DOT/FAA/AM-90/6

Office of Aviation Medicine
Washington, D.C. 20591

Pilot Views of Montgomery County, Texas Automated FSS Services

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August 1990

Final Report

U.S. Department of Transportation
Federal Aviation Administration

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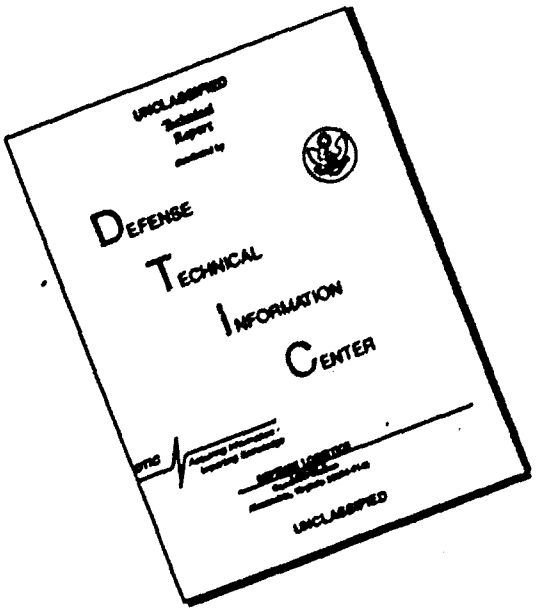

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Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT/FAA/AM-90/6		

4. Title and Subtitle	5. Report Date
Pilot Views of Montgomery County, Texas Automated FSS Services	August 1990
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
Carol A. Manning, David J. Schroeder	
9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
FAA Civil Aeromedical Institute P.O. Box 25082 Oklahoma City, OK 73125	11. Contract or Grant No.
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address Office of Aviation Medicine Federal Aviation Administration 800 Independence Avenue, S.W. Washington, D.C. 20591	14. Sponsoring Agency Code

15. Supplementary Notes

This work was performed under task AM-C-88/89-HRR-102 for the FAA.

16. Abstract

The Federal Aviation Administration has seldom assessed the satisfaction of pilot "customers" with the services provided by its air traffic facilities. Most available information about pilots' satisfaction with Air Traffic Control (ATC) services is anecdotal; thus, decisions affecting the users have been based on management's perceptions rather than on an objective measure of the flying public's satisfaction with the services provided. The purpose of this study was to assess user satisfaction with the services provided by one air traffic facility, the Montgomery County, Texas Automated Flight Service Station (AFSS). The study also provides the FAA with a model for assessing user satisfaction with other ATC services.

Overall, pilots who responded to the survey were very satisfied with the performance of the specialists at the Montgomery County AFSS, and were slightly less satisfied with the services provided by the facility. Private pilots were more satisfied than were Airline Transport pilots with most of the services. The pilots' perceptions of how the FSS weather briefers performed their jobs affected ratings of satisfaction with the facility's services. A significant area of dissatisfaction to pilots was the amount of time they thought was required to reach a pilot briefer, especially during inclement weather.

17. Key Words	18. Distribution Statement
Air Traffic Control Pilots Satisfaction Survey	Document is available to the public through the National Technical Information Service, Springfield, Virginia 22161

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	59	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

ACKNOWLEDGEMENTS

The authors wish to acknowledge the following individuals for assisting in various ways with this project: Keith Gunnell, Specialist, Montgomery County AFSS, for providing technical advice to the authors and coordinating the project with facility and regional management; other Montgomery County AFSS specialists and staff who reviewed the survey and waited patiently for the project to take place; a number of unidentified pilots, who provided advance reviews of the survey, Kevin Bryant and David Nelms, for obtaining a readable version of the Airmen Directory File, Clara Williams for handling the logistics of mailing the surveys and processing the response forms; Lena Dobbins, for writing the data entry programs and providing other logistical support; a number of unnamed contract workers who stamped numbers on forms and stuffed envelopes; Carolyn Dollar, for developing the procedure for assigning codes to pilot comments, and for assigning codes to comments; Lendell Nye and Wayne McMillin, for also assigning codes to comments; and Fred Hyman, Mary Weltin, and Dana Broach, for carefully reviewing the manuscript.

PILOT VIEWS OF MONTGOMERY COUNTY, TEXAS AUTOMATED FSS SERVICES

INTRODUCTION

The Federal Aviation Administration's (FAA) Air Traffic Control (ATC) facilities have few methods for assessing the satisfaction of their pilot "customers," the primary users of the services they provide. Most of the information available regarding pilots' perceptions of satisfaction with ATC services is anecdotal; decisions to institute services and plans in response to major system changes are thus based on management's perceptions of user satisfaction rather than an objectively determined measure of the flying public's satisfaction with the services provided. The purpose of this study was to assess user satisfaction with one such change, the introduction of Automated Flight Service Stations (AFSSs), by measuring pilots' reported satisfaction with the services provided by a single AFSS located in Montgomery County, Texas.

History of AFSS automation and consolidation

The recent consolidation and automation of FAA flight service stations (FSSs) is a system change which should be evaluated from the users' perspective. The Flight Service Automation Program Master Plan (1978) identified one objective of automating flight service stations as "meeting the present and projected long-term demand for flight services without a proportional increase in staff and commensurate operating costs." The original plan called for automating a number of the busiest Flight Service Stations, then collocating and consolidating many of the present FSSs into Hub facilities located at the Air Route Traffic Control Centers (ARTCCs). An amended plan (1980) revised the steps, eliminating the effort to collocate the FSSs into ARTCC facilities, and instead provided for the 318 then-existing FSSs to be consolidated into 61 new facilities, 59 of which would require new buildings to be constructed. Currently, 46 of the 61 planned AFSSs are operational and 123 of the manual FSSs remain.

Previous surveys of pilot satisfaction with AFSS services

Although much of the consolidation and automation of FSSs began in 1986, no FAA studies were conducted to evaluate user satisfaction with the services provided. The only surveys which assessed pilots' use of and satisfaction with AFSS services were conducted by the Aircraft Owners and Pilots Association (AOPA) Pilot magazine. AOPA conducted two surveys, the first in August 1986, and the second in September 1987. The results of these AOPA surveys, published in December 1986 and February 1988, indicated that about 92% of the readers did not use a private vendor service for weather information and that 53-54% "always" contacted flight service. Furthermore, between August 1986 and September 1987, the percentage of readers whose "primary contact" was made to automated as compared with manual FSSs increased from 23% to 43%. An increasing percentage of readers from the first survey to the second reported encountering significant delays with AFSSs; however, the question was phrased in such a way as to make interpretation of these results difficult. In general, these surveys provided some useful information about user perceptions of system usage, but did not provide the FAA with sufficient feedback regarding specific problems.

Purpose of FAA survey

This report describes an FAA-sponsored survey administered to pilots in the flight plan area of the AFSS located in Montgomery County, Texas. The survey was developed to ascertain pilots' perceptions of the quality, cost effectiveness, utilization, and knowledge of the types of services offered by the Montgomery County AFSS, and to a lesser extent, by other AFSSs. The Human Resources Research Division (HRRD) of the FAA Civil Aeromedical Institute assisted the Montgomery County AFSS in developing, administering, and analyzing the survey.

The primary purpose of this study was to address issues related to user satisfaction with services provided by a specific facility so that other AFSSs could become aware of the satisfaction pilots have with different types of services and learn what factors influence satisfaction with AFSS services. It was not possible to derive that type of information from the AOPA surveys because those surveys primarily addressed system utilization rather than user satisfaction and did not employ a specific sampling plan. The FAA survey, besides including a set of questions for which answers were provided in a multiple choice format, also provided a nondirective area in which respondents were allowed to provide comments addressing their specific concerns about the services provided by AFSSs. Furthermore, the sampling strategy used in the administration of the FAA survey allows the results to be generalized to particular groups of pilots.

The information gained from this survey will be used by the Montgomery County AFSS to: a) determine in what ways users perceive that their needs are or are not being met, b) determine the level of awareness of the services provided by AFSSs, c) establish a method of identifying system weaknesses, and d) obtain an evaluation of services which will contribute to making decisions regarding future system improvement. The facility plans to review and revise their operational policies, if appropriate, based on the results of the survey. Results of the survey will also be provided to Regional and Headquarters managers.

METHOD

Subjects

Subjects were randomly selected from all pilots in the FAA Airmen Directory File whose addresses of record fell in the Montgomery County AFSS's flight plan area as of June 1989. The Airmen Directory File contains a record for each certified airman who has been issued a valid airmen medical certificate within the last 25 months. The file is updated twice a year.

It was expected that different types of pilots might utilize AFSS services differentially, and might have different perceptions and concerns about the flight services provided by the Montgomery County AFSS. Consequently, sampling was stratified by pilot certificate (airline transport, commercial, private, and student) to allow the results to be generalized to each type of certificate holder.

Formula 4.19 from Schaeffer, Mendenhall, and Ott (1979) was used to determine the sample size required for each pilot group, assuming a 5% bound on the error of estimation. The sample size identified as appropriate for each group was doubled to insure that even if only 50% of the chosen sample responded, the number of responses would be sufficient to insure the 5% bound on the error of estimation. Procedures from the SPSS-X statistical package were used to separate the airmen population into the different certificate categories and select each random sample. A total of 2,292 pilots was selected using this method; 554 held airline transport pilot certificates, 554 held commercial pilot certificates, 656 held private pilot certificates, and 528 held student pilot certificates.

Procedure

Development. The instrument was based on a set of questions identified by the specialists at the Montgomery County AFSS. These questions were refined a number of times, then reviewed by a certified flight instructor, a human performance investigator for the National Transportation Safety Board, and a group of six non-government pilots identified by an Aviation Safety Inspector assigned to FAA Flight Standards District Office 67. The pilots were asked to record the amount of time required to complete the questionnaire and any comments they had about the questions. Their comments, and those of the other reviewers, were coordinated with personnel from the Montgomery County AFSS and many were incorporated into the final version of the questionnaire.

The final version of the questionnaire contained 56 items; 14 dealing with information about recent flying experience, 3 dealing with the amount of time required to contact a pilot weather briefer, 10 dealing with the amount of utilization of specific AFSS services, 3 dealing with the type of weather briefing typically requested, 6 dealing with utilization of specific inflight and EFAS services or procedures, 6 dealing with satisfaction about specific AFSS services, 1 dealing with use of the "Fast File" system to file flight plans, 6 dealing with ratings about Montgomery County specialists, 5 dealing with satisfaction and familiarity with Montgomery County specialists and services, 1 comparing the services provided by Montgomery County AFSS with those provided by other AFSSs, and 1 indicating whether the respondent would be interested in receiving additional information about AFSS services.

Mailing. A cover letter describing the project and a printed questionnaire were administered by mail to the sample of pilots described above (Appendix A contains a sample of the package). Respondents recorded their answers on an optically scanned mark sense form and returned it in a prepaid mailing envelope, along with a handwritten comment sheet and request for additional information. The information recorded on the forms was transferred to a Digital VAX 11/780-8350 cluster system for further analysis.

Respondents were assured that their names would not be associated with individual responses after the data had been processed. However, a code number was assigned to each name to allow a second mailing (including another copy of the questionnaire, response sheet, and mailing envelope) to be sent to pilots who did not respond to the first mailing. On the second mailing, a one-page letter was added to the package which allowed the pilot to indicate why he or she did not complete the survey. The single page document could be returned instead of the response sheet.

Handwritten comments were categorized using a classification procedure developed by the authors and a psychology technician from the HRRD. The categories identified whether the comments were positive or negative and the general content of the comment within each of these classifications. Three independent reviewers used the classification procedure to categorize up to 5 discrete comments for each pilot. Any discrepancies in the categorization of comments were discussed until a consensus was achieved.

RESULTS

Return rates

Discrepancies of self-reports with certification records. The number sampled in each group of pilots was based upon the class of airmen certificate recorded for each pilot in the Airmen Directory File. When the surveys were returned, 84 pilots reported that their most advanced certificate was different than that which had been recorded for them. In most cases, differences in certificates occurred because pilots reported that their most advanced certificate was higher than the one recorded in the file. For example, 8 pilots recorded as commercial, 16 pilots recorded as private, and 54 pilots recorded as student reported that their most advanced certificate was higher than that recorded in the file. However, two pilots recorded as airline transport pilots, 1 pilot recorded as commercial, and 4 pilots recorded as private reported that their most advanced certificate was lower than what was recorded in the Airmen Directory File.

For the purpose of the study, if a pilot reported that their "most advanced certification" was different than the certificate contained in the Airmen Directory File, their self-report was used for categorization. The "most" advanced certification" for those who turned in only the sheet indicating why they did not complete the survey and did not report the certificate held, was assumed to be that which was coded in the Airmen Directory File.

Respondents. With the exception of the student pilots, return rates were very consistent across groups regardless of type of certificate held. While only about 24% (n=126) of student pilots returned their surveys, 60% (n=395) of private pilots, 60% (n=330) of commercial pilots, and 59% (n=326) of airline transport pilots returned their surveys. The low return rate made it difficult to generalize the results of the survey to the population of student pilots. Consequently, the group of student pilots was eliminated from further analyses.

Surveys submitted by 21 other pilots were also eliminated from further analyses because they indicated in their comments that they 1) had not flown for at least 3 years (and thus could not have used Montgomery County AFSS' automated services), or 2) had not used the services provided by the Montgomery County AFSS (because they obtained weather and flight plan services from another source or used the services of another FSS or AFSS). The responses of commercial pilots who reported that they used the En Route Flight Advisory Services (EFAS) provided by Montgomery County AFSS were retained, even if they reported using none of the other available services.

Nonrespondents. About five percent (118) of the 2,292 surveys mailed were not deliverable because they had incorrect addresses. No other addresses which were more accurate could be obtained for these pilots. The highest proportion of surveys with incorrect addresses had been mailed to student pilots (44%). About 25% were addressed to private pilots, 16% were addressed to commercial pilots, and 15% were addressed to airline transport pilots.

Overall, 1,177 surveys were returned. Three hundred and twenty-six (28%) of the returns were the single page forms that had been sent with the second mailing to request information about why the first mailing was not returned. More student pilot respondents returned single page forms than any other group of respondents (about 48% (61) of student pilots). About 22% (88) of private pilot respondents, 24% (80) of commercial pilot respondents, and 30% (97) of airline transport pilot respondents also returned only the single page response sheet form.

Most private (73%), commercial (64%), and airline transport pilots (85%) who completed the single page response form reported that they did so because they do not use the services of the Montgomery County AFSS. Only 39% of student pilots who returned the single page form reported that they do not use the services of that particular AFSS. On the other hand, a higher percentage of student pilots (48%) than pilots with other types of certificates (ranging from 9-25%) reported that they did not complete the survey because they no longer fly as pilots.

Demographics

Overall, 65% of the remaining 725 pilot respondents who completed the survey indicated that they have an instrument rating. About 22% of private pilots, 87% of commercial pilots, and all airline transport pilots reported holding an instrument rating.

Hours of flight. Twenty-nine private pilots, twenty-two commercial pilots, and seven airline transport pilots reported not flying at all during the last 6 months. Tables 1 and 2 show the number of hours that pilots with different types of certificates reported flying during the previous 6 months by the type of flight, type of activity, and type of aircraft. Generally, few pilots reported spending any hours flying IFR for personal business/pleasure, turbo-prop aircraft, or flying either single-engine pressurized or turbocharged or multi engine pressurized (turbocharged aircraft.

TABLE 1

NUMBER OF HOURS FLOWN PER MONTH, DURING LAST 6 MONTHS
BY TYPE OF FLIGHT

	MOST ADVANCED CERTIFICATE HELD					
	PRIVATE PILOT		COMMERCIAL PILOT		AIRLINE TRANSPORT PILOT	
	N	%	N	%	N	%
VFR FOR PERSONAL BUSINESS						
NO HOURS	155	53.3%	120	50.8%	165	77.1%
1-10 HOURS	87	29.9%	70	29.7%	31	14.5%
11-50 HOURS	37	12.7%	32	13.6%	12	5.6%
MORE THAN 50 HRS	12	4.1%	14	5.9%	6	2.8%
IFR FOR PERSONAL BUSINESS						
NO HOURS	245	85.7%	150	63.8%	169	79.3%
1-10 HOURS	31	10.8%	56	23.8%	33	15.5%
11-50 HOURS	8	2.8%	20	8.5%	5	2.3%
MORE THAN 50 HRS	2	.7%	9	3.8%	6	2.8%
VFR FOR PLEASURE						
NO HOURS	56	19.1%	91	37.9%	149	70.0%
1-10 HOURS	149	50.9%	105	43.8%	51	23.9%
11-50 HOURS	77	26.3%	36	15.0%	9	4.2%
MORE THAN 50 HRS	11	3.8%	8	3.3%	4	1.9%
IFR FOR PLEASURE						
NO HOURS	243	85.0%	175	74.8%	186	87.7%
1-10 HOURS	37	12.9%	50	21.4%	21	9.9%
11-50 HOURS	5	1.7%	7	3.0%	4	1.9%
MORE THAN 50 HRS	1	.3%	2	.9%	1	.5%
VFR COMMERCIAL FOR HIRE						
NO HOURS	284	100%	141	60.0%	139	64.7%
1-10 HOURS			27	11.5%	24	11.2%
11-50 HOURS			30	12.8%	22	10.2%
MORE THAN 50 HRS			37	15.7%	30	14.0%
IFR COMMERCIAL FOR HIRE						
NO HOURS	282	100%	167	71.7%	47	21.5%
1-10 HOURS			30	12.9%	25	11.4%
11-50 HOURS			19	8.2%	33	15.1%
MORE THAN 50 HRS			17	7.3%	114	52.1%

TABLE 2

NUMBER OF HOURS FLOWN PER MONTH, DURING LAST 6 MONTHS BY AIRCRAFT USED

	MOST ADVANCED CERTIFICATE HELD					
	PRIVATE PILOT		COMMERCIAL PILOT		AIRLINE TRANSPORT PILOT	
	N	%	N	%	N	%
1-ENGINE UNPRESSURIZED AIRCRAFT						
NO HOURS	39	13.1%	58	24.1%	129	60.3%
1-10 HOURS	133	44.8%	69	28.6%	53	24.8%
11-50 HOURS	98	33.0%	67	27.8%	18	8.4%
MORE THAN 50 HRS	27	9.1%	47	19.5%	14	6.5%
1-ENGINE PRESSURIZED OR TURBOCHARGED AIRCRAFT						
NO HOURS	264	92.3%	208	89.3%	201	95.3%
1-10 HOURS	14	4.9%	16	6.9%	9	4.3%
11-50 HOURS	5	1.7%	7	3.0%		
MORE THAN 50 HRS	3	1.0%	2	.9%	1	.5%
MULTI-ENGINE UNPRESSURIZED CRAFT						
NO HOURS	266	94.0%	162	69.5%	155	72.8%
1-10 HOURS	11	3.9%	36	15.5%	31	14.6%
11-50 HOURS	3	1.1%	24	10.3%	13	6.1%
MORE THAN 50 HRS	3	1.1%	11	4.7%	14	6.6%
MULTI-ENGINE PRESSURIZED OR TURBOCHARGED AIRCRAFT						
NO HOURS	278	97.9%	203	87.5%	172	80.8%
1-10 HOURS	2	.7%	15	6.5%	17	8.0%
11-50 HOURS	3	1.1%	6	2.6%	6	2.8%
MORE THAN 50 HRS	1	.4%	8	3.4%	18	8.5%
TURBO-PROP AIRCRAFT						
NO HOURS	283	100%	202	86.7%	157	74.1%
1-10 HOURS			8	3.4%	13	6.1%
11-50 HOURS			11	4.7%	19	9.0%
MORE THAN 50 HRS			12	5.2%	23	10.8%
JET AIRCRAFT						
NO HOURS	281	99.3%	203	86.8%	67	30.7%
1-10 HOURS	2	.7%	5	2.1%	10	4.6%
11-50 HOURS			11	4.7%	34	15.6%
MORE THAN 50 HRS			15	6.4%	107	49.1%

Additional analyses were conducted which further combined pilot groups (respondents were categorized as either "0 hours" or "more than 0 hours" spent making each type of flight or flying each type of aircraft.) The analyses identified some significant differences in the frequencies with which certain types of pilots reported making different types of flights. The results of the chi square statistics produced from these analyses are shown in Appendix B and are discussed below.

Private and commercial pilots reported flying VFR for personal business with about equal frequency, but both made VFR business flights significantly more frequently than did airline transport pilots. Private pilots were significantly more likely to fly VFR for pleasure and fly single engine unpressurized aircraft than were both commercial and airline transport pilots. Commercial pilots were also significantly more likely to make these types of flights than were airline transport pilots.

Commercial pilots were more likely to report flying IFR for personal business and for pleasure than were either private or airline transport pilots. The frequency with which private and airline transport pilots reported making these types of flights did not differ significantly.

Private pilots were significantly less likely to report flying multi-engine unpressurized aircraft and multi-engine pressurized or turbocharged aircraft than were either commercial and airline transport pilots. The frequency with which commercial and airline transport pilots reported making these types of flights did not differ significantly.

No significant differences were observed between airline transport and commercial pilots in the frequency of making VFR commercial flights or flying single-engine pressurized or turbocharged aircraft.

However, airline transport pilots were significantly more likely than commercial pilots to report making IFR commercial flights and flying turbo-prop aircraft and jet aircraft. Private pilots were excluded from these analyses because they did not make commercial flights or fly turbo-prop aircraft. Two NASA pilots with private pilot certificates reported flying jet aircraft, but because of the infrequency of occurrence, those data were not analyzed.

Utilization of services

Specific equipment and services. A series of items was included which assessed pilots' utilization of specific weather briefing services provided by either AFSSs or nongovernmental sources. These services include the Telephone Information Briefing System (TIBS), the Interim Voice Response System (IVRS), an AFSS preflight specialist, the AM Weather Television show on PBS, television, radio station newspaper reports of weather, private companies, an AFSS inflight specialist, the Transcribed Weather Broadcast (TWEB) on the GLS NDB, the Hazardous Inflight Weather Advisory Service (HIWAS), the En Route Flight Advisory Service (EFAS, also called "Flight Watch").

TIBS provides weather information recorded by AFSS specialists which is accessible to pilots by touch-tone phone. TIBS includes a generalized weather briefing in an area or along a limited set of routes. The recording is updated periodically and as conditions change. IVRS is a service run by a contractor which provides weather information also accessible by touch-tone phone. The data used for IVRS are based on FAA weather data received from the Kansas City Weather Message Switching Center. IVRS incorporates more detailed weather information than does TIBS, but does not provide Notices to Airmen (NOTAMs) for any portion of a flight. The TWEB is a continuous recording of meteorological and some aeronautical information, covering the basic flight plan area, that is broadcast on a Nondirectional Beacon (NDB) to be received inflight. The HIWAS is a continuous broadcast of inflight hazardous weather advisories obtained from the National Weather Service or urgent pilot weather reports. These advisories predict or identify locations of conditions hazardous to aircraft inflight.

FAA preflight specialists communicate to pilots the meteorological and aeronautical information necessary prior o a flight. Preflight specialists provide current information (weather and NOTAMs) applicable to

the pilot's route of flight. FAA inflight specialists provide information similar to that provided by the preflight specialist, but they communicate by radio with pilots who are already aloft. Inflight specialists draw much of their information from current weather observations and reports.

The AM Weather television show, produced by the National Weather Service, is shown on Public Broadcasting System affiliated stations each morning. The show, targeted to aviation viewers, provides general information about expected weather across the country for the coming day. Viewers are reminded to obtain a complete weather briefing prior to departure. Television, radio, and newspaper weather reports are very general and do not contain information required for flight planning.

A number of private companies offer weather services. These include alphanumeric and graphical displays of weather information, based in some cases on interpretations made by staff meteorologists. Verbal briefings are provided by some companies, while others allow the pilot to access their weather data base using a personal computer and print out a hard copy of a weather briefing or weather maps. Note that at the time this survey was administered (July 1989), the Direct User Access Terminal System (DUAT) was not yet on line (implementation took place in September 1989). Thus, pilots' judgments about use of weather services provided by private companies does not encompass the DUAT system.

The EFAS specialist provides en route aircraft with timely inflight weather advisories pertinent to a pilot's route of flight. The weather sources used by the EFAS specialist include real-time color weather radar, National Weather Service outlets, pilot weather reports, and Geostationary Operational Environmental Satellite (GOES) imagery products.

Table 3 shows the percentage of flights on which each type of pilot reported using each type of service as their primary weather source. The high percentage of pilots indicating that they used each type of service suggests that the pilots may have responded to these items as if they were asked to report on what percentage of their flights they used each service as an important weather source, rather than on what percentage of their flights they used each as their primary weather source. The way in which pilots responded to these items makes it difficult to interpret the responses.

TABLE 3

ON WHAT % OF YOUR FLIGHTS DO YOU USE THE FOLLOWING AS YOUR PRIMARY WEATHER SOURCE?

	MOST ADVANCED CERTIFICATE HELD					
	PRIVATE PILOT		COMMERCIAL PILOT		AIRLINE TRANSPORT PILOT	
	N	%	N	%	N	%
TELEPHONE INFORMATION BRIEFING SYSTEM (TIBS)						
DO NOT USE	107	35.9%	94	39.5%	135	61.9%
< = 50% OF TIME	96	32.2%	97	40.8%	63	28.9%
> 50% OF TIME	95	31.9%	47	19.7%	20	9.2%
INTERIM VOICE RESPONSE SYSTEM (IVRS)						
DO NOT USE	209	71.3%	147	62.0%	167	76.3%
< = 50% OF TIME	74	25.3%	76	32.1%	46	21.0%
> 50% OF TIME	10	3.4%	14	5.9%	6	2.7%

TABLE 3 (continued)

ON WHAT % OF YOUR FLIGHTS DO YOU USE THE FOLLOWING AS YOUR PRIMARY WEATHER SOURCE?

	MOST ADVANCED CERTIFICATE HELD					
	PRIVATE PILOT		COMMERCIAL PILOT		AIRLINE TRANSPORT PILOT	
	N	%	N	%	N	%
AFSS PREFLIGHT SPECIALIST						
DO NOT USE	59	20.0%	62	25.9%	77	34.8%
< = 50% OF TIME	104	35.3%	77	32.2%	58	26.2%
> 50% OF TIME	132	44.7%	100	41.8%	86	38.9%
AM WEATHER TV SHOW						
DO NOT USE	145	48.7%	97	40.2%	103	46.3%
< = 50% OF TIME	98	32.9%	107	44.4%	90	40.9%
> 50% OF TIME	55	18.5%	37	15.4%	27	12.3%
TV, RADIO, NEWSPAPER REPORTS						
DO NOT USE	98	32.9%	67	28.0%	84	38.2%
< = 50% OF TIME	125	41.9%	115	48.1%	98	44.5%
> 50% OF TIME	75	25.2%	57	23.8%	38	17.3%
PRIVATE COMPANY						
DO NOT USE	252	85.4%	171	72.5%	87	39.7%
< = 50% OF TIME	38	12.9%	38	16.1%	39	17.8%
> 50% OF TIME	5	1.7%	27	11.4%	93	42.5%
FSS INFLIGHT SPECIALIST						
DO NOT USE	80	27.2%	46	19.2%	53	24.0%
< = 50% OF TIME	154	52.4%	135	56.3%	117	52.9%
> 50% OF TIME	60	20.4%	59	24.6%	51	23.1%
TRANSCRIBED WEATHER BROADCAST ON THE GLS NDB						
DO NOT USE	149	50.5%	110	45.6%	116	52.7%
< = 50% OF TIME	122	41.4%	112	46.5%	95	43.2%
> 50% OF TIME	24	8.1%	19	7.9%	9	4.1%
HAZARDOUS INFLIGHT WEATHER ADVISORY SERVICE (HIWAS)						
DO NOT USE	196	66.9%	131	54.8%	88	40.0%
< = 50% OF TIME	83	28.3%	92	38.5%	107	48.6%
> 50% OF TIME	14	4.8%	16	6.7%	25	11.4%
EN ROUTE FLIGHT ADVISORY SERVICE (EFAS)						
DO NOT USE	71	23.9%	51	21.3%	36	16.4%
< = 50% OF TIME	148	49.8%	127	52.9%	134	60.9%
> 50% OF TIME	78	26.3%	62	25.8%	50	22.7%

Additional analyses were conducted to compare the percentage of pilots responding that they used the equipment or services with the percentage who did not use the services, and to assess the frequency of use for those who responded that they used the equipment or services. In these chi square analyses, using a significance level of .01, comparisons were made to determine whether the pilot groups differed significantly in their usage of specific AFSS services. The results are reported in Appendices C and D.

Appendix C shows no significant differences between pilot groups in the percentage reporting that they used the AM Weather television show; reports from television, radio, etc.; an AFSS inflight specialist; the Transcribed Weather Broadcast (TWEB); and the En Route Flight Advisory Service (EFAS). However, a significantly lower percentage of airline transport pilots than both private and commercial pilots reported using the Telephone Information Briefing System (TIBS) and a significantly lower percentage of airline transport pilots than private pilots reported using an AFSS preflight specialist. Also, all groups differed significantly in their use of a private weather service and the Hazardous Inflight Weather Advisory Service (HIWAS). Airline pilots reported using both private weather services and the HIWAS most frequently; private pilots reported using these services least frequently. A significantly higher percentage of commercial pilots than airline transport pilots reported using the Interim Voice Response System (IVRS).

Appendix D shows the results of analyses which compared the frequency of utilization of particular AFSS services for members of each group of pilots reporting that they use the services. For most of the services listed, the frequency of utilization did not differ as a function of the type of pilot certificate held. However, a higher percentage of airline transport pilots than commercial pilots, and a higher percentage of commercial pilots than private pilots reported using a private weather service more than 50% of the time. Also, private pilots reported using the TIBS more frequently than did both commercial pilots and airline transport pilots.

TABLE 4
WHAT % OF THE TIME DO YOU ASK FOR THE FOLLOWING WHEN CONTACTING A PILOT WEATHER BRIEFER?

	MOST ADVANCED CERTIFICATE HELD					
	PRIVATE PILOT		COMMERCIAL PILOT		AIRLINE TRANSPORT PILOT	
	N	%	N	%	N	%
STANDARD PILOT WEATHER BRIEFING						
DO NOT USE	37	12.5%	49	20.5%	72	32.7%
< = 50% OF TIME	41	13.8%	46	19.2%	46	20.9%
> 50% OF TIME	219	73.7%	144	60.3%	102	46.4%
ABBREVIATED WEATHER BRIEFING						
DO NOT USE	123	42.1%	90	38.0%	89	40.6%
< = 50% OF TIME	154	52.7%	119	50.2%	100	45.7%
> 50% OF TIME	15	5.1%	28	11.8%	30	13.7%
AN OUTLOOK BRIEFING						
DO NOT USE	78	26.4%	73	30.5%	94	42.9%
< = 50% OF TIME	137	46.4%	119	49.8%	94	42.9%
> 50% OF TIME	80	27.1%	47	19.7%	31	14.2%

Utilization of briefing services. Table 4 shows the percent of time pilots reported asking for certain types of weather briefings when contacting an AFSS pilot weather briefer. In general, standard briefings were requested most frequently, outlook briefings next, then abbreviated briefings. Chi square analyses, reported in Appendix E, were conducted to compare the frequency of requesting particular types of briefings by type of pilot certificate. No significant differences were found in the percentage of any group of pilots requesting abbreviated briefings. Airline transport pilots were significantly less likely than were both private and commercial pilots to request both standard and outlook briefings. However, private and commercial pilots did not differ significantly in the frequency of their requests for any type of briefing.

Table 5 shows the percentage of pilots reporting that it required more or less than 3 minutes to contact a pilot weather briefer during periods of "nonsignificant" and "significant" weather. Appendix F contains the results of chi square analyses which compared the percentages reported by each type of pilot certificate holder. A significantly lower percentage of private pilots than airline transport pilots reported that it took more than 3 minutes to contact a briefer during "nonsignificant" weather, and a significantly lower percentage of private pilots than both commercial and airline transport pilots reported that it took more than 3 minutes to contact a briefer during "significant" weather. No significant differences between commercial and airline transport pilots were observed.

With regard to this issue, it must be noted that "significant" and "nonsignificant" were not defined to the pilots, but were left up to the pilots' interpretation. Weather perceived as significant to a private pilot may be perceived as nonsignificant to an airline transport pilot. Furthermore, times reported by pilots to reach pilot weather briefers are not actual measurements, but are instead their perceptions of the amount of time required.

TABLE 5
TIME REQUIRED TO REACH A PILOT WEATHER BRIEFER:

	MOST ADVANCED CERTIFICATE HELD					
	PRIVATE PILOT		COMMERCIAL PILOT		AIRLINE TRANSPORT PILOT	
	N	%	N	%	N	%
DURING "NONSIGNIFICANT" WEATHER						
3 MINUTES OR LESS	234	94.0%	159	90.3%	115	82.1%
> 3 MINUTES	15	6.0%	17	9.7%	25	17.9%
DURING "SIGNIFICANT" WEATHER						
3 MINUTES OR LESS	168	69.7%	90	48.9%	52	36.1%
> 3 MINUTES	73	30.3%	94	51.1%	92	63.9%

Utilization of Inflight and EFAS services. Table 6 shows responses to items dealing with the utilization of inflight services, particularly the En route Flight Advisory Service (EFAS.) Examination of Table 5 suggests that two-thirds of the pilots utilized AFSS inflight services. Additional analyses, reported in Appendix G, compared rates of utilization for each group of pilots. The results reflected no significant differences between pilot groups in the percentage who reported using EFAS, identifying their radio frequency to an inflight specialist, or their position or altitude when contacting EFAS. Private pilots were less likely than were both commercial and airline transport pilots to use EFAS between 10:00 p.m. and 6:00 a.m. Airline transport pilots were more likely to use the discrete high altitude EFAS frequency than were either private or commercial pilots. Furthermore, commercial pilots were more likely than were private pilots to use the high altitude EFAS frequency.

Another question concerned the use of the Fast File system to file flight plans. Results of a chi square analysis showed that private pilots were significantly less likely to use the Fast File system than were both commercial and airline transport pilots. Commercial and airline transport pilots did not differ significantly in their utilization of the Fast File.

TABLE 6
ON WHAT % OF YOUR FLIGHTS DO YOU:

	MOST ADVANCED CERTIFICATE HELD					
	PRIVATE PILOT		COMMERCIAL PILOT		AIRLINE TRANSPORT PILOT	
	N	%	N	%	N	%
IDENTIFY YOUR FREQUENCY TO INFLIGHT SPECIALIST						
DO NOT USE	90	30.3%	54	22.5%	55	24.9%
< = 50% OF TIME	99	33.3%	71	29.6%	48	21.7%
> 50% OF TIME	108	36.4%	115	47.9%	118	53.4%
USE EFAS						
DO NOT USE	78	26.2%	56	23.3%	47	21.4%
< = 50% OF TIME	148	49.7%	113	47.1%	125	56.8%
> 50% OF TIME	72	24.2%	71	29.6%	48	21.8%
USE EFAS BETWEEN 10 PM AND 6 AM						
DO NOT USE	198	66.9%	115	47.9%	91	41.6%
< = 50% OF TIME	87	29.4%	102	42.5%	114	52.1%
> 50% OF TIME	11	3.7%	23	9.6%	14	6.4%
IDENTIFY YOUR POSITION UPON CONTACTING EFAS						
DO NOT USE	79	26.5%	51	21.2%	51	23.4%
< = 50% OF TIME	55	18.5%	35	14.5%	49	22.5%
> 50% OF TIME	164	55.0%	155	64.3%	118	54.1%
IDENTIFY YOUR ALTITUDE UPON CONTACTING EFAS						
DO NOT USE	92	30.9%	64	26.7%	61	28.0%
< = 50% OF TIME	87	29.2%	61	25.4%	68	31.2%
> 50% OF TIME	119	39.9%	115	47.9%	89	40.8%
USE THE DISCRETE HIGH ALTITUDE EFAS FREQUENCY						
DO NOT USE	271	91.6%	181	75.4%	91	41.4%
< = 50% OF TIME	21	7.1%	38	15.8%	62	28.2%
> 50% OF TIME	4	1.4%	21	8.8%	67	30.5%
USE THE FAST FILE SYSTEM TO FILE FLIGHT PLANS						
DO NOT USE	209	70.4%	142	59.7%	122	55.2%
< = 50% OF TIME	79	26.6%	83	34.9%	79	35.7%
> 50% OF TIME	9	3.0%	13	5.5%	20	9.0%

Satisfaction with services

The next section concerns the extent to which pilots reported that they were satisfied with various aspects of the services provided by the Montgomery County AFSS. The section will address satisfaction with specific types of services, the perceived adequacy of the briefings provided, and the overall satisfaction with the flight services provided by Montgomery County AFSS. The relative frequency of responses will be analyzed first, then relationships between different items will be analyzed.

Satisfaction with specific services. Table 7 shows the percentage of pilots reporting differing degrees of satisfaction with specific equipment and services. Those responding that they did not use the services were excluded from the analyses. A general examination of the data suggests that airline transport pilots were less satisfied and private pilots were more satisfied with the services described, with the exception of the HIWAS and EFAS.

Appendix H shows the results of more specific statistical analyses which compared the percentage of pilots in each group who expressed satisfaction with each type of service provided. For the purpose of this analysis, the responses were combined into two categories; those responding "Not at all" or "To a limited extent" were categorized as "Not satisfied," while those responding "To a moderate extent," "To a considerable extent," or "To a great extent" were categorized as "Satisfied." This method of categorization was used to allow comparison of results of this survey with results of other user surveys.

The results suggest that a higher percentage of private pilots than both airline transport pilots and commercial pilots were satisfied with the amount of time required to contact a pilot weather briefer. Furthermore, a higher percentage of private pilots were satisfied with the TIBS, the IVRS, the pilot weather briefings, and the TWEB than were airline transport pilots. No other significant differences occurred between private and commercial pilots and no significant differences occurred between commercial and airline transport pilots in the percentage reporting satisfaction with any of the services.

TABLE 7
TO WHAT EXTENT ARE YOU SATISFIED WITH THE FOLLOWING:

	MOST ADVANCED CERTIFICATE HELD					
	PRIVATE PILOT		COMMERCIAL PILOT		AIRLINE TRANSPORT PILOT	
	N	%	N	%	N	%
TELEPHONE INFORMATION BRIEFING SYSTEM (TIBS)						
NOT AT ALL	11	5.3%	7	4.7%	14	12.4%
TO A LIMITED EXTENT	30	14.6%	29	19.5%	29	25.7%
TO A MODERATE EXTENT	34	16.5%	28	18.8%	20	17.7%
TO A CONSIDERABLE EXTENT	57	27.7%	37	24.8%	17	15.0%
TO A GREAT EXTENT	74	35.9%	48	32.2%	33	29.2%
INTERIM VOICE RESPONSE SYSTEM (IVRS)						
NOT AT ALL	18	18.8%	20	21.5%	23	24.5%
TO A LIMITED EXTENT	15	15.6%	15	16.1%	28	29.8%
TO A MODERATE EXTENT	19	19.8%	15	16.1%	13	13.8%
TO A CONSIDERABLE EXTENT	17	17.7%	18	19.4%	8	8.5%
TO A GREAT EXTENT	27	28.1%	25	26.9%	22	23.4%

TABLE 7 (continued)
TO WHAT EXTENT ARE YOU SATISFIED WITH THE FOLLOWING:

	MOST ADVANCED CERTIFICATE HELD					
	PRIVATE PILOT		COMMERCIAL PILOT		AIRLINE TRANSPORT PILOT	
	N	%	N	%	N	%
MONTGOMERY COUNTY AFSS WEATHER BRIEFERS						
NOT AT ALL	3	1.2%	3	1.5%	2	1.3%
TO A LIMITED EXTENT	8	3.1%	14	7.1%	16	10.0%
TO A MODERATE EXTENT	36	14.1%	22	11.2%	20	12.5%
TO A CONSIDERABLE EXTENT	68	26.6%	62	31.5%	47	29.4%
TO A GREAT EXTENT	141	55.1%	96	48.7%	75	46.9%
TRANSCRIBED WEATHER BROADCAST ON GLS NDB						
NOT AT ALL	11	6.2%	9	6.2%	18	14.1%
TO A LIMITED EXTENT	41	23.0%	38	26.2%	39	30.5%
TO A MODERATE EXTENT	52	29.2%	37	25.5%	32	25.0%
TO A CONSIDERABLE EXTENT	34	19.1%	30	20.7%	13	10.2%
TO A GREAT EXTENT	40	22.5%	31	21.4%	26	20.3%
HAZARDOUS INFLIGHT WEATHER ADVISORY SERVICE (HIWAS)						
NOT AT ALL	14	12.7%	15	13.2%	9	6.0%
TO A LIMITED EXTENT	24	21.8%	24	21.1%	36	23.8%
TO A MODERATE EXTENT	23	20.9%	22	19.3%	31	20.5%
TO A CONSIDERABLE EXTENT	21	19.1%	27	23.7%	33	21.9%
TO A GREAT EXTENT	28	25.5%	26	22.8%	42	27.8%
EN ROUTE FLIGHT ADVISORY SERVICE (EFAS)						
NOT AT ALL	8	3.3%	11	5.6%	3	1.6%
TO A LIMITED EXTENT	26	10.8%	20	10.2%	21	11.3%
TO A MODERATE EXTENT	48	19.9%	32	16.2%	34	18.3%
TO A CONSIDERABLE EXTENT	58	24.1%	54	27.4%	51	27.4%
TO A GREAT EXTENT	101	41.9%	80	40.6%	77	41.4%

Ratings of Montgomery County AFSS specialist performance. Table 8 displays responses to items regarding pilots' evaluations of specific aspects of the performance of the specialists at the Montgomery County AFSS. In general, the ratings for the areas addressed by these items seems to be very high for pilots holding each type of certificate. Areas for which the lowest percentage of pilots provided positive ratings included the accuracy of the weather briefing and the extent to which the specialists tailored the weather briefings to meet the needs of the pilot.

Chi square analyses were conducted which compared the performance ratings provided by different groups of pilots for the dichotomized rating variable. The results of these analyses are displayed in Appendix I. The results suggested that there were no statistically significant differences between any of the pilot groups in their ratings with the Montgomery County AFSS specialists' performance, although a marginally higher percentage of private pilots than commercial pilots provided positive ratings for the technical competence of Montgomery County specialists. A marginally higher percentage of private pilots than both commercial and airline transport pilots, provided high ratings for the extent to which the specialists tailored weather

briefings. . marginally higher percentage of commercial than airline transport pilots gave high ratings to the sufficiency of the weather briefing to allow planning a flight.

TABLE 8
TO WHAT EXTENT DO YOU FEEL THAT MONTGOMERY COUNTY AFSS SPECIALISTS:

	MOST ADVANCED CERTIFICATE HELD					
	PRIVATE PILOT		COMMERCIAL PILOT		AIRLINE TRANSPORT PILOT	
	N	%	N	%	N	%
ARE COURTEOUS IN THE CONDUCT OF THEIR DUTIES						
NOT AT ALL			1	.5%		
TO A LIMITED EXTENT	2	.8%	2	1.0%	3	1.8%
TO A MODERATE EXTENT	19	7.3%	20	10.0%	8	4.8%
TO A CONSIDERABLE EXTENT	71	27.3%	53	26.4%	37	22.4%
TO A GREAT EXTENT	168	64.6%	125	62.2%	117	70.9%
APPEAR TECHNICALLY COMPETENT						
NOT AT ALL			1	.5%		
TO A LIMITED EXTENT	3	1.2%	9	4.5%	4	2.4%
TO A MODERATE EXTENT	20	7.7%	17	8.5%	16	9.7%
TO A CONSIDERABLE EXTENT	76	29.3%	61	30.5%	53	32.1%
TO A GREAT EXTENT	160	61.8%	112	56.0%	92	55.8%
PROVIDE ACCURATE WEATHER BRIEFINGS						
NOT AT ALL	1	.4%				
TO A LIMITED EXTENT	4	1.5%	9	4.6%	8	4.9%
TO A MODERATE EXTENT	27	10.4%	44	22.7%	20	12.3%
TO A CONSIDERABLE EXTENT	99	38.1%	77	39.7%	60	37.0%
TO A GREAT EXTENT	129	49.6%	64	33.0%	74	45.7%
PROVIDE COMPLETE WEATHER BRIEFINGS						
NOT AT ALL	1	.4%				
TO A LIMITED EXTENT	6	2.3%	5	2.6%	8	4.9%
TO A MODERATE EXTENT	24	9.3%	25	13.0%	13	8.0%
TO A CONSIDERABLE EXTENT	83	32.0%	63	32.6%	57	35.2%
TO A GREAT EXTENT	145	56.0%	100	51.8%	84	51.9%
PROVIDE YOU A BRIEFING SUFFICIENT TO ALLOW YOU TO PLAN FLIGHT						
NOT AT ALL	1	.4%			1	.6%
TO A LIMITED EXTENT	6	2.3%	4	2.1%	9	5.6%
TO A MODERATE EXTENT	16	6.2%	24	12.6%	13	8.1%
TO A CONSIDERABLE EXTENT	73	28.2%	54	28.3%	43	26.7%
TO A GREAT EXTENT	163	62.9%	109	57.1%	95	59.0%
TAILOR THEIR WEATHER BRIEFINGS TO MEET YOUR NEEDS						
NOT AT ALL	2	.8%	6	3.1%	3	1.8%
TO A LIMITED EXTENT	17	6.6%	19	9.9%	19	11.7%
TO A MODERATE EXTENT	27	10.5%	23	12.0%	25	15.3%
TO A CONSIDERABLE EXTENT	78	30.2%	55	28.6%	45	27.6%
TO A GREAT EXTENT	134	51.9%	89	46.4%	71	143.6%

Knowledge of and satisfaction with services provided. Table 9 shows the degree to which different pilot certificate holders reported knowledge of and satisfaction with the services provided by the Montgomery County AFSS and other AFSSs. Higher percentages of pilots expressed satisfaction with Montgomery County's services than expressed satisfaction with the services provided by all AFSSs.

TABLE 9
TO WHAT EXTENT ARE YOU:

	MOST ADVANCED CERTIFICATE HELD					
	PRIVATE PILOT		COMMERCIAL PILOT		AIRLINE TRANSPORT PILOT	
	N	%	N	%	N	%
FAMILIAR WITH SERVICES PROVIDED BY MONTGOMERY AFSS SPECIALISTS						
NOT AT ALL	4	1.5%			4	2.3%
TO A LIMITED EXTENT	79	29.9%	42	20.4%	21	12.1%
TO A MODERATE EXTENT	80	30.3%	59	28.6%	42	24.3%
TO A CONSIDERABLE EXTENT	63	23.9%	51	24.8%	61	35.3%
TO A GREAT EXTENT	38	14.4%	54	26.2%	45	26.0%
CONFIDENT THAT YOUR FLIGHT PLAN WILL BE HANDLED CORRECTLY						
NOT AT ALL			1	.5%	1	.6%
TO A LIMITED EXTENT	8	3.4%	4	2.1%	9	5.8%
TO A MODERATE EXTENT	20	8.4%	20	10.3%	19	12.3%
TO A CONSIDERABLE EXTENT	55	23.1%	53	27.3%	41	26.6%
TO A GREAT EXTENT	155	65.1%	116	59.8%	84	54.5%
GENERALLY SATISFIED WITH THE PERFORMANCE OF MONTGOMERY SPECIALISTS						
NOT AT ALL	1	.4%	1	5%		
TO A LIMITED EXTENT	5	1.9%	7	3.5%	9	5.5%
TO A MODERATE EXTENT	18	6.9%	18	8.9%	17	10.3%
TO A CONSIDERABLE EXTENT	79	30.4%	69	34.2%	51	30.9%
TO A GREAT EXTENT	157	60.4%	107	53.0%	88	53.3%
GENERALLY SATISFIED WITH SERVICES PROVIDED BY THE MONTGOMERY AFSS						
NOT AT ALL	3	1.2%	2	1.0%	3	1.9%
TO A LIMITED EXTENT	11	4.3%	8	4.0%	12	7.5%
TO A MODERATE EXTENT	32	12.5%	38	19.2%	28	17.5%
TO A CONSIDERABLE EXTENT	93	36.2%	76	38.4%	56	35.0%
TO A GREAT EXTENT	118	45.9%	74	37.4%	61	38.1%
GENERALLY SATISFIED WITH SERVICES PROVIDED BY ALL AFSSs						
NOT AT ALL	4	1.6%	4	2.0%	7	4.0%
TO A LIMITED EXTENT	21	8.4%	24	12.0%	33	18.6%
TO A MODERATE EXTENT	49	19.5%	57	28.5%	46	26.0%
TO A CONSIDERABLE EXTENT	96	38.2%	67	33.5%	50	28.2%
TO A GREAT EXTENT	81	32.3%	48	24.0%	41	23.2%

Chi square analyses, contained in Appendix J, compared the relative satisfaction of each group of pilots with the services provided by the Montgomery County AFSS using the dichotomous response variable. Significantly fewer private pilots than both commercial and airline transport pilots were familiar with the services provided by the Montgomery County AFSS. Commercial and airline transport pilots expressed statistically equivalent degrees of familiarity with the services provided. No differences were found in the percentages of pilots from each of the groups who expressed moderate to high degrees of satisfaction with the services provided by the Montgomery County AFSS. However, a higher percentage of private pilots than airline transport pilots were satisfied with the services provided by all FAA's AFSSs.

Table 10 shows the percentage of pilots who rated the services provided by the Montgomery County AFSS in comparison with the services provided by other AFSSs. About 44% of the pilots thought Montgomery County's services were better than those provided by other AFSSs, and fewer than 5% thought the services provided were worse than those provided by other AFSSs. Chi square analyses revealed no significant differences in ratings as a function of the type of certificate held.

TABLE 10
COMPARISON OF MONTGOMERY COUNTY SERVICES WITH THOSE OF OTHER AFSSs:

	MOST ADVANCED CERTIFICATE HELD					
	PRIVATE PILOT		COMMERCIAL PILOT		AIRLINE TRANSPORT PILOT	
	N	%	N	%	N	%
RATE MONTGOMERY COUNTY AFSS SERVICES AS COMPARED WITH OTHER AFSSs						
MUCH BETTER THAN OTHERS	41	16.0%	24	11.7%	21	11.3%
SOMEWHAT BETTER THAN OTHERS	73	28.5%	68	33.2%	61	32.8%
ABOUT THE SAME AS OTHERS	136	53.1%	106	51.7%	101	54.3%
SOMEWHAT WORSE THAN OTHERS	4	1.6%	6	2.9%	2	1.1%
MUCH WORSE THAN OTHERS	2	.8%	1	.5%	1	.5%

Finding patterns in the responses

A series of analyses was conducted to identify patterns in the ratings made by the pilot respondents. Correlational analyses, a factor analysis, and regression analyses were conducted and will be reported in this section. The purpose of the analyses is to identify the items which may predict satisfaction (or dissatisfaction) with the services provided by the Montgomery County AFSS, so that the facility can target those areas.

Correlational analyses. Pearson product-moment correlations were computed between the items in the survey to assess their interrelationships. Correlation coefficients, as used in this context, are statistics which describe the extent to which pilots' responses on one item are related to their responses on a second item. Correlation coefficients range between -1.0 (a perfect negative correlation; suggesting that every pilot who made a high-valued response on one item also made a low-valued response on a second item) and +1.0 (a perfect positive correlation; suggesting that every pilot who made a high-valued response on one item also made a high-valued response on a second item). A correlation of 0 suggests that all responses are independent; that is, there is no relationship between the response made on one item and the response made on a second. Subsets of correlation coefficients computed between items on the survey can be seen in Tables 11-14.

For these analyses, the variable describing type of pilot was decomposed into three variables, "Private," "Commercial," and "Airline Transport," each having a value of 1 or 0, depending on the type of certificate held by each pilot. The rows and columns in the tables contain abbreviations describing the content of each item. For further clarification of the labels, please refer to Appendix A.

Table 11 shows the intercorrelations between the type of pilot and items reflecting the pilots' experience, type of flight, type of aircraft flown, and knowledge of AFSS services. The table illustrates that type of ratings was correlated with type of flying and aircraft usage. Having a private pilot certificate was positively correlated with number of hours spent flying VFR for pleasure and was negatively correlated with having an IFR rating, making VFR or IFR commercial flights, and flying jet aircraft. Having a commercial pilot certificate was positively correlated with having an IFR rating. Having an airline transport pilot certificate was positively correlated with having an IFR rating, making IFR commercial flights, and flying turbo-prop and jet aircraft and was negatively correlated with flying single-engine unpressurized aircraft and making VFR pleasure flights.

Patterns of significant correlations can be found among other items. Having an IFR rating was positively correlated with making IFR and VFR commercial flights, flying IFR for personal business, and flying jet aircraft. Making VFR pleasure flights was correlated with making IFR pleasure flights, and making VFR flights for personal business was correlated with making IFR flights for personal business. Flying single-engine unpressurized aircraft was positively correlated with making VFR flights, for both pleasure and personal business, and was negatively correlated with flying jet aircraft. Making VFR commercial flights was correlated with flying multi-engine unpressurized aircraft and turbo-prop aircraft, and making IFR commercial flights was correlated with flying multi-engine pressurized aircraft, turbo-prop aircraft, and jet aircraft. Finally, flying multi-engine pressurized aircraft was correlated with flying turbo-prop aircraft.

Table 12 shows correlations between the type of pilot, items dealing with utilization of specific AFSS services, and knowledge of AFSS services. Few items were significantly correlated with each other. Having a private pilot certificate had a negative correlation and having an airline transport pilot certificate had a positive correlation with using a private company as a primary weather source. The amount of time perceived to be required to contact a briefer during "nonsignificant" weather was correlated with the amount of time perceived to be required to contact a pilot briefer during "significant" weather. Use of the AM Weather show as a primary weather source was correlated with use of TV, radio, etc., as primary weather sources. Use of an inflight specialist was related to use of the TWEB, HIWAS, and EFAS as primary weather sources. Use of TWEB was also correlated with use of HIWAS, and use of HIWAS was correlated with use of EFAS as primary weather sources. Requesting a standard briefing was negatively correlated with requesting an abbreviated briefing.

Table 13 shows intercorrelations between the type of pilot, knowledge of AFSS services, and variables related to the utilization of the EFAS. Holding a private pilot certificate was negatively correlated, and holding an airline transport pilot certificate was positively correlated, with using the discrete High Altitude EFAS frequency. Identifying one's position was highly correlated with identifying one's altitude when contacting EFAS. The percentage of the time that EFAS was used was correlated with using the EFAS as a primary weather source, percentage of time that EFAS was used between 10:00 p.m. and 6:00 a.m., percentage of time that the pilot identified his or her position and altitude when contacting EFAS, and the user's satisfaction with EFAS.

Table 14 shows intercorrelations between the variables indicating type of pilot certificate held, knowledge of AFSS services, variables related to satisfaction with specific services, and general satisfaction with Montgomery County's services. The variables describing the type of pilot certificate held and knowledge of services were not related to ratings of satisfaction. Satisfaction regarding the time to reach a briefer was moderately correlated with satisfaction regarding Montgomery County specialists, and with satisfaction regarding the services provided by Montgomery County's and all other AFSSs. Items assessing the courtesy and competence of the specialists; the accuracy, completeness, and sufficiency of the briefings; and the degree to which the briefings are tailored to the pilots' needs were highly correlated with each other and with items assessing satisfaction with Montgomery County specialists and services. To a lesser extent, these items were also correlated with the rating of satisfaction with services provided by all AFSSs.

TABLE 11
CORRELATIONS BETWEEN DEMOGRAPHIC VARIABLES
N=602

	PRIV	COMM	ATP	FAMIL	IFR	VFRPB	IFRPB	VFRPL	IFRPL	VFRCH	IFRCH	SNGUN	SNGPR	MULUN	MULPR	TURPR	JET
PRIVATE	1.00																
COMMERCL	-.57*	1.00															
AIR TRANS	-.50*	-.42*	1.00														
FAMILIAR	-.22*	.08	.16*	1.00													
IFR RATE	-.76*	.39*	.42*	.28*	1.00												
VFR PB	.03	.13*	-.17*	.04	-.01	1.00											
IFR PB	-.18*	.19*	-.00	.11*	.30*	.37*	1.00										
VFR PL	.31*	-.01	-.33*	.02	-.25*	.22*	04	1.00									
IFR PL	-.03	.12*	-.09	.17*	.25*	.13*	26*	.38*	1.00								
VFR COM	-.41*	.25*	.19*	.16*	.32*	-.01	- 06	-.18*	-.06	1 00							
IFR COM	-.48*	-.08	.62*	.19*	.41*	-.20*	-.11*	-.27*	-.11*	.26*	1.00						
SINGL UNP	.13*	.17*	-.32*	.03	-.11*	.40*	.12*	.54*	.27*	.20*	-.27*	1.00					
SINGL PR	-.01	.06	-.06	.01	.09	.14*	10	.11*	.07	.11*	-.03	.15*	1.00				
MULTI UNP	-.27*	.16*	.12*	.10	.28*	.18*	23*	-.03	.11*	.43*	.11*	.04	.05	1 00			
MULTI PR	-.20*	.04	.18*	.15*	.20*	.07	.16*	.00	.11*	.14*	.33*	.03	.04	.15*	1 00		
TURBO PRP	-.28*	.01	.30*	.13*	.23*	.01	.01	-.14*	.00	.34*	.34*	.03	.02	.24*	.34*	1 00	
JET	-.41*	-.16*	.63*	.09	.35*	-.20*	.04	-.27*	-.07	.04	.73*	-.36*	-.07	-.04	.15*	.13*	1 00

* Correlations are statistically significant at p < .01

TABLE 12
CORRELATIONS BETWEEN VARIABLES DESCRIBING
UTILIZATION OF SERVICES
N=523

	PRI	COM	ATP	FAMIL	TIMEN	TIMES	TIBS	IVRS	PREFL	AMWX	TV	PRIWX	INFLT	TWEB	NIWAS	EFAS	STAND	ABBRV	OUTLK	FAFL
PRIV	1.00																			
COMM	-.59*	1.00																		
ATP	-.50*	-.40*	1.00																	
FAMIL	-.22*	.11*	.13*	1.00																
TIMEN	-.15*	-.04	.22*	.07	1.00															
TIMES	-.29*	.07	.25*	-.00	.59*	1.00														
TIBS	.16*	-.03	-.16*	.04	-.06	-.10	1.00													
IVRS	-.07	.12*	-.05	.11*	-.03	-.02	18*	1.00												
PREFL	-.02	.00	.03	.09	.01	.20*	-.12*	-.06	1.00											
AMWX	-.01	.02	-.00	.12*	-.01	.00	.12*	.19*	.01	1.00										
TV	.01	.01	-.03	-.02	-.07	-.05	.12*	.05	.03	.40*	1.00									
PRIWX	-.32*	-.09	.45*	.07	.12*	.13*	-.15*	-.01	-.09	.01	-.06	1.00								
INFLT	-.15*	.06	.11	.24*	.16*	.15*	.03	.08	.12*	.25*	.10	.07	1 00							
TWEB	.00	.09	-.10	.13*	-.03	.01	.25*	.22*	.11*	.29*	.15*	.01	.30*	1.00						
NIWAS	-.15*	-.01	.17*	.21*	.12*	.16*	.08	.18*	.12*	.14*	.02	.18*	.31*	.39*	1.00					
EFAS	-.02	.00	.02	.20*	.12*	.12*	.08	.08	.17*	.21*	.16*	.05	.43*	.29*	.41*	1.00				
STAND	.21*	-.04	-.20*	.02	-.03	-.01	.06	-.03	.22*	.01	.00	-.20*	.11	.02	.00	.09	1.0(			
ABBRV	-.23*	.06	.20*	.17*	.04	.11	.07	.08	-.01	.06	-.02	.15*	.09	.10	.14*	.05	-.43*	1.00		
OUTLK	.04	.02	-.07	.06	-.04	-.05	.13*	.12*	-.01	.10	.03	-.03	.09	.17*	.07	.10	.03	.13*	1 00	
FAFL	-.18*	.01	.20*	.20*	.10	.08	.10	.22*	.00	.07	-.04	.16*	.14*	.07	.19*	.12*	-.03	.18*	-.01	1.00

* Correlations are statistically significant at p < .01

TABLE 13
CORRELATIONS BETWEEN VARIABLES DESCRIBING
UTILIZATION OF EFAS SERVICES
N=554

PRIVATE	1.00											
COMMERCL	-.56*	1.00										
AIRTRANS	-.51*	-.43*	1.00									
FAMILIAR	-.17*	.07	.11*	1.00								
%EFAS	.05	-.04	-.01	.14*	1.00							
ID FREQ	-.16*	.04	.13*	.16*	.07	1.00						
USE EFAS	-.02	.06	-.04	.15*	.56*	.19*	1.00					
EF 10-6	-.20*	.11*	.10	.21*	.25*	.11*	.31*	1.00				
ID POSN	-.02	.08	-.06	.10	.26*	.27*	.37*	.19*	1.00			
ID ALT	-.01	.05	-.05	.03	.22*	.17*	.32*	.13*	.68*	1.00		
DISC FRQ	-.35*	-.08	.46*	.16	.11	.15*	.11*	.28*	.11*	.18*	1.00	
SAT EFAS	.00	-.02	.02	.10	.33*	.07	.30*	.11	.20*	.14*	.14*	1.00
	PRIV	COMM	ATP	FAMIL	%EFAS	IDFRQ	USEEF	10-6	IDPSN	IDALT	D FRQ	SAT E

* Correlations are statistically significant at p < .01

TABLE 14
CORRELATIONS BETWEEN VARIABLES DESCRIBING
SATISFACTION WITH SERVICES
N=480

PRIVATE	1.00																
COMMERCL	-.57*	1.00															
AIRTRANS	-.51*	-.42*	1.00														
FAMILIAR	-.19*	.06	.14*	1.00													
SATTIME	.17*	-.01	-.18*	.06	1.00												
SATBRFR	.09	-.01	-.09	.14*	.25*	1.00											
SATEFAS	.01	-.01	-.00	.10	.11	.31*	1.00										
COURTEOUS	.03	-.06	.03	.16*	.20*	.39*	.18*	1.00									
TECH COMP	.09	-.05	-.04	.13*	.26*	.46*	.23*	.65*	1.00								
ACCURATE	.13*	-.15*	.01	.19*	.21*	.38*	.18*	.49*	.65*	1.00							
COMPLETE	.06	-.04	-.03	.20*	.23*	.43*	.16*	.53*	.61*	.67*	1.00						
SUFFICNT	.07	-.04	-.04	.19*	.25*	.47*	.21*	.49*	.61*	.66*	.76*	1.00					
TAILR BRF	.11	-.03	-.09	.14*	.27*	.43*	.09	.53*	.56*	.56*	.63*	.62*	1.00				
SAT SPEC	.09	-.05	-.05	.18*	.32*	.51*	.16*	.61*	.66*	.61*	.63*	.68*	.65*	1.00			
SAT SERV	.12*	-.05	-.08	.22*	.36*	.46*	.18*	.45*	.52*	.53*	.52*	.55*	.54*	.69*	1.00		
SAT ALL	.17*	-.01	-.17*	.10	.32*	.32*	.10	.33*	.39*	.40*	.36*	.39*	.44*	.50*	.67*	1.00	
COMPAR	-.02	.04	-.03	-.17*	-.13*	-.24*	-.08	-.23*	-.17*	-.14*	-.21*	-.20*	-.24*	-.26*	-.28*	.01	1.00
	PRI	COM	ATP	FAMIL	SATTM	SATBR	SATEF	COURT	COMPE	ACCUR	COMPL	SUFF	TAILR	SATSP	SATSV	SATAL	COMPAR

* Correlations are statistically significant at p < .01

TABLE 15
ROTATED FACTOR MATRIX

	FACT 1 SATIS	FACT 2 ATP	FACT 3 COM	FACT 4 EFAS	FACT 5 WX	FACT 6 TIME
SATIS SPECLST	.85					
COMPLETE BRF	.83					
SUFFICIENT BRF	.82					
SPEC COMPETENT	.82					
TAILOR BRIEF	.78					
ACCURATE BRF	.78					
SATIS SERVICE	.75					
SPEC COURTEOUS	.73					
SATIS BRIEFERS	.66					
SATIS ALL FSS	.57					-.36
COMPARE AFSS	-.31					
SINGL ENG UNPR		-.72				
JET AIRCRAFT		.67	.33			
DISCRETE FREQ		.63				
IFR COMMERCL		.60	.57			
PRIVATE WX		.60				
VFR PLEAS		-.59				
VFR PERS BUS		-.54				.33
IFR PLEAS		-.47				
IFR RATING			.67			
PILOT CERTIF		.49	.66			
VFR COMMERC			.61			
TURBO-PROP AC			.60			
MULTI-ENG UNP			.53			
MULTI-ENG PR			.53			
FAMILIAR			.39			
IDENT POSN				.69		
% USE EFAS				.66		
IDENT ALT				.66		
EFAS PRIMARY				.62	.32	
SAT EFAS				.50		
USE INFLIGHT				.43	.34	.30
EFAS 10-6				.38		
STANDARD BRF				.36		
USE TWEB					.66	
USE IVRS					.59	
USE TIBS					.56	
USE HIWAS				.37	.48	
OUTLOOK BRF					.43	
AM WX TV SHOW					.42	
ABBREV BRF			.33		.37	
FAST FILE			.31		.35	
TIME SIGN WX						.72
TIME NONS WX						.69
SAT TIME BRFR	.31					-.63
IFR PERS BUS		-.36				.39

Factor analysis of responses. While examining correlations between individual variables is useful, it is difficult to determine relationships between multiple variables. After completing the correlational analyses, a principal components analysis using a Varimax rotation was performed as an exploratory analysis. Principal components analysis is one method of identifying a small number of common factors which represent interrelationships between a large number of variables.

The principal components analysis used the items included in the survey to identify factors which describe common aspects of different sets of items. The analysis was based upon the responses of 407 pilots: items 37, 38, 40, and 41 (items dealing with satisfaction with specific services provided), and item 50 (confidence that a filed flight plan will be handled correctly) were excluded from the analysis because a considerable number of pilots did not provide ratings of satisfaction as they did not use the services. A screen test was used to identify a 6-factor solution, which accounted for 43.9% of the common variance in the responses. The results are displayed in Table 15. Loadings less than .3 were deleted from the table. Loadings shown in the table represent the correlations between each variable and each factor. The description of each factor is thus dependent on the common aspects of the variables that have high (positive or negative) correlations with that factor.

The first factor appears to represent user satisfaction with Montgomery County's services. The item that loads highest on the first factor assesses the extent to which the respondent is generally satisfied with the performance of the Montgomery County AFSS specialists. Other high-loading items deal with the perceived sufficiency, accuracy, completeness of the weather briefings, whether the briefings are tailored to the user's needs, the perceived technical competence and courtesy of the briefers, the satisfaction with Montgomery County AFSS's weather briefers and services, and general satisfaction with all AFSSs. Satisfaction with the time required to reach a pilot weather briefer loaded moderately on the first factor. The item comparing Montgomery County's services with those provided by other AFSSs had a moderate negative loading on this factor.

The second factor appears to be defined by responses describing airline transport pilots. The items with the highest loadings on this factor are the number of hours spent flying jet aircraft, use of the discrete High Altitude EFAS frequency, number of hours spent making IFR commercial flights, use of a private company as a primary weather source, and type of pilot. Items having high negative loadings on this factor included flying single-engine unpressurized aircraft, flying VFR for personal business or for pleasure, and flying IFR for pleasure. The amount of time spent flying IFR for personal business had a moderate negative loading on this factor.

The third factor appears to be defined by elements associated with commercial pilots. The items having the highest loadings on this factor include: having an IFR rating; the type of pilot; making VFR commercial flights; flying multi-engine pressurized or unpressurized aircraft or turbocharged aircraft; and number of hours spent making IFR commercial flights. Items with moderate to low loadings include familiarity with AFSS services, the amount of time spent flying jet aircraft, requesting an abbreviated briefing, and use of the Fast File system.

The fourth factor appears to be related to the use of the EFAS. The items with highest positive loadings on this factor include: the percentage of flights on which the pilot uses EFAS; use of the EFAS as a primary weather source; whether or not the pilot identifies the position and altitude when contacting EFAS; satisfaction with EFAS; and use of an inflight specialist as a primary weather source. Items with low to moderate positive loadings include use of the EFAS between 10:00 p.m. and 6:00 a.m., requesting a standard pilot briefing, and using the HIWAS as a primary weather source.

The fifth factor appears to be related to use of multiple sources to obtain weather information. The items with the highest loadings are use of the TWEB, the IVRS, the TIBS, and the HiWAS. Items with low to moderate positive loadings included using AM Weather as a primary weather source, requesting abbreviated and outlook briefings, use of EFAS and an inflight specialist as primary weather sources, and use of the Fast File.

The sixth factor is defined by the items dealing with the amount of time it takes to contact a pilot briefer, both during periods of "nonsignificant" and "significant" weather. Satisfaction with the amount of time required to contact a briefer has a high negative loading on this factor. Other items having low to moderate positive loadings were use of an inflight specialist as a primary weather source and flying VFR and IFR for personal business. The item rating pilot satisfaction with the services provided by all AFSSs had a moderate negative loading on this factor.

Item 10, hours flown on a single engine pressurized or turbocharged aircraft; item 20, use of a preflight specialist as a primary weather source; item 22, use of television, radio, or newspaper reports as primary weather sources; and item 31, identifying the frequency when contacting an inflight specialist, did not have any loadings greater than .3 on any factor.

Regression analyses. While the factor analysis yielded some interesting results, it is necessary to conduct additional analyses to determine the variables predicting satisfaction with the services provided by the Montgomery County AFSS. Several regression analyses were performed. The analyses were conducted separately for private, commercial, and airline transport pilots to determine if different factors predicted satisfaction for pilots with different levels of experience and different flying requirements. The purpose of the regression analysis was to identify a small number of items, or predictors, which sufficiently predict or account for the variance in the pilots' satisfaction ratings, the dependent variables. Identification of such a set of items can inform the facility about which factors affect pilots' satisfaction with the services provided.

Three dependent variables were used for the first set of regression analyses. These were pilots' ratings of 1) satisfaction with the performance of Montgomery County AFSS specialists (item 51), 2) general satisfaction with the services provided by Montgomery County AFSS (item 53), and 3) general satisfaction with the services provided by all FAA's AFSSs (item 54). Because relatively few pilots in each group answered all the questions on the survey, a subset of items was chosen to be the predictors for the regression analyses which used the three dependent variables mentioned above. These included three variables which combined information from items describing the pilot's rating and amount of time spent making VFR or IFR flights over the last 6 months; items 20, 21, 23, 24, and 26 regarding the type of services used as a primary weather source; items 28 and 29 regarding the type of briefing requested; items 32, 33, 36, and 42 regarding the use of and satisfaction with the EFAS; item 43, regarding use of the Fast File system; items 44-49, regarding the perceived competence of specialists and adequacy of briefings provided; and items 15-17, regarding the perceived time to contact a pilot briefer and satisfaction with that amount of time.

Tables 16-19 show the results of the stepwise regression analyses. The multiple R is the correlation between the combination of items entered at each step of the stepwise regression analysis and the dependent variable. R^2 is the square of the multiple correlation, and reflects the percentage of variance in the dependent variable that is accounted for by the combination of independent or predictor variables. R^2 change is the change in the percentage of variance accounted for which resulted from adding an additional

variable to the set of predictors. Betas are the standardized regression coefficients which reflect the relative importance of the independent variables in predicting the dependent variable, in the presence of the other independent variables. The partial correlation is the correlation between each independent variable and the dependent variable when the effects of the other independent variables have been removed. This statistic provides an estimate of the relative importance of the independent variables in isolation in predicting the dependent variable.

Table 16 shows the results of the analysis using item 51, satisfaction with the performance of Montgomery County AFSS specialists, as a dependent variable. For all three groups of pilots, ratings on items 45, 48, and 49 (To what extent do you feel that Montgomery County briefers [45] appear to be technically competent, [48] provide you with a weather briefing that is sufficient to allow you to plan your flight, [49] tailor their weather briefings to meet your specific needs) predicted satisfaction with the specialists. For private pilots, item 23 (use of a private weather company as a primary weather source) was inversely related to satisfaction with Montgomery County specialists.

TABLE 16
REGRESSION ANALYSES PREDICTING PILOT SATISFACTION
DEPENDENT VARIABLE 1: SATISFACTION WITH MONTGOMERY COUNTY SPECIALISTS

PRIVATE PILOTS (N=195)

Step	Item #	Multiple R	R^2	R^2 change	Beta	Partial Correlation
1	48	.67	.45	.45	.29	.31
2	45	.75	.57	.12	.33	.39
3	49	.78	.60	.03	.29	.31
4	23	.79	.61	.01	-.12	-.20

COMMERCIAL PILOTS (N=150)

Step	Item #	Multiple R	R^2	R^2 change	Beta	Partial Correlation
1	48	.74	.55	.55	.40	.41
2	45	.79	.62	.07	.26	.30
3	49	.81	.65	.03	.25	.29

AIRLINE TRANSPORT PILOTS (N=122)

Step	Item #	Multiple R	R^2	R^2 change	Beta	Partial Correlation
1	49	.64	.41	.41	.37	.41
2	48	.72	.52	.11	.29	.32
3	45	.75	.56	.04	.24	.27

Table 17 shows the results of the analysis using item 53, general satisfaction with the services provided by Montgomery County AFSS, as a dependent variable. For all three groups of pilots, ratings on item 17, satisfaction with the amount of time required to contact a pilot briefer, was predictive of satisfaction with the services provided by the facility. However, each type of pilot differed in the other variables which predicted satisfaction. For private pilots, the perceived technical competence of the briefers and the degree to which briefers tailored their briefings to the needs of the pilot also predicted satisfaction. For commercial pilots, the extent to which briefers provided a briefing that was sufficient to plan the flight and the perceived technical competence of the briefers also predicted satisfaction. For airline transport pilots, the accuracy of the briefings and the degree to which briefers tailored their briefings to the needs of the pilot also predicted satisfaction.

TABLE 17
REGRESSION ANALYSES PREDICTING PILOT SATISFACTION
DEPENDENT VARIABLE 2: GENERAL SATISFACTION WITH SERVICES
PROVIDED BY MONTGOMERY COUNTY AFSS

PRIVATE PILOTS (N=195)

Step	Item #	Multiple R	R^2	R^2 change	Beta	Partial Correlation
1	45	.58	.34	.34	.42	.41
2	49	.62	.39	.05	.24	.25
3	17	.64	.41	.02	.16	.20

COMMERCIAL PILOTS (N=150)

Step	Item #	Multiple R	R^2	R^2 change	Beta	Partial Correlation
1	48	.63	.40	.40	.33	.33
2	17	.68	.47	.07	.26	.33
3	45	.72	.52	.05	.32	.32

AIRLINE TRANSPORT PILOTS (N=122)

Step	Item #	Multiple R	R^2	R^2 change	Beta	Partial Correlation
1	49	.52	.27	.27	.25	.27
2	46	.60	.36	.09	.35	.38
3	17	.66	.44	.08	.30	.35

Table 18 shows the results of the analysis using item 54, general satisfaction with the services provided by all FAA's AFSSs, as a dependent variable. For all three groups of pilots, ratings on item 49, the extent to which briefers tailored their briefings to the needs of the pilot, were predictive of satisfaction with all AFSSs. For private pilots, the amount of time required to contact a pilot briefer during times of "significant" weather was inversely related to satisfaction (suggesting that the less time they perceived was required to contact a pilot weather briefer, the more likely they were to be satisfied with services provided by all AFSSs), and item 45, the perceived technical competence of the briefers, was positively related to satisfaction. For commercial pilots, the perceived accuracy of the briefings was the only other item found to be predictive of satisfaction with all AFSSs. For airline transport pilots, the amount of time required to contact a pilot briefer during times of "significant" weather was the only other item found to be related to satisfaction, and its relationship was inverse.

TABLE 18
REGRESSION ANALYSES PREDICTING PILOT SATISFACTION
DEPENDENT VARIABLE 3: GENERAL SATISFACTION WITH SERVICES
PROVIDED BY ALL FAA'S AFSSs

PRIVATE PILOTS (N=195)

Step	Item #	Multiple R	R^2	R^2 change	Beta	Partial Correlation
1	45	.43	.19	.19	.28	.27
2	16	.49	.24	.05	-.21	-.24
3	49	.53	.28	.04	.25	.23

COMMERCIAL PILOTS (N=150)

Step	Item #	Multiple R	R^2	R^2 change	Beta	Partial Correlation
1	49	.51	.26	.26	.35	.34
2	46	.56	.31	.05	.28	.27

AIRLINE TRANSPORT PILOTS (N=122)

Step	Item #	Multiple R	R^2	R^2 change	Beta	Partial Correlation
1	16	.43	.19	.19	-.38	-.41
2	49	.53	.28	.09	.31	.33

Table 19 shows the results of another regression analysis conducted using item 42, satisfaction with EFAS, as a dependent variable. This analysis utilized a different set of predictor variables: 3 items about the pilot's rating and type of flights made over the last 6 months; items 20, 21, 23, 24, and 26, regarding the type of services used as a primary weather source; items 28 and 29, regarding the type of briefing requested; items 31, 32, 33, 34, 35, and 36, regarding the use of the EFAS; item 43, regarding use of the Fast File system; items 44-49, regarding the perceived competence of specialists and adequacy of briefings provided; and items 15-17, regarding the perceived time to contact a pilot briefer and satisfaction with that amount of time.

