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PRELIMINARY EVALUATION OF USER TERMINALS FOR AN AUTOMATED PILOT BRIEFING SYSTEM

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FINAL REPORT

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<p>16. Abstract This report describes a preliminary evaluation of various user terminal concepts for an automated aviation pilot weather briefing and flight plan filing system. Terminals embodying differing operational concepts were used by volunteer general aviation pilots in a structured experiment consisting of a series of simulated pre-flight briefings. Four candidate terminals were intended for application as fixed, self-service stations at strategic geographic locations. Four other terminals were provided for personal use from home or office via telephone link. Each pilot experienced extensive use of one of each class of terminal in separate two-hour test sessions and manipulated or observed the operational characteristics of the other terminals for comparison purposes.</p> <p>The remote terminal concept for flight briefing by telephone was found to be a viable, acceptable means for obtaining preliminary flight weather information and filing a flight plan. Comparative performance and pilot preference scores for the candidate terminal hardware concepts were obtained.</p>			
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PREFACE

As part of the Federal Aviation Administration's program for the automation of Flight Service Stations, the present report describes preliminary evaluation of concepts for Pilot Self-Briefing Terminals for obtