 The FAA needs to fix both AWOS/ASOS machines. There are 2 machines that don t work.

Report Number 13

F.1 A heavy rain shower impacted the south end of the airport before the ATIS could be corrected to current conditions. The circle to land is required to be a VFR procedure.

F.2 At the first sign a normal VFR pattern in VMC could not be flown, I would do a 180 degree turn and continue VFR/VMC back towards good VMC.

F.3 Be clear in your mind and the flight crew's mind that you will be proceeding VFR. When it becomes clear VMC cannot be maintained, immediately return to improving VMC.

Report Number 14

F.1 Unforecasted weather, snow showers which is difficult to forecast.

F.2 No, a large deviation would have put us in more risk than we were.

F.3 The same minor deviations. The particular incident dealt with light snow showers. However, interpreted by some, it could be considered icing conditions. The report was filed to protect myself from the possibility that an FAA inspector would interpret it this way.

Report Number 15

F.1 Didn't get an updated weather briefing at any point on the trip so I didn't know that the weather had moved in that fast.

F.2 Got more weather briefings.

F.3 Get as much weather info before and during flight.

Report Number 16

F.1 The weather unexpectedly got worse than forecast near the end of my flight, and I expected it to be temporary. Once I was committed to the approach, I didn't want to go around and divert to my alternate with the ice buildup and the hot EGT on one cylinder.

F.2 Probably not, as I thought the low visibility was due to a short-term "squall line" and would pass quickly, and the ice was not expected.

F.3 Divert to the alternate if forecast or current conditions are suddenly below minimums, don't get past the point of no return as I did, with (as it turned out) false optimism that the condition would be momentary.

Report Number 17

F.1 Pushed the weather when prudence dictated otherwise (no temperature-dewpoint spread).

F.2 Yes, cancel.

F.3 Check all variables; when three items are unfavorable, cancel, or at least delay. Confidence in flying on gauges in weather paramount.

Report Number 18

F.1 Optical illusion. Proceeding from the FAF, we both saw the airport and agreed to cancel IFR. While in the descent, a (fog or undercast) obscured our view and we initiated a missed approach. We re-initiated with ATC on the missed.

F.2 In the future, I will not cancel until we are on the ground.

F.3 Do not get tempted to cancel IFR if there exists any doubt concerning keeping sight of the runway environment.

Report Number 19

F.1 The incident occurred due to inaccurate and lack of available weather forecasting. The low clouds formed about 3 hours earlier than forecasted. Also, my destination was the only reporting station (forecasting weather) within 60 miles.

F.2 In retrospect, I found out after I landed that the weather at my point of departure was still VFR. So I would have requested a weather report for my departure airport and returned there to avoid the IMC conditions.

F.3 Become intimately familiar with the weather patterns in your area if you know that you have unreliable weather reports and forecasts.

KEY:

F.1 Why do you think the incident occurred?

F.2 In retrospect, is there anything you would have done differently?

F.3 What would you recommend that others do to avoid a similar occurrence?

Report Number 20

F.1 The dark night conditions were the deciding factor. I could not see the low-level clouds move over the airport as I transitioned from the instrument to visual approach.

F.2 I would not have been so quick to cancel IFR and should have relied less heavily on the automated weather reporting station.

F.3 If there is any reported weather within 50 or so miles of the airport, and it is nighttime, I will now fly a full instrument procedure, always. No visual approaches.

Report Number 21

F.1 Overall, this incident happened because of poor judgement. When I looked at the available weather, I should have made the decision to stay on the ground. The weather was below my personal minimums.

F.2 Definitely, I would have better assessed the weather. It was well below my personal minimums, but I felt like I needed to get home.

F.3 In short, there is no reason that we ever have to fly. If the equipment doesn't meet the weather, don't go.

Report Number 22

F.1 Non forecast icing conditions. Known poor radio coverage area. Lack of foresight by controller and myself to use a block altitude.

F.2 As per above, requested a block altitude.

F.3 Same. If changing altitude in icing conditions, have a plan for lost radio coverage (next frequency, block altitude). I did have next frequency.

Report Number 23

F.1 Pressure to get patient to the hospital in a timely manner. Observing conditions inflight that were better than being reported by FSS.

F.2 Would have made the request slightly earlier in the process for special VFR clearance.

Report Number 24

F.1 Clouds closed in quickly.

F.2 No, clouds were not noticeably coming down because of haze.

F.3 N/A

Report Number 25

F.1 1) I had a new Garmin CNX80 that I had not entirely mastered. I failed to switch from GPS to LOC. 2) I was vectored south then north of final approach course and started approach high and fast and too close in to stabilize for approach. 3) I started missed approach after hesitating and was pointed at mountains instead of flat terrain.

F.2 1) I would have asked to be vectored out to start the approach at a distance where I could be stabilized at correct altitude, intercept and airspeed. 2) I would not hesitate to start the missed approach. 3) I would pay more attention to terrain avoidance feature of GPS.

F.3 1) Don't accept approach when vectored excessively, too high, too fast, and too close. 2) Take a class or instruction when transitioning to new complicated equipment. 3) Do not hesitate when it's time to do the missed approach.

Report Number 26

F.1 The weather near the destination was much worse than forecast. I hadn't been flying enough yet to fully utilize VOR navigation methods.

F.2 Chose not to fly at that time. Better utilized VORTAC navigation. I am now an owner of a handheld GPS and learning to use it for better navigation aids. Contact ATC sooner.

F.3 Practice radio navigation aids and contact ATC sooner for flight following.

Report Number 27

F.1 Believed local terrain knowledge would let me stay under ceiling and stay VFR. But didn't keep track of VMC/IMC status of routes to my alternate, so by the time I diverted to my alternate it had already gone IMC.

F.2 I'm glad the controller was "pleased" that I remembered to ask for SVFR clearance. It's frustrating that if I hadn't remembered to ask for it, he couldn't suggest SVFR. I would have still landed but could have faced another violation issue!

F.3 Emphasize that as soon as weather is worse than anticipated, to start continually maintaining 4 valid VMC options.

Report Number 28

F.1 I was prepared for an IFR approach, however, the plate I studied and carried was not the IFR approach in use that day. Approach communications were poor (they were very busy), and I was well into flying the wrong instrument approach before I discovered the problem on my own.

F.2 Yes. Be less casual about looking for all available approaches prior to leaving home. I prepped for the Localizer Runway 36L, and they were using VOR Runway 6 that day. I didn't even know the latter approach existed!

F.3 Don't get complacent...the approach I needed was found on the last page of my commercial chart book. It was my habit to quit looking at plates behind the section for RNAV or GPS approaches (my plane is equipped for neither). I continued to believe VOR approaches always followed ILS approaches, and came before RNAV and GPS approaches in commercial chart procedure books. I believe that no more.

Report Number 29

F.1 Conditions changed from the time I received the ATIS till the time I departed. In addition, I was under personal time constraints and departed in marginal conditions rather than wait for VMC conditions.

F.2. Nothing as far as obtaining weather forecasts or observations, but I could have delayed longer in hope of better conditions.

F.3 Assume that with marginal VMC weather conditions, there may be areas of IMC within them.

Report Number 30

F.1 An unforecasted undercast formed in area at my destination. For an unknown reason, ATC did not accept my request to shoot the GPS approach. The ATC facility involved was an approach control.

F.2 Yes. I would have first contacted the ATC center folks, who I feel confident would have set up an IFR flight plan, and the approach controller would not have to take an IFR (pop-up) flight risk.

F.3 "Others" — meaning FAA/ATC — may wish to establish procedures allowing for the easy descent through an undercast with high ceilings (the ceiling was 1900 ft AGL).

Report Number 31

F.1 I had planned to descend to an altitude that would keep me out of the ice prior to reaching that part of my route. ATC traffic would not allow that descent, which put me in the ice.

F.2 I would have requested a lower altitude much earlier in the flight.

F.3 Plan the altitude of the different legs of the flight to keep out of weather. Not think they can request altitude changes from ATC as needed during the flight.

Report Number 32

F.1 I repeatedly received AWOS, flight watch reports and METAR reports at airports along my route that indicated ceilings and visibilities above VFR minimums and considerably better than I actually encountered.

F.2 Landed sooner and shut down the flight for the day instead of pressing on.

F.3 Be smart and go with a more conservative level of "margin" when the weather is worse than forecast or reported.

Report Number 33

F.1 My decision to be VFR so ATC could not vector me into a thunderstorm and I would control my options.

F.2 Next time will file IFR and refuse any vector from ATC that does not agree with my on board weather.

F.3 File IFR or wait out the weather.

Report Number 34

F.1 Mist came from nowhere. Iced my wings and propeller in a matter of seconds. I never seen this kind of weather before.

F.2 No, I saved my life and wife and kids. I did not panic and regained control of airplane. Continued my flight to destination.

F.3 I don't know.

Report Number 35

F.1 I became overwhelmed upon entering clouds and simultaneously trying to receive and read back a clearance that involved turning and descending the aircraft.

F.2 I would have ignored the radios until I had the aircraft under better control. Aviate, navigate, then communicate.

F.3 I think keeping better currency with instrument procedures and maneuvering the aircraft in IMC would have made my situation easier to handle. Keeping in good practice is the key.

Report Number 36

F.1 Equipment failure - pushed too far trying to find VMC.

F.2 Turned back sooner.

F.3 Do not hesitate, turn back before you have no way out. "Better to be on the ground wishing you were flying than flying wishing you were on the ground."

Report Number 37

F.1 I encountered icing at 10000 ft on a warm April day. I filed higher than necessary because of mountains. I simply did not ask the freezing level or for pilot reports. Most of my flying is in the southeast where freezing is unlikely in April.

F.2 I should have filed for an altitude under the freezing level and taken a slightly longer route to clear terrain. Also, I should have spent more time in preflight planning.

F.3 Ice is dangerous. Assume it is there unless you verify from flight service it is not, then when in IMC keep a close eye on the outside air temperature. Be aware that conditions in other parts of the country may be different than what you are used to.

Report Number 38

F.1 It appeared that I could continue above the weather - destination was VMC. In fact, cloud tops continued to rise, leaving little choice but icing IMC or climb into PCA.

F.2 Turn around at rising cloud tops.

F.3 Forecast and en-route actuals should be discarded when you can see the weather is worse than forecast - turn around.

Report Number 39

F.1 Fast moving low-level broken cloud layer.

F.2 One less touch and go. Working the pattern at the time of clouds quickly moving in from the northwest.

F.3 Be more vigilant of fast moving low-level cloud layers.

KEY:

F.1 Why do you think the incident occurred?

F.2 In retrospect, is there anything you would have done differently?

F.3 What would you recommend that others do to avoid a similar occurrence?

Report Number 40

F.1 The VFR sectional had a lot of clutter and misread where the airport information was pointing to. With degraded weather conditions, this made it harder to identify the correct airport.

F.2 Better pre-flight planning.

F.3 If unfamiliar with a new area, ensure that a thorough pre-flight plan has been conducted of the entire area.

Report Number 41

F.1 ATC way too busy. Pilot fatigue. Should have declared an emergency.

F.2 I would have been more aggressive with ATC but I was really tired. Also, I would not have started a climb without ATC clearance.

F.3 Be demanding with ATC, if that does not work, declare an emergency.

Report Number 42

F.1 Pushing unpredictable spring weather too hard.

F.2 Not gone down to the freeway to look at weather.

F.3 Watch weather in the mountains more carefully.

Report Number 43

F.1 [No answer provided.]

F.2 [No answer provided.]

F.3 [No answer provided.]

Report Number 44

F.1 All available information indicated that the flight could be made safely under VFR. The reality was that VFR conditions did not exist. Had accurate en-route weather reports been available, the flight never would have departed.

F.2 No.

F.3 The problem here was a lack of reliable information. Automated weather systems do not accurately depict sky conditions. Until we wake up and employ live observers, this type of occurrence will continue to happen.

Report Number 45

F.1 On GPS approach, broken out thin overcast well above next waypoint crossing altitude. Continued flight visually, without canceling IFR flight plan and descended below next waypoint altitude. Not enough actual IMC hours/training leading to high stress.

F.2 Training in actual conditions. Recurrent training.

F.3 Training in actual conditions. Recurrent training.

Report Number 46

F.1 Flying the margin to IMC too close.

F.2 Provide a larger margin.

F.3 Be more conservative.

Report Number 47

F.1 Too aggressive climbing through broken layer to what I assumed was VFR on top, but that was not possible given the service ceiling of my airplane.

F.2 I should not have tried to get above the broken layer.

F.3 I always knew that I had plenty of altitude underneath the broken layer of clouds to fly VFR, so being a little bold was not good but it was not a big deal and I did have the option of backing out.

Report Number 48

F.1 Lack of en-route weather reporting stations in the area I operate in as an EMS pilot.

F.2 Filed IFR from departure airport.

F.3 Expect worse than forecast weather.

Report Number 49

F.1 Cloud tops at 0 degrees Celsius, clear air at 2 degrees Celsius. Carburetor heat cable jammed.

F.2 Requested higher altitude sooner to clear clouds.

F.3 Inspect carburetor heat cable for wear and replace if notched on end.

Report Number 50

F.1 Poor judgement on my part by letting management talk me into attempting the flight after I had already turned it down.

F.2 My initial reaction was to not take the flight in the first place, but management pressure as stated in my report led to me going ahead and at least trying the trip. I would have stuck with my instinct and said no (if it were to happen again).

F.3 I would say do what feels like the best answer for the situation that you're in at the time. If you're flying a VFR airplane and there's a possibility of ice or IMC conditions, leave it up to the company to assign another more capable airplane to get the job done. Example: one that can handle the conditions that you're gonna face. It's not worth your life or anyone else's to make your company the extra dollar.

Report Number 51

F.1 Distraction by intermittent NAVCOM # 1. Distraction by personal pressure — wife, children on board.

F.2 Slowed down, developed appropriate mindset. Deviated around weather, rather than attempted climb through.

F.3 Slow down, develop appropriate mindset. Deviate around weather, rather than attempt climb through.

Report Number 52

F.1 Trusted TAF in unfamiliar area. Destination TAF of MVFR and I did not file IFR to begin with. Few actual IMC hours (I'm based in desert southwest), hood time mostly. Did not use autopilot initially into IMC. Vertigo created "task saturation" — difficulty thinking and navigating.

F.2 Filed IFR initially for the leg. Activated autopilot sooner. Ask for vectors sooner. (I attempted to comply with "own navigation to the IAF" after being vectored off course for traffic and while suffering effects of vertigo.)

F.3 Get as much IMC experience as possible (hood time alone is insufficient). File IFR if TAF is MVFR in unfamiliar country. If task saturated, ask for (insist on) vectors. Emphasize unusual attitude recovery in recurrent IFR training — this is what saved me.

Report Number 53

F.1 Lack of full understanding in regards to SVFR procedure.

F.2 Asked for SVFR clearance to transit Class D airspace

F.3 Study SVFR procedures, especially if attempting to transit Delta airspace when the tower has declared field below VFR minimums. Just because part of the airspace is better than VFR, doesn't excuse the requirement for SVFR clearance.

Report Number 54

F.1 I allowed myself to get stuck at an airport with inadequate facilities.

F.2 Filed IFR and gotten a clearance void time.

F.3 Only fly into airports that accept credit cards for fuel payment. Do not go into a "Podunk" airport without a published instrument approach.

Report Number 55

F.1 We made a good approach into a close by alternate field. We broke out well above minimums. Canceled IFR. We had about 1000 ft AGL and better than 3 miles. I decided to go to our destination about 7 miles away. En-route, the ceiling kept getting lower and lower. I continued, but had to descend to stay below the overcast, winding up over our destination at about 500 ft, still descending to stay VFR. We landed and I kicked myself for the bad decision making. I knew better than to do something like that. Looking back, the field where we made our approach was nice, paved, and had good ceiling and visibility. We elected to go on to a private field with grass and no approaches, no radio aids, etc., AND BAD WEATHER! I should have completed the approach and landing and called a friend to pick us up from the approach airport. We had exactly the same thing happen 2 days ago. We made an IFR approach at that same field, broke out and looked toward our destination. The ceiling looked 'iffy' so we put it on the ground and called for a ride. Once bitten, twice shy!!

F.2 I should have landed at the approach airport and waited for the weather to improve.

F.3 Plan your approach with the idea of landing. If you are going to try and go to your destination, make darn sure you have the altitude and visibility to do so, after you break off your approach.

Report Number 56

F.1 Since from my departure point to my destination point was less than 75 miles, I did not realize the impending thunderstorms were so close. I felt I had plenty of time to make the brief trip. That was a great mistake.

F.2 Yes. I (as I now do) pay much closer attention to the weather reports en-route and obtain weather reports from FSS as to what other pilots are reporting.

F.3 Do not take what weather conditions are at the departure point and superimpose them on even the briefest planned VFR trip.