Results of the regression analyses suggested that the same items predicted satisfaction with EFAS for both private and commercial pilots, but a different set of items was predictive for airline transport pilots. For both private and commercial pilots, items 32 (on what percent of your flights do you use the EFAS) and item 45 (the extent to which Montgomery County AFSS specialists appear technically competent) were sufficient to predict satisfaction with the EFAS. For airline transport pilots, item 34 (on what percent of your flights do you identify your position upon contacting EFAS), item 36 (on what percent of your flights do you use the discrete High Altitude EFAS frequency), and item 48 (to what extent do you feel that Montgomery County AFSS specialists provide you with a weather briefing that is sufficient to allow you to plan your flight) were sufficient to predict satisfaction with EFAS.

TABLE 19
REGRESSION ANALYSES PREDICTING PILOT SATISFACTION
DEPENDENT VARIABLE 4: SATISFACTION WITH EFAS

PRIVATE PILOTS (N=183)

Step	Item #	Multiple R	R^2	R^2 change	Beta	Partial Correlation
1	32	.23	.05	.05	.25	.25
2	45	.33	.11	.06	.23	.24

COMMERCIAL PILOTS (N=149)

Step	Item #	Multiple R	R^2	R^2 change	Beta	Partial Correlation
1	32	.41	.17	.17	.40	.41
2	45	.47	.22	.05	.24	.26

AIRLINE TRANSPORT PILOTS (N=118)

Step	Item #	Multiple R	R^2	R^2 change	Beta	Partial Correlation
1	34	.31	.10	.10	.28	.29
2	48	.44	.19	.09	.30	.32
3	36	.49	.24	.05	.22	.24

For these regression analyses, examination of the multiple correlations and squared multiple correlations shows that the dependent variable predicted best by the other questions on the survey was "satisfaction with the performance of the briefers" (Table 16); next was "satisfaction with the services provided by Montgomery County AFSS" (Table 17). The effectiveness of the prediction is assessed by examining the squared multiple correlations, which measure the proportion of variance in the dependent variable accounted for by the predictors. Because of the magnitude of the squared multiple correlations, it is apparent that the items on the survey did not predict satisfaction with the services provided by all AFSSs as well as they predicted satisfaction with Montgomery County's services. However, this result is expected, because the items specifically addressed Montgomery County's operations and not the operations of other AFSSs. Furthermore, prediction of satisfaction with EFAS was relatively inefficient; apparently, factors other than those measured by the items in the survey also affected pilots' satisfaction with EFAS.

Pilot comments

Two hundred and ninety-three pilots submitted comment sheets with their response sheets. From these, 548 different comments were coded from the written materials submitted by the respondents. Student pilot comments were eliminated from the statistical analysis of the comment categorizations because, as mentioned earlier, the student pilots' responses could not be generalized to the population of student pilots. One hundred and fifty-four (28%) of the comments were neutral, 190 (35%) were positive, and 204 (37%) were negative.

Table 20 shows the number and percentage of positive, negative, and neutral comments made by type of pilot certificate held. Individual chi square statistics were computed to compare the proportions of positive and negative comments made by each type of pilot. The only significant difference revealed by the analyses was that private pilots were significantly more likely to make positive comments than were airline transport pilots ($X^2(1) = 18.2$, $p < .001$).

TABLE 20
TYPE OF COMMENT BY PILOT CERTIFICATE

	MOST ADVANCED CERTIFICATE HELD					
	PRIVATE PILOT		COMMERCIAL PILOT		AIRLINE TRANSPORT PILOT	
	N	%	N	%	N	%
TYPE OF COMMENT						
NEUTRAL	44	24.0%	52	31.7%	44	26.5%
POSITIVE	82	44.8%	51	31.1%	40	24.1%
NEGATIVE	57	31.1%	61	37.2%	82	49.4%

Appendix K shows the number and percentage of specific types of comments made by pilots holding each type of certificate. No additional analyses were conducted to compare the types of comments made by each type of pilot. To assist the reader in appreciating the types of comments made by the pilots, Appendix L contains several "typical" examples for each category of comments.

Relationship between comments and satisfaction. Statistical analyses were conducted to assess the relationship between the type of comments made by pilots and the level of satisfaction they expressed with different aspects of the performance of the Montgomery County and other AFSSs. The percentage of positive, negative, and neutral comments, as compared with the total number of comments provided, was computed. A Spearman rho correlation coefficient was then computed between this number and each pilot's response to items 51, 53, 54, and 55, which dealt with satisfaction with various aspects of AFSS performance. (Note that while low numbers reflect low levels of satisfaction for items 51, 53, and 54, low numbers reflect high levels of satisfaction for item 55. This explains the difference in signs for some of the correlation coefficients.) The results for each group of pilots are shown in Tables 21-23.

For each type of pilot, the percentage of negative comments had a significant negative correlation with the degree to which they were satisfied with the services provided by the Montgomery County and other AFSSs. For private and commercial pilots, the percentage of negative comments was also significantly related to their rating of the Montgomery County AFSS as compared with other AFSSs, but the relationship was not statistically significant for airline transport pilots.

For airline transport pilots, the percentage of positive comments made was positively correlated with their satisfaction with Montgomery County and other AFSSs. The percentage of commercial pilots' positive

comments was only correlated with their satisfaction with Montgomery County AFSS specialists, and the services provided by all AFSSs, while the percentage of private pilots' positive comments was only significantly correlated with their satisfaction with all AFSSs. For no group of pilots was the percentage of positive comments significantly correlated with their rating of Montgomery County AFSS as compared with other AFSSs.

The percentage of neutral comments made had a significant positive correlation with private and commercial pilots' satisfaction with the services provided by Montgomery County, but not other AFSSs, and with their rating of the services provided by Montgomery County AFSS as compared with other AFSSs. However, the percentage of neutral comments made by airline transport pilots was not statistically related to their satisfaction with AFSS services.

TABLE 21
CORRELATIONS BETWEEN TYPE OF COMMENTS
AND PILOT SATISFACTION
FOR PRIVATE PILOTS

	ITEM NUMBER			
TYPE OF COMMENTS	51	53	54	55
PERCENT POSITIVE	-.12	.06	.27*	.12
PERCENT NEGATIVE	-.29*	-.40*	-.42*	.31*
PERCENT NEUTRAL	.40*	.33*	.22	-.42

* Statistically significant at $p <= .01$

TABLE 22
CORRELATIONS BETWEEN TYPE OF COMMENTS
AND PILOT SATISFACTION
FOR COMMERCIAL PILOTS

	ITEM NUMBER			
TYPE OF COMMENTS	51	53	54	55
PERCENT POSITIVE	.33*	.21	.30*	.00
PERCENT NEGATIVE	-.53*	-.46*	-.45*	.29*
PERCENT NEUTRAL	.31*	.34*	.24	-.40*

* Statistically significant at $p <= .01$

TABLE 23
CORRELATIONS BETWEEN TYPE OF COMMENTS
AND PILOT SATISFACTION
FOR AIRLINE TRANSPORT PILOTS

	ITEM NUMBER			
TYPE OF COMMENTS	51	53	54	55
PERCENT POSITIVE	.46*	.44*	.25	-.07
PERCENT NEGATIVE	-.40*	-.40*	-.36*	.06
PERCENT NEUTRAL	-.06	-.00	.19	-.05

* Statistically significant at $p <= .01$

DISCUSSION AND CONCLUSIONS

The results of this survey provide important information to the Montgomery County AFSS to allow them to target their activities toward increasing user familiarity with their services, and improving services that pilots perceive to be deficient. These results should also be noted by FAA management officials in Washington Headquarters who are interested in assessing user satisfaction with FAA services. While these results can only be generalized to one specific AFSS, the areas of dissatisfaction and concerns expressed may be applicable to other AFSSs.

This project identified a number of ways in which this survey should be improved if it were to be used to assess pilot satisfaction with AFSS services on a national level. First, the lack of response of student pilots to the survey is of concern. Student pilots comprise the segment of the pilot population likely to be least familiar with AFSS services. Their identification of problem areas could provide valuable feedback to aid AFSS facilities in improving or better describing their services. Future efforts to survey pilots should identify other ways to contact pilots than using the Airmen Directory file. Second, a future survey should expand the section on the use of private weather services to identify what type of private services are preferred by pilots. Use of and satisfaction with DUAT should also be addressed by a future survey. Third, questions on a future survey should be revised in light of problems experienced with the present survey. For example, the questions dealing with use of specific services as a "primary weather source" should be revised to address the percentage of flights for which the services are used. The sections dealing with number of hours during which specific types of flights were made and specific types of aircraft were flown could be compressed.

The results of this survey suggest that pilots appear to be very satisfied with the performance of the specialists at the Montgomery County AFSS, and slightly less satisfied with the services provided by the facility. More pilots were satisfied with the services provided by Montgomery County AFSS than were satisfied with the services provided by other AFSSs. Private pilots were more satisfied with most of the specific services provided, and were more likely to make positive comments about the services, than were airline transport pilots.

Private pilots were less familiar with the services provided than were other types of pilots. However, most pilots, regardless of familiarity, expressed an interest in learning more about the services provided by the facility. Over 60% expressed an interest in receiving information by mail, another 12% indicated an interest in meeting to discuss optimal utilization of the AFSS system, and another 10% expressed interest in taking a tour of the facility. Facility actions to increase awareness of services provided, as well as system limitations, can only serve to improve communications between pilots and AFSS specialists.

The satisfaction levels reported by respondents to this survey compare very favorably with those of another survey of users of the services provided by FAA Airworthiness Inspectors (Schroeder, Collins, and Dollar, 1987). While 96% of the private, commercial, and airline transport pilots responding to this survey were moderately to greatly satisfied with the performance of Montgomery County AFSS specialists, only about 83% of the users in the aforementioned survey were similarly satisfied with the performance of their assigned airworthiness inspectors. In fact, the 96% level of satisfaction exceeds reported satisfaction levels of users with the performance of the following types of professionals, for example, veterinarians (91%), income tax preparers (88%), medical doctors and nurses in offices or homes (81%), and lawyers (79%) (Day and Bodur, 1977).

The analyses conducted using pilots' responses to the survey showed that ratings of satisfaction with both the Montgomery County AFSS specialists and the services provided by the facility could be predicted by responses to items dealing with the specialists' perceived technical competence, the perceived sufficiency and accuracy of the weather briefings, and the degree to which the briefer tailored the briefing to fit the needs of the pilot. Thus, the pilots' perceptions of how the briefers do their jobs is very important in affecting their ratings of satisfaction with the services provided. While the survey did not address specific aspects of briefer performance, an examination of the comments may provide examples of specific incidents that may influence a pilot's perceptions of good or poor performance.

A significant area of dissatisfaction to pilots was the amount of time pilots perceived was required to reach a pilot briefer. Not only was their satisfaction with that amount of time correlated with their satisfaction with other services provided by the AFSS, but the amount of time that pilots reported was required to contact a pilot briefer during periods of "significant" weather was among the top three predictors (negative) of private and airline transport pilots' satisfaction with all AFSSs. A high percentage of private and airline transport pilots' negative comments also dealt with this issue. In fact, 7 pilots (5 were airline transport pilots) indicated that they were willing to go without a briefing if it took too long to contact a pilot briefer. Such comments should highlight this area as a significant safety concern that should be addressed by facility, regional, and FAA Headquarters management.

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APPENDIX A

US Department of Transportation
Federal Aviation Administration

Mike Monroney Aeronautical Center

P.O. Box 25082
Oklahoma City, Oklahoma 73125

AAM-500

Members of the Aviation Community:

In order to assure that the needs of the flying public are being met and provide you with improved services, the Montgomery County Automated Flight Service Station is seeking a better understanding of your thoughts and perceptions concerning their services. To accomplish this goal, we are asking you to complete the enclosed questionnaire, entitled "Pilot Views of Montgomery County, Texas, Automated FSS Services." This questionnaire has been approved by the Office of Management and Budget, and has been given an OMB Approval Number of 2120-0537.

You are one of a random sample of pilots selected from the 32 county flight plan area of the Montgomery County AFSS. Since only a small number of pilots will receive this survey, it is very important that you complete and return it. Your opinions will be combined with those of the others in the sample to represent the thoughts and feelings of all pilots within the Montgomery County AFSS flight plan area.

The questions in the survey cover items about your utilization and satisfaction with particular services provided by the Montgomery County AFSS, as well as your perceptions of the courtesy and competence of the facility's specialists. Your responses will assist the AFSS in meeting its safety and service objectives.

Please be assured that your responses will remain anonymous. The mailing, analysis of the results, and production of the report are being conducted by researchers at the FAA's Civil Aeromedical Institute (CAMI), not by employees of the Montgomery County AFSS. At CAMI, your responses will be machine-scored, and only summarized results--NOT INDIVIDUAL ANSWERS--will be provided back to the facility. You may notice that each answer sheet contains a code number. The number will be used to identify those who do not return their survey within 3 weeks, so that a follow-up reminder letter and another copy of the survey can be mailed to them from CAMI. After the response sheets are returned, the forms will be machine-scanned and the code number and all identifying information will be removed from the data file.

When you are ready to return the survey, please enclose only the answer sheet along with the consent sheet and the sheet requesting additional information (if you completed the last two pages). These should be mailed in the return envelope provided in the packet. Please DO NOT staple anything to the computer-scannable response sheet. You do not need to return the questionnaire to us, just the response sheets.

We need to begin analyzing the responses as soon as possible, so we are asking you to take the time to complete the survey, today if possible, and

return it in the enclosed return envelope. If we do not receive the survey within 3 weeks, we will send out a reminder letter along with another copy of the survey.

When the final report has been prepared, it will be made available to the public. We would appreciate your participation and assure you that your responses and comments will be given careful consideration.