Report Number 57

F.1 I thought that I knew my "home turf" better than the briefer. The airport where the briefer said the IMC was located is on top of a mountain (3790 MSL) while my home airport is 2130 MSL. I figured that IMC on the mountain meant "undercast" with bottoms about where they were at my home airport. Also, my internet weather showed little or no precipitation. Lastly, the weather in my VFR flights had been getting slowly worse with no ill effect.

F.2 Listened to the weather briefer! Also, listened to the hints provided by the sky and the little-voice-of-doubt in my head ("Gee, it's good we don't have any passengers today, isn't it?").

F.3 Realize that VFR-into-IMC incidents can follow the frog-in-a-pot pattern. When hangar flying about these things, I used to wonder what kind of idiot would fly into a wall of cloud and put himself into this situation. Then I found out that it's not a wall of cloud, but a raising undercast — and I found that idiot looking back at me in the mirror. Also, I am beginning to think of an instrument rating as a "basic qualification" for pilots. If I ever become a CFI, I will have my students promise to get an IFR rating ASAP!

Report Number 58

F.1. Cincinnati's inability to efficiently handle IFR traffic at peak times during bad weather. They have a hard time handling traffic when the weather is good...systemic of overall ATC abilities. ATC lack of understanding of significant convective activity.

F.2 Canceled the IFR, climbed to a VFR altitude and re-filed/obtained clearance en-route.

F.3 Avoid Cincinnati, good weather or bad.

Report Number 59

F.1 Flew through updraft in small but growing (15000 - 16000 ft) cumulus cloud.

F.2 Could have avoided the clouds and stayed in clear air.

F.3 Realize that even comparatively small cumulus clouds that are "building" can produce unwanted climb/descent rates.

KEY:

F.1 Why do you think the incident occurred?

F.2 In retrospect, is there anything you would have done differently?

F.3 What would you recommend that others do to avoid a similar occurrence?

Report Number 60

F.1 Got caught in too small of an area with controlled airspace (Class B and Class C) above and left. Hills and possibly ice to the right. Rising terrain ahead. Normal IFR routing tries to keep GA away from hub airports so flies over higher terrain raising icing possibility.

F.2 Started flight on flight following and/or prefiled an IFR clearance to pick up en-route. Kept better aware of my position and escape path before starting 180 degree. Maybe even file IFR the whole way — icing would not have been a factor as it turns out.

F.3 Stay in contact with ATC. Take note of roll out heading before starting 180 degree. If going to "take a look," ensure enough airspace and visibility to execute course reversal. Remember that VFR into IMC isn't as bad as VFR into granite.

Report Number 61

F.1 Encountered unexpected updraft/turbulence resulting in near instantaneous altitude gain of several hundred feet.

F.2 Avoided the immediate area if condition was known — ask for block of altitude prior to entering clouds "just in case" unexpected conditions were encountered.

F.3 Try to stay clear of convective activity and/or ask for a block of altitude beforehand with ATC.

Report Number 62

F.1 Deteriorating weather and poor flight planning. Failure to 180 degree sooner than later.

F.2 Established personal VFR minimums.

F.3 When flying in minimal weather, establish and stick to personal minimums. Think about IFR planes' possible proximity when close to clouds at or near VFR minimums!

Report Number 63

F.1 Fog/low clouds developed sooner than forecast. I checked ATIS at destination but not airport that I was to overfly. ATC instructed me to "proceed, remain VFR," but ATC (tower control for Class D airport overflown in transit to destination) should have known that weather near airport was not VMC and stated "airport not VFR, state intentions."

F.2 Although I could not see the bottom of the low cloud layer from the other side of the hills bordering the Class D, I should have anticipated the problem given what I saw and requested a different route around the Class B. Fly IFR.

F.3 Instrument pilots get used to following ATC instructions, but "proceed, remain VFR," should be interpreted as "you may proceed if you wish as long as you can remain VFR (but it may not be possible, it's not our job to check)."

Report Number 64

F.1 I was flying at night and could not see the cloud I penetrated.

F.2 I would have stopped over night and not continue the flight.

F.3 Don't fly at night unless you have at least 15 miles visibility.

Report Number 65

F.1 Went on a local joyride despite forecast for "moderate/severe turbulence." Was not aware that "CAT" can produce windshear-like effects.

F.2 Stayed on the ground.

F.3 Expect that turbulence will be worse than forecast. The FAA/NASA should develop and require primary training to deal with turbulence/shear. Short final is not the place to start learning!