Sincerely,

Carol A. Manning

Carol A. Manning, Ph.D.
Supervisor, Training Systems Section

OMB Approval Number 2120-0537

PILOT VIEWS OF MONTGOMERY COUNTY, TEXAS, AUTOMATED FSS SERVICES

1. What is the most advanced pilot certificate that you hold?
a. Student pilot
b. Private pilot
c. Commercial pilot
d. Airline transport pilot

2. Do you have an instrument rating?
a. No
b. Yes, for airplane
c. Yes, for rotorcraft
d. Yes, for both airplane and rotorcraft

DURING THE LAST 6 MONTHS, ABOUT HOW MANY HOURS PER MONTH DID YOU FLY:

	MORE THAN 100 HOURS	51-100 HOURS	26-50 HOURS	11-25 HOURS	5-10 HOURS	1-4 HOURS	NO HOURS
3. VFR for personal business	A	B	C	D	E	F	G
4. IFR for personal business	A	B	C	D	E	F	G
5. VFR for pleasure	A	B	C	D	E	F	G
6. IFR for pleasure	A	B	C	D	E	F	G
7. VFR commercial flights (for hire)	A	B	C	D	E	F	G
8. IFR commercial flights (for hire)	A	B	C	D	E	F	G

DURING THE LAST 6 MONTHS, ABOUT HOW MANY HOURS PER MONTH DID YOU FLY:

	MORE THAN 100 HOURS	51-100 HOURS	26-50 HOURS	11-25 HOURS	5-10 HOURS	1-4 HOURS	NO HOURS
9. Single-engine unpressurized aircraft	A	B	C	D	E	F	G
10. Single-engine pressurized or turbocharged aircraft	A	B	C	D	E	F	G
11. Multi-engine unpressurized aircraft	A	B	C	D	E	F	G
12. Multi-engine pressurized or turbocharged aircraft	A	B	C	D	E	F	G
13. Turbo-prop aircraft	A	B	C	D	E	F	G
14. Jet aircraft	A	B	C	D	E	F	G

15. During periods of nonsignificant weather, when you call Montgomery County AFSS for a pilot weather briefing, about how long does it typically take before a briefer answers the telephone?

a. I do not use this service
b. less than 1 minute
c. 1-3 minutes
d. More than 3 and less than 5 minutes
e. 5 minutes or more

16. During periods of significant weather, when you call Montgomery County AFSS for a pilot weather briefing, about how long does it typically take before a briefer answers the telephone?

a. I do not use this service
b. Less than 1 minute
c. 1-3 minutes
d. More than 3 and less than 5 minutes
e. 5 minutes or more

17. How acceptable do you find the amount of time it takes for you to contact a pilot weather briefer at the Montgomery County AFSS?

a. Not at all
b. To a limited extent
c. To a moderate extent
d. To a considerable extent
e. To a great extent

ON WHAT PERCENTAGE OF YOUR FLIGHTS DO YOU USE ANY OF THE FOLLOWING AS YOUR PRIMARY WEATHER SOURCE:

	A 25% OR LESS OF MY FLIGHTS	B 26-50% OF MY FLIGHTS	C 51-75% OF MY FLIGHTS	D MORE THAN 75% OF MY FLIGHTS	E DO NOT USE
18. the Telephone Information Briefing System (TIBS)?	A	B	C	D	E
19. the Interim Voice Response System (IVRS)?	A	B	C	D	E
20. an FAA Automated Flight Service Station (AFSS) preflight specialist?	A	B	C	D	E
21. the AM Weather television show on PBS?	A	B	C	D	E
22. television, radio station, or newspaper report?	A	B	C	D	E
23. a private company?	A	B	C	D	E
24. a FAA Flight Service Station (FSS) inflight specialist?	A	B	C	D	E
25. the Transcribed Weather Broadcast (TWEB) on the GLS or NDB?	A	B	C	D	E
26. the Hazardous Inflight Weather Advisory Service (HIWAS)?	A	B	C	D	E
27. En route Flight Advisory Service or "Flight Watch" (EFAS)?	A	B	C	D	E

WHEN CONTACTING A MONTGOMERY COUNTY AFSS PILOT WEATHER BRIEFER, WHAT PERCENTAGE OF THE TIME DO YOU ASK FOR:

	A 25% OR LESS OF THE TIME	B 26-50% OF THE TIME	C 51-75% OF THE TIME	D MORE THAN 75% OF THE TIME	E DO NOT USE
28. A standard pilot weather briefing?	A	B	C	D	E
29. An abbreviated weather briefing?	A	B	C	D	E
30. An outlook briefing?	A	B	C	D	E

ON WHAT PERCENTAGE OF YOUR FLIGHTS DO YOU:

	A 25% OR LESS OF THE TIME	B 26-50% OF THE TIME	C 51-75% OF THE TIME	D MORE THAN 75% OF THE TIME	E DO NOT USE
31. Identify your frequency when contacting an AFSS inflight specialist?	A	B	C	D	E
32. Use the Enroute Flight Advisory Service (EFAS)?	A	B	C	D	E
33. Use EFAS between the hours of 10:00 p.m. and 6:00 a.m. local time?	A	B	C	D	E
34. Identify your position upon contacting EFAS?	A	B	C	D	E
35. Identify your altitude upon contacting EFAS?	A	B	C	D	E
36. Use the discrete High Altitude EFAS frequency?	A	B	C	D	E

TO WHAT EXTENT ARE YOU SATISFIED WITH:

	A NOT AT ALL	B TO A LIMITED EXTENT	C TO A MODERATE EXTENT	D TO A CONSIDERABLE EXTENT	E TO A GREAT EXTENT	F HAVE NOT USED
37. the Telephone Information Briefing System (TIBS)?	A	B	C	D	E	F
38. the Interim Voice Response System (IVRS)?	A	B	C	D	E	F
39. Montgomery County FAA AFSS weather briefers?	A	B	C	D	E	F
40. the Transcribed Weather Broadcast (TWEB)?	A	B	C	D	E	F
41. the Hazardous Inflight Weather Advisory Service (HIWAS)?	A	B	C	D	E	F
42. En Route Flight Advisory Service or "Flight Watch" (EFAS)?	A	B	C	D	E	F

43. For what percentage of your flights do you use the "fast file" system to file flight plans?
(a) 25% or less
(b) 26 to 50%
(c) 51 to 75%
(d) More than 75%
(e) Have not used

TO WHAT EXTENT DO YOU FEEL THAT MONTGOMERY COUNTY AFSS SPECIALISTS:

	TO A GREAT EXTENT	TO A CONSIDERABLE EXTENT	TO A MODERATE EXTENT	TO A LIMITED EXTENT	NOT AT ALL	HAVE NOT USED
44. are courteous in the conduct of their duties?	A	B	C	D	E	F
45. appear to be technically competent in the conduct of their duties?	A	B	C	D	E	F
46. provide accurate weather briefings?	A	B	C	D	E	F
47. provide complete weather briefings?	A	B	C	D	E	F
48. provide you with a weather briefing that is sufficient to allow you to plan your flight?	A	B	C	D	E	F
49. tailor their weather briefings to meet your specific needs?	A	B	C	D	E	F

TO WHAT EXTENT ARE YOU:

	TO A GREAT EXTENT	TO A CONSIDERABLE EXTENT	TO A MODERATE EXTENT	TO A LIMITED EXTENT	NOT AT ALL	HAVE NOT USED
50. confident that a flight plan that you file with Montgomery County AFSS will be handled correctly?	A	B	C	D	E	F
51. generally satisfied with the performance of Montgomery County AFSS specialists?	A	B	C	D	E	F
52. familiar with the services provided by Montgomery County AFSS specialists?	A	B	C	D	E	F
53. generally satisfied with the services provided by the Montgomery County Automated Flight Service Station?	A	B	C	D	E	F
54. generally satisfied with the services provided by all the FAA's Automated Flight Service Stations?	A	B	C	D	E	F

55. How would you rate the services provided by the Montgomery County Automated Flight Service Station as compared with other currently operating Automated Flight Service Stations that you have contacted?

a. Much better than others.
b. Somewhat better than others.
c. About the same as others.
d. Somewhat worse than others.
e. Much worse than others.

56. Would you be interested in receiving additional information on AFSS services?

a. I feel that I am already sufficiently informed about AFSS services
b. Would like to receive information by mail on the range of services provided by an AFSS.
c. Would be interested in attending a meeting on how best to utilize the AFSS system.
d. Would be interested in touring the facility.

REQUEST FOR ADDITIONAL INFORMATION

If you would be interested in receiving more information about the services provided by the Montgomery County AFSS, please circle the letter next to the response below that best describes the type of information you desire. Then write your name and address on the bottom of this page and, if appropriate, list any specific information you would like to receive. Enclose the page with your computer-scannable response sheet in the return envelope. Please DO NOT staple the pages together. This page will be separated from your response sheet and sent to employees of the Montgomery County AFSS. Those completing this page will soon be contacted by a representative of the facility.

a. Would like to receive information by mail on the range of services provided by an AFSS.
b. Would be interested in attending a meeting on how best to utilize the AFSS system.
c. Would be interested in touring the facility.

APPENDIX B

RESULTS OF CHI SQUARE ANALYSES COMPARING FREQUENCY OF FLIGHTS FOR 3 PILOT GROUPS

Item description	Comparison	X^2 (df=1)	p
VFR for personal business	PRI vs. COM	.3	> .55
	PRI vs. ATP	30.2	.001 *
	COM vs. ATP	33.3	.001 *
IFR for personal business	PRI vs. COM	33.5	.001 *
	PRI vs. ATP	3.5	.06
	COM vs. ATP	13.1	.001 *
VFR for pleasure	PRI vs. COM	23.4	.001 *
	PRI vs. ATP	132.3	.001 *
	COM vs. ATP	46.5	.001 *
IFR for pleasure	PRI vs. COM	8.5	.004 *
	PRI vs. ATP	.8	> .35
	COM vs. ATP	12.1	.001 *
VFR Commercial	COM vs. ATP	1.0	> .30
IFR Commercial	COM vs. ATP	114.2	.001 *
Single engine unpressurized	PRI vs. COM	10.8	.002 *
	PRI vs. ATP	125.3	.001 *
	COM vs. ATP	61.4	.001 *
Single engine pressurized or turbocharged	PRI vs. COM	1.4	> .20
	PRI vs. ATP	1.8	> .15
	COM vs. ATP	5.5	.02
Multi-engine unpressurized	PRI vs. COM	54.1	.001 *
	PRI vs. ATP	42.6	.001 *
	COM vs. ATP	.6	> .40
Multi-engine pressurized or turbocharged	PRI vs. COM	21.8	.001 *
	PRI vs. ATP	41.7	.001 *
	COM vs. ATP	3.8	.05
Turbo-prop	COM vs. ATP	11.4	.001 *
Jet	COM vs. ATP	147.2	.001 *

APPENDIX C

RESULTS OF CHI SQUARE ANALYSES COMPARING USE OF PARTICULAR FSS SERVICES FOR 3 PILOT GROUPS

USED VS. DIDN'T USE

Item description	Comparison	X^2 (df=1)	p
TIBS	PRI vs. COM	.7	> .35
	PRI vs. ATP	34.2	.001 *
	COM vs. ATP	22.9	.001 *
IVRS	PRI vs. COM	5.1	.03
	PRI vs. ATP	1.6	> .20
	COM vs. ATP	10.7	.001 *
AFSS Preflight specialist	PRI vs. COM	2.7	> .10
	PRI vs. ATP	14.3	.001 *
	COM vs. ATP	4.3	.04
AM Weather show	PRI vs. COM	3.8	> .05
	PRI vs. ATP	.2	> .65
	COM vs. ATP	2.0	> .15
TV, radio, etc.	PRI vs. COM	1.5	> .20
	PRI vs. ATP	1.6	> .20
	COM vs. ATP	5.3	> .02
Private weather service	PRI vs. COM	13.6	.001 *
	PRI vs. ATP	116.9	.001 *
	COM vs. ATP	49.6	.001 *
AFSS Inflight specialist	PRI vs. COM	4.7	.03
	PRI vs. ATP	.7	> .40
	COM vs. ATP	1.6	> .20
TWEB	PRI vs. COM	1.3	> .25
	PRI vs. ATP	.3	> .60
	COM vs. ATP	2.3	> .10
HIWAS	PRI vs. COM	8.1	.005 *
	PRI vs. ATP	36.8	.001 *
	COM vs. ATP	10.1	.002 *
EFAS	PRI vs. COM	.5	> .45
	PRI vs. ATP	4.4	.04
	COM vs. ATP	1.8	> .15

APPENDIX D

RESULTS OF CHI SQUARE ANALYSES COMPARING FREQUENCY OF USE OF PARTICULAR FSS SERVICES FOR 3 PILOT GROUPS

USED MORE OR LESS THAN 50% OF THE TIME

Item description	Comparison	X^2 (df=1)	p
TIBS	PRI vs. COM	9.8	.002 *
	PRI vs. ATP	15.6	.001 *
	COM vs. ATP	1.8	>.15
IVRS	PRI vs. COM	.5	>.45
	PRI vs. ATP	.0	>.90
	COM vs. ATP	.4	>.50
AFSS Preflight specialist	PRI vs. COM	.0	>.90
	PRI vs. ATP	.5	>.45
	COM vs. ATP	.3	>.55
AM Weather show	PRI vs. COM	3.6	.06
	PRI vs. ATP	5.2	.03
	COM vs. ATP	.2	>.60
TV, radio, etc.	PRI vs. COM	.8	>.35
	PRI vs. ATP	3.3	.07
	COM vs. ATP	1.0	>.30
Private weather service	PRI vs. COM	11.1	.001 *
	PRI vs. ATP	45.6	.001 *
	COM vs. ATP	15.3	.001 *
AFSS Inflight specialist	PRI vs. COM	.3	>.55
	PRI vs. ATP	.3	>.60
	COM vs. ATP	.0	>.99
TWEB	PRI vs. COM	.2	>.65
	PRI vs. ATP	3.2	.08
	COM vs. ATP	1.9	>.15
HIWAS	PRI vs. COM	.0	>.90
	PRI vs. ATP	.8	>.35
	COM vs. ATP	.7	>.35
EFAS	PRI vs. COM	.1	>.70
	PRI vs. ATP	2.5	>.10
	COM vs. ATP	1.4	>.20

APPENDIX E

RESULTS OF CHI SQUARE ANALYSES COMPARING FREQUENCY OF REQUESTING DIFFERENT TYPES OF PILOT WEATHER BRIEFINGS FOR 3 PILOT GROUPS

Item description	Comparison	X^2 (df=1)	p
Standard	PRI vs. COM	6.4	.02
	PRI vs. ATP	31.2	.001 *
	COM vs. ATP	8.8	.002 *
Abbreviated	PRI vs. COM	.9	> .33
	PRI vs. ATP	.1	> .70
	COM vs. ATP	.3	> .55
Outlook	PRI vs. COM	1.1	> .25
	PRI vs. ATP	15.3	.001 *
	COM vs. ATP	7.6	.006 *

APPENDIX F

RESULTS OF CHI SQUARE ANALYSES COMPARING PERCEIVED TIME TO REACH A PILOT WEATHER BRIEFER FOR 3 PILOT GROUPS

Item description	Comparison	X^2 (df=1)	p
In "nonsignificant" weather	PRI vs. COM	1.2	>.15
	PRI vs. ATP	13.6	.001 *
	COM vs. ATP	4.5	.04
In "significant" weather	PRI vs. COM	18.9	.001 *
	PRI vs. ATP	41.6	.001 *
	COM vs. ATP	5.4	.02

APPENDIX G

RESULTS OF CHI SQUARE ANALYSES COMPARING FREQUENCY OF UTILIZING EFAS AND PROVIDING IDENTIFYING INFORMATION FOR 3 PILOT GROUPS

Item description	Comparison	X^2 (df=1)	p
Identify frequency when contact inflight specialist	PRI vs. COM	4.1	.05
	PRI vs. ATP	1.8	>.15
	COM vs. ATP	.4	>.50
Use EFAS	PRI vs. COM	.6	>.40
	PRI vs. ATP	1.6	>.20
	COM vs. ATP	.3	>.60
Use EFAS between 10:00 p.m. and 6:00 a.m.	PRI vs. COM	19.6	.001 *
	PRI vs. ATP	32.8	.001 *
	COM vs. ATP	1.9	>.15
Identify position when contact EFAS	PRI vs. COM	2.1	.15
	PRI vs. ATP	.7	>.40
	COM vs. ATP	.3	>.55
Identify altitude when contact EFAS	PRI vs. COM	1.1	>.25
	PRI vs. ATP	.5	>.45
	COM vs. ATP	.1	>.75
Use discrete High Altitude EFAS Frequency	PRI vs. COM	26.1	.001 *
	PRI vs. ATP	151.8	.001 *
	COM vs. ATP	55.1	.001 *
Use Fast File	PRI vs. COM	6.7	.01*
	PRI vs. ATP	12.6	.001*
	COM vs. ATP	.9	>.30

APPENDIX H

RESULTS OF CHI SQUARE ANALYSES COMPARING REPORTED SATISFACTION WITH SPECIFIC AFSS SERVICES FOR 3 PILOT GROUPS

Item description	Comparison	X^2 (df=1)	p
Time to reach pilot weather briefer	PRI vs. COM	14.1	.001 *
	PRI vs. ATP	30.9	.001 *
	COM vs. ATP	3.5	.07
TIBS	PRI vs. COM	.9	>.30
	PRI vs. ATP	12.4	.001 *
	COM vs. ATP	5.9	.02
IVRS	PRI vs. COM	.2	>.60
	PRI vs. ATP	7.6	.006 *
	COM vs. ATP	5.2	.03
Montgomery County AFSS weather briefers	PRI vs. COM	3.6	.06
	PRI vs. ATP	7.3	.007 *
	COM vs. ATP	.7	>.40
TWEB	PRI vs. COM	.4	>.50
	PRI vs. ATP	7.6	.006 *
	COM vs. ATP	4.2	.04
HIWAS	PRI vs. COM	.0	>.95
	PRI vs. ATP	.7	>.40
	COM vs. ATP	.6	>.40
EFAS	PRI vs. COM	.2	>.60
	PRI vs. ATP	.1	>.70
	COM vs. ATP	.6	>.40

APPENDIX I

RESULTS OF CHI SQUARE ANALYSES COMPARING REPORTED SATISFACTION WITH SPECIALIST PERFORMANCE FOR 3 PILOT GROUPS

To what extent do you feel that Montgomery County AFSS specialists:

Item description	Comparison	X^2 (df=1)	p
are courteous	PRI vs. COM	.6	>.45
	PRI vs. ATP	1.0	>.30
	COM vs. ATP	.1	>.80
appear technically competent	PRI vs. COM	6.1	.02
	PRI vs. ATP	1.0	>.30
	COM vs. ATP	1.6	>.20
provide accurate weather briefings	PRI vs. COM	2.7	.10
	PRI vs. ATP	3.0	.10
	COM vs. ATP	.0	>.85
provide complete weather briefings	PRI vs. COM	.0	>.90
	PRI vs. ATP	1.4	>.20
	COM vs. ATP	1.4	>.20
provide sufficient weather briefings to plan flight	PRI vs. COM	.2	>.65
	PRI vs. ATP	3.1	.08
	COM vs. ATP	3.9	.05
tailor weather briefings to meet specific needs	PRI vs. COM	4.0	.05
	PRI vs. ATP	4.3	.04
	COM vs. ATP	.0	>.85

APPENDIX J

RESULTS OF CHI SQUARE ANALYSES COMPARING REPORTED SATISFACTION WITH MONTGOMERY COUNTY SERVICES FOR 3 PILOT GROUPS

To what extent are you:

Item description	Comparison	X^2 (df=1)	p
confident of accurate flight plan handling?	PRI vs. COM	.2	>.60
	PRI vs. ATP	2.1	.15
	COM vs. ATP	3.2	.08
generally satisfied with specialist performance?	PRI vs. COM	1.1	>.30
	PRI vs. ATP	2.9	.09
	COM vs. ATP	.5	>.45
familiar with Montgomery County services?	PRI vs. COM	7.2	.008 *
	PRI vs. ATP	16.2	.001 *
	COM vs. ATP	2.3	>.10
generally satisfied with Montgomery Co. services?	PRI vs. COM	.0	>.85
	PRI vs. ATP	2.4	>.10
	COM vs. ATP	2.5	>.10
generally satisfied with all FAA's AFSS services?	PRI vs. COM	1.8	>.15
	PRI vs. ATP	12.9	.001 *
	COM vs. ATP	4.7	.03

APPENDIX K

CATEGORIZATION OF COMMENTS BY TYPE OF PILOT

	MOST ADVANCED CERTIFICATE HELD					
	PRIVATE PILOT		COMMERCIAL PILOT		AIRLINE TRANSPORT PILOT	
	N	%	N	%	N	%
NEUTRAL COMMENTS						
GENERAL INFORMATION	31	16.9%	40	24.4%	40	24.1%
SUGGESTIONS	6	3.3%	6	3.7%	3	1.8%
REQUEST MORE INFORMATION	7	3.8%	6	3.7%	1	.6%
POSITIVE COMENTS						
ABOUT THE SURVEY	5	2.7%	1	.6%	3	1.8%
ABOUT SERVICES	22	12.0%	17	10.4%	10	6.0%
COURTEOUS PERSONNEL	28	15.3%	10	6.1%	9	5.4%
COMPETENT PERSONNEL	10	5.5%	8	4.9%	7	4.2%
ACCURATE INFORMATION	12	6.6%	13	7.9%	8	4.8%
MONTGOM CO IS SUPERIOR	5	2.7%	2	1.2%	3	1.8%
NEGATIVE COMMENTS						
DISCOURTEOUS PERSONNEL	3	1.6%	4	2.4%	2	1.2%
INCOMPETENT PERSONNEL	1	.5%	3	1.8%	2	1.2%
INACCURATE INFORMATION	2	1.1%	3	1.8%	3	1.8%
BRIEFERS EDIT WEATHER	1	.5%	10	6.1%	4	2.4%
AFSS NEEDS MORE PEOPLE	2	1.1%	2	1.2%	1	.6%
COMPLAINTS ABOUT EFAS	1	.5%			1	.6%
COMPLAINTS FLT PLANS	2	1.1%	4	2.4%	11	6.6%
OTHER COMPLAINTS	3	1.6%	1	.6%	4	2.4%
POOR EQUIPMENT	4	2.2%	9	5.5%	10	6.0%
TIME TO REACH BRIEFER	11	6.0%	7	4.3%	19	11.4%
DISLIKE RECORDINGS	8	4.4%	4	2.4%	11	6.6%
MISC COMPLAINTS	13	7.1%	11	6.7%	12	7.2%
COMPLAINTS ABOUT SURVEY	4	2.2%	2	1.2%	2	1.2%
UNRELATED CRITICISMS	2	1.1%	1	.6%		

APPENDIX L

REPRESENTATIVE COMMENTS FROM SURVEY RESPONDENTS

PART 1 - NEUTRAL COMMENTS

A. GENERAL INFORMATION

1. "I am a pilot with a commercial carrier, so therefore never have the opportunity to use Montgomery County AFSS."

2. "Being a student pilot and just now starting x country flights, I am sure I have not taken advantage of all the services Montgomery County AFSS has to offer."

3. "My flying time has been limited to less than 25 hours in the last 3 years. I have used Montgomery Co. AFSS for briefings in the past. The questions answered on the sheet will be based on these briefings."

B. SUGGESTIONS

1. "Could we (pilots) have a file for name, address, home base, etc. at MCAFSS? It sure would save time for us and open telephone lines if we could say 'On file, MCAFSS, #1009."

2. "Install a FAX machine for filing flight plans!!! It works well at NASA Moffett Field (NUQ), and could probably work well for you too."

3. "A 1-800 number for weather briefings and flight plan filing could only benefit the flying community as well as the FAA."

C. REQUESTS FOR MORE INFORMATION

1. "Like every other pilot, flying to me is a continual learning process and I would enjoy learning more about F.S.S. services--"

2. "Would like to have list of 800 no's."

3. "At such time I will be interested learning more about the pilot aids available in the East Texas area."

PART 2 - POSITIVE COMMENTS

A. COMMENTS ABOUT THE SURVEY

1. "Thank you for considering pilots in your survey. We often get the feeling that we have little or no input into the very system which exists for our use. Surveys such as this are steps in the right direction."

2. "As a pilot I appreciate you asking for the pilots opinion of the services and hopefully I may be able to be more helpful on a future survey."

3. "Thank you for the chance to participate."

APPENDIX L (continued)

REPRESENTATIVE COMMENTS FROM SURVEY RESPONDENTS

PART 2 - POSITIVE COMMENTS (continued)

B. COMMENTS ABOUT SERVICES

1. "I have been pleased with the services provided by the Montgomery County AFSS and would like to thank you for your support."

2. "I do use 'Flight Watch' en route and appreciate the fast, helpful responses. I have heard many favorable comments from friends who use Montgomery Co. FSS so keep up the good work."

3. "Have found Montgomery County services to be much improved."

C. COMMENTS ABOUT PERSONNEL

1. Courteous/helpful

   a. "Most of the briefers are very helpful and knowledgeable and do a good job."

   b. "...the one time I did use them on a trip to Central America during Hurricane Gilbert last year they were very helpful and provided everything we needed."

   c. "Each time I have had the opportunity to contact the Montgomery County AFSS, I have never failed to receive courteous and prompt service."

2. Competent/professional

   a. "I find most of the specialists to be courteous and competent as well as willing to help with normal problems."

   b. "Thank you for a good job. You people provide courteous, personal, and accurate briefings. Your briefers also are very helpful in suggesting routes to avoid trouble."

   c. "Thank you for your excellent and professional assistance."

3. Provide accurate/complete information

   a. "Several times I have complimented the briefer on services and info received and manner given. So far I've always made the right decision on "go" or "no-go" based on the briefing received."

   b. "...they have provided excellent instruction to both our pilots and flight operations specialists."

   c. "Overall, the pilot briefing I receive from Montgomery County AFSS is very satisfactory for planning and conducting a flight."

APPENDIX L (continued)

REPRESENTATIVE COMMENTS FROM SURVEY RESPONDENTS

PART 2 - POSITIVE COMMENTS (continued)

D. MONTGOMERY AFSS SUPERIOR TO OTHER AFSSs

1. "I rated Montgomery County AFSS as good or better than other Automated Flight Service Stations but I rate all AFSS's as marginal compared to the old FSS that is being phased out."

2. "Montgomery County FSS briefers compare favorably with other briefers nationwide."

3. "Just moved from Texas to Minnesota. Montgomery County AFSS is far superior in services and courteous conduct."

PART 3 - NEGATIVE COMMENTS

A. COMMENTS ABOUT PERSONNEL

1. Discourteous/not helpful

   a. "Most of my flight plans involve multi-legged (2 or 3 legs) 'stopover' flight plans occasioned by the need for en route refueling stops. Some specialists will not accept a stopover flight plan when you read it off in the "DOD FLIP General Planning format", but require you to read them 2 or 3 separate flight plans. It is most helpful when you can just read straight through the required format."

   b. "However, as in each large organization, there are a few that become somewhat "testy" under pressure."

   c. "Occasionally a briefer will be unfriendly and rude. In one situation after advising 'VFR flight not recommended' he would not give any further information, would only keep saying loudly 'VFR flight not recommended.'"

2. Incompetent/nonprofessional

   a. "FSS specialists like other option ATCS seem to have little technical knowledge on aircraft characteristics and no desire to learn. I am based at CXO and except for one or two specialists I have never seen any visit the facilities on the airport (I am on the airport 6 days a week.) In briefings there seems to be too much 'CYA' feeling."

   b. "Would like to request that they go through the ranks and pick out the best diction and ask them to speak slower and more distinctly in prerecorded segments. Some talk fast and sort of 'mumble'."

   c. "Other briefers simply regurgitate NWS paper with lack of true understanding. This sometimes leads to defensiveness & insecurity."

APPENDIX L. (continued)

REPRESENTATIVE COMMENTS FROM SURVEY RESPONDENTS

PART 3 - NEGATIVE COMMENTS (continued)

A. COMMENTS ABOUT PERSONNEL (continued)

3. Briefers do not provide accurate/complete information

   a. "Have called to get weather at Montgomery Co. Airport and you couldn't give it to me. Get some windows in your bldg!"

   b. "I feel the briefers sometimes do not attempt to provide information tailored to the profile of the flight the pilot describes but tend to follow the standard briefing form (either complete or abbreviated) that provides a lot of useless information and may leave out information pertinent to the flight planned."

   c. "Please give all info on the last hour's sequence report even if the weather is CAVU. POXS want the temps, I want the dev pt, surface winds, and alt setting at the departure airport and destination without having to ask."

4. Opinionated/conservative

   a. "In general, the briefings and recommendations are obviously too conservative and as a result pilots have lost confidence in their recommendations."

   b. "The personnel providing the weather briefing should provide complete and accurate weather information concerning possibly hazardous conditions, not shading or editing the information to influence my decision."

   c. "On occasion, I have had briefers editorialize the briefing based on their personal opinions of what the weather is doing."

B. NEED MORE PEOPLE/TRAINING OF PERSONNEL

1. "I think most of your briefers need experience in actual marginal VFR flying, that is so prevalent here on the Gulf Coast."

2. "Need more briefers."

3. "Briefers are very professional, could make quicker by employing more personnel."

C. COMPLAINTS ABOUT SPECIFIC SERVICES

1. EFAS

   a. "At times, information given in PIREPS to EFAS doesn't get in the system, especially if it is contradictory to the 'approved official' forecast."

APPENDIX L (continued)

REPRESENTATIVE COMMENTS FROM SURVEY RESPONDENTS

PART 3 - NEGATIVE COMMENTS (continued)

C. COMPLAINTS ABOUT SPECIFIC SERVICES (continued)

2. Flight plan processing

   a. "Too many lost FLT/Plans."

   b. "Sometimes the second or third flight plan of a series of flight plans 'gets lost', but I understand that this may be a computer problem rather than a people problem."

   c. "About filing flight plans: Some specialists are new (slow), and sometimes flight plan does not get into system."

3. Other - TIBS, IVRS, TWEB, HIWAS

   a. "I would like to be able to get the TIBS on a 24 hr basis rather than only until 10:00 pm."

   b. "I would like to see a weather briefing for high altitude jet aircraft, that didn't include low altitude en route weather."

   c. "Access to the TIBS should be available immediately without having to listen to all the TIBS codes."

4. Poor/unusable equipment/procedures

   a. "Often while getting a clearance, the remote will go 'dead' and require additional pilot/briefer time to repeat. This happens more often than not!"

   b. "I have one major complaint with FSS and this may be a problem with all FSS not just Mont. Co AFSS. On many diff. occasions FSS has given me NOTAMS or NAV-AIDS that are out of service."

   c. "With better radar equipment I feel a better pin point of T-shwrs W/I (?) a 100 nm radius would be most helpful."

D. LENGTH OF TIME TO REACH A BRIEFER

1. "My biggest irritant with Montgomery Co. A.F.S.S. is the 3 to 5 minute wait in order to get a 'warm body' briefer."

2. "I once held 45 minutes because the phone system didn't 'roll over'. I found this out by using a second telephone to call in without hanging up the first line."

3. "Many pilots depart without proper information due to excessive delays, especially where most needed (NE)(NW)."

APPENDIX L (continued)

REPRESENTATIVE COMMENTS FROM SURVEY RESPONDENTS

PART 3 - NEGATIVE COMMENTS (continued)

E. DISLIKE OF RECORDED INSTRUCTIONS

1. "I would like to be able to enter a number on the phone and bypass the normal verbiage and go directly to a briefer."

2. "I would like to have a direct line to briefers without going through the 'touch-tone' menu."

3. "I understand that the auto services use touch tones. What about those of us who use rotary dial phones on party lines?"

F. MISCELLANEOUS COMPLAINTS ABOUT OTHER FSSs

1. "Williamsport, Pa., AFSS stands out as particularly poor when compared to FSS stations at Morgantown, W.Va.; Martinsburg, W.Va.; Lufkin, Tx.; and Crestview, Fl."

2. "Montgomery County AFSS is of a much higher quality than other AFSS. San Angelo is the worst."

3. "I find that wx & tr[illegible]e briefs are n[illegible]as complete as when they were received from FSS's prior to the creation of AFSS's."

G. UNRELATED CRITICISMS

1. Complaints about the survey

   a. "I question the validity of this statement (the following underlined in red on the cover letter) 'THE CODE NUMBER AND ALL IDENTIFYING INFORMATION WILL BE REMOVED FROM THE DATA FILE.'"

   b. "May I suggest (for future use) that the questions be stapled in the upper LH corner rather than at the left mid page. It makes it easier to flip page by page."

   c. "My comment is about the questionnaire. I believe that you are going to have many answers that are inaccurate on questions 37-42 inasmuch as "Do Not Use" is an "E" response to that point and most responding pilots will assume that to be true for them too. I caught my mistake--others may not. Next time devise the responses so this will not occur."

2. Critical statements, but unrelated to issues addressed by survey

   a. "I think the addition of windows in the AFSS (like the FSS) would be most helpful to your [illegible]pecialists."

   b. The survey you should be taking is how we all (including most ATP's and FAA personnel) feel about the most unamerican bureaucratic government action that I know of in this country; the power grab to take away our freedom and right (not just privilege) to fly..."

   c. "I feel flight instructors do not go into enough detail about the services that are provided, and as a student you do not always know what to ask for."

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