Report Number 66

F.1 While I had an alternate (VFR) and a decision point in mind, I did not allow pause to determine "how to" get to the alternate. At decision time I was headed south, the alternate was west, and the quickest way was a 90 degree right turn which took us into the cloud front moving SW to NE.

F.2. Taken a few moments to analyze options and consequences before rushing to take action. A left 270 degree turn would have taken only 60 seconds more (maximum) and avoided IMC.

F.3 Recognize that as long as the airplane is under control, there is time to solve problems and analyze alternative scenarios. The computer between our ears can work with amazing speed.

Report Number 67

F.1 Fatigue. Schedule (personal). Get homeitis.

F.2 Yes, obtain "pop-up" IFR clearance to VMC/destination.

F.3 Stay current. File for clearance.

Report Number 68

F.1 The weather at the airport was worse than reported perhaps because of its proximity to a lake.

F.2 I would speak with a briefer and if I went to the airport I would climb a nearby hill to check visibility conditions.

F.3 Speak with a briefer. After the AWOS is installed, things might be different.

Report Number 69

F.1 Upon as successful landing at an improperly closed airport, my left wing contacted a small tree growing only 4 ft off the runway edge. Runway was approximately 20 ft wide and was littered with cones, branches, and 55 gallon drums. Had airport been available for emergency landing, incident would not have occurred.

F.2 Possibly my personal minimums are high — stopping or turning around sooner would have produced different results. My options were limited because of how far I flew towards the weather.

F.3 Probably review your own minimums so as to avoid an encounter with diminishing weather. Be in touch with EFAS or Radar Center for additional help.

Report Number 70

F.1 Convective weather. Contributing factors: A. No prominent landmarks in the area to use for ADIZ boundary. B. Guard channel never announced any warning.

F.2 Would have contacted approach, informed of heading change as well as convective weather encountered.

F.3 Contact approach for flight following when: A. Within 10 miles of ADIZ and weather is deteriorating. B. Any time within 5 miles of ADIZ.

Report Number 71

F.1 I was following a company helicopter when I turned 180 degrees to follow. I climbed unintentionally and popped into the cloud.

F.2 I could have made a turn without climbing and stayed further away from the clouds.

F.3 Give yourself plenty of cloud clearance and keep the ground in sight at all times.

Report Number 72

F.1 Delayed departure too long with approaching weather system.

F.2 Might "highlight" tower frequencies of airports near route in case of urgent need for contact.

Report Number 73

F.1 Weather was worse than forecast at departure airport (10 miles away). It was a narrow frontal area and the briefing indicated I could slip under it to the VMC on the other side. I already flying low after departure (approximately 500 ft) and assumed I'd have enough ceiling to escape the frontal area. Not so — the ceiling started dropping and I found myself in IMC while 500 ft AGL. I did an immediate 180 degree turn and escaped back the way I came. Here are the key factors I think led to the incident: 1) Over confident in FSS forecast — they forecast minimum VMC and I didn't really consider ceilings being less than minimums. 2) I was lured by the promise of VMC on the other side of the frontal area. It was perfectly clear 20 miles away on the other side of the front. What could go wrong in 20 miles? 3) There was some pressure to get home for work, but not full blown get homeitis. I was ready to make the call to stay. But getting home that morning definitely motivated the launch in VMC. There were a hundred other airplanes departing at the same time, so there was some momentum to leave too, because if it was good enough for them to fly VFR, it had to be ok for me, too.

F.2 Checked ASOS/AWOS at airports in the frontal area to check ceilings, turned around sooner not launched into minimum VMC.

F.3 Establish personal minimums and stick with them no matter what. Be aware of how fast you can be in the clouds when going 140 knots.

Report Number 74

F.1 Lack of actual IFR condition experience.

F.2 Had greater fuel margins, gone to alternate when I realized weather was dropping quickly.

F.3 Get some actual time as part of training.

Report Number 75

F.1 Observed local offshore stratus characteristics during daytime seemed benign. Didn't account for night (nocturnal) cooling effects and placed too much hope on forecast for much later deterioration.

F.2 Adhere to more conservative nighttime weather minimums/requirements.

F.3 Realize that despite METAR, ATIS, TAF, a dose of self forecasting is prudent (ie, my own weather analysis based on personally observed elements and how they match up with synoptic picture), and more generally, don't rely on your skills to recover from any uncertainties in decision making.

Report Number 76

F.1 Weather forecast was not correct. Weather closed in much faster than predicted.

F.2 I would have filed a VFR flight plan. I had a "feeling" that the weather would not hold as predicted. I should have "trusted" my feelings.

F.3 [No answer provided.]

Report Number 77

F.1 This happened because the ATIS at my destination and the ASOS at my departure airports reported VMC, and I chose not to get a weather brief for the 11 nm trip.

F.2 At the time, no. Now, however, I will get a weather brief if it is very hazy such that I cannot see the clouds.

F.3 Get a weather brief if the visibility is restricted due to haze, mist, etc.

Report Number 78

F.1 I wanted to "get under" the clouds — they were lower than I had thought. I also wanted to make a good impression on the traffic watch reporter that I was flying with. It was my first traffic watch flight.

KEY:

F.1 Why do you think the incident occurred?

F.2 In retrospect, is there anything you would have done differently?

F.3 What would you recommend that others do to avoid a similar occurrence?

F.2 I would have turned around once the clouds started forcing me lower.

F.3 Know your personal minimums and don't take chances, just turn around.

Report Number 79

F.1 1) Student pilot froze on controls. 2) Lack of positive exchange of controls. 3) Bad weather report.

F.2 Stayed on the ground, remained a little more calm, actually I think I did everything possible to avoid an accident.

F.3 Make sure your student understands positive exchange of controls, have a plan to use if your student freezes on controls. We have no ATIS/AWOS at our airport, find a better means of measuring ceiling in the local area! (Water towers/ towers etc.)

Report Number 80

F.1 I was unable to detect localized weather approaching.

F.2 Checked with flight service before leaving.

F.3 Get a preflight briefing from flight service before flight of any distance.

Report Number 81

F.1 Combination of passenger distractions, unforecast en-route turbulence, undercast closing up, and time pressure to meet with friends.

F.2 1) Called approach. 2) Requested emergency IFR descent (I am not IFR current).

F.3 I don't know. I checked weather before, during, and after flight. Nobody mentioned anything about this cloud buildup. While my IFR skills weren't too fresh, I feel that I might have done better with my statement above. Others might feel more comfortable doing exactly what I did.

Report Number 82

F.1 I was late in requesting a climb into Class A airspace above FL180, and when ATC could not clear me quickly, I entered cloud tops at 17500 ft and picked up ice.

F.2 Plan ahead farther, get on IFR flight plan sooner, leave more margin for error.

F.3 Plan ahead!

Report Number 83

F.1 Thunderstorm moved over VOR and on the airway. No lightning strikes on "storm-scape" prior to near miss (hit?) by lightning.

F.2 Asked for diversion sooner (vectors around). At the time I did not know such violent weather from clouds with tops at 13000 ft MSL. Now I know and will teach as much. I assumed it was a "girly cloud."

F.3 Avoid build ups 13000 to 14000 ft MSL in east. In my home state, most clouds of 13000 to 14000 ft do not have lightning — that I have known in my 10000 hours — mostly west of Mississippi.

Report Number 84

F.1 1) Delay in ATC (Approach Control) granting climb clearance. 2) If delay known, would have requested it sooner. 3) With light rime accreting, and no knowledge of extent of delay, emergency declared. (Especially since ATC said "maintain" altitude and that I had "busted" my clearance only 300 ft above assigned.)

F.2 1) Requested higher sooner. 2) 180 degree turn as soon as light rime formed. But I was in/out of the tops as it was ... maybe not.

F.3 1) Not be reluctant to declare an emergency. 2) Watch en-route OAT and chance of entering clouds when OAT is 30 to 32 degrees F.

Report Number 85

F.1 Because I was not observing conditions outside my aircraft.

F.2 Fly to closest VMC airport, land, park aircraft, and call wife to come and get me.

F.3 Observe all weather conditions around you. If you must, fly to closest VMC airport, land, park airplane and stay on ground until conditions improve.

Report Number 86

F.1 I was delivering an aircraft that has engine conversions. Using more fuel than I was informed of.

F.2 Stopped every two hours to refuel.

F.3 Call the destination airport to get actual weather, at last fuel stop.

Report Number 87

F.1 Poor decision making about getting above cloud layers with VFR only airport.

F.2 Should have stayed on-top until I learned where VFR weather was and then flew into it.

F.3 N/A

Report Number 88

F.1 Inability to get through to FSS (hurricane).

F.2 Not taken off!

F.3 Stay put!

Report Number 89

F.1 No weather reporting at departure location. Missed visual cues (couldn't see stars, saw a plane scud running) during pre-flight.

F.2 Would have attempted to climb above the cloud layer to regain some visual references.

F.3 Don't trust that interpolation will give you the weather for a non-reporting location.

Report Number 90

F.1 Weather poorer than forecast.

F.2 Given circumstances at the time, I think I handled situation well.

F.3 Wouldn't have needed to land off airport if I'd been a competent instrument pilot.

Report Number 91

F.1 I failed to make my request clear for the approach I wanted. The approach clearance I received took me where I was not prepared to go and I lost awareness of my actual position.

F.2 I should have been more clear about the approach I wanted. I should have continued with the approach I was given until I was sure of my position.

F.3 Do not cancel IFR until absolutely sure of your position and ability to continue on VFR.

Report Number 92

F.1 I misjudged the weather. The ceiling looked to be pattern altitude.

F.2 When in doubt or if there is a question, don't do it. If I have to question the weather conditions, then the conditions are non VFR.

F.3 If you have the slightest doubt about the weather, then save the flight for another day.

Report Number 93

F.1 Rising cloud deck, dropping temperature (-20 degrees C), "upslope" wind causing aerographic lifting. Those were the conditions that occurred. I anticipated no icing at 16000 ft MSL and guessed wrong. I should have looked at forecast (icing) weather better.

F.2 NOAA ADDS forecast icing at planned altitude, altered route with no forecast icing. (We will buy and install onboard satellite weather.) Once I encountered icing, I feel my action (divert right of course, away from rising cloud tops and descend) was appropriate.

F.3 Give accurate PIREPS of unexpected conditions. Get onboard satellite weather to help plan alternate routes to avoid obvious forecast versus actual weather changes. It is very difficult to visualize airborne radio reported weather over any substantial flight plan.

Report Number 94

F.1 Distraction by flashing lights, closed tower, other pilot, lack of AWOS, and time pressure of security procedures. Weather lowered sooner than predicted. Unclear frequency for clearance delivery.

F.2 I would have picked up my filed IFR clearance on ground.

F.3 Recognize that when tower is closed, ASOS governs IFR/VFR situation with respect to Class E airspaces. Read the 'Green' book first.

Report Number 95

F.1 Unfamiliar with aircraft, area, and no real IMC experience.

F.2 Would have canceled flight.

F.3 Make sure you are familiar with the airplane and feel comfortable in IMC.

Report Number 96

F.1 Weather reported was 1300 ft 1800 ft visibility 10 miles as was the same at my destination. So I tried to descend VFR to fly under scattered clouds, but the finger of fog went all the way to the water and ground.

F.2 Would have stayed at 3500 ft VFR and flew around the back side and descended VFR.

F.3 Don't be afraid to turn around and divert to another airport regardless of condition of patient on board. EMS helicopter.

Report Number 97

F.1 Lack of experience in climbing on top of clouds. (I have a foreign license -- it is not allowed to fly above clouds.) Poor decision making.

F.2 Wait for better weather before takeoff. Train in crossing clouds to climb on top.

F.3 Train in 'cloudy' situations. IFR training.

Report Number 98

F.1 Briefer failed to convey that thunderstorms clearing the area to the east at arrival time could be followed by others. They were part of a huge circular system that kept passing through for over two days.

F.2. Yes, refrained from flying through the tops of white puffy build-up at 12500 ft on a DVFR clearance. (I was suckered into believing it would all be gone as I approached.)

F.3 Maintain VMC when on a DVFR clearance — should have done the maneuver that I taught a thousand times — turn 180 degrees — NOW!

Report Number 99

F.1 Confusion on ATC's part as to my status. He thought I was on an IFR flight. I was receiving flight following for a VFR flight.

F.2 I think I made correct decisions. When weather was worse than NWS and ADDS forecast, I diverted, landed and stayed night to let front pass.

F.3 1) Be more specific to ATC about their rating. He wanted me to comply with instrument procedures, but did not realize that I was not rated.

Report Number 100

F.1 Continued flight into deteriorating visibility.

F.2 Slowed down! Turned around sooner.

F.3 Turn around sooner before you get yourself in trouble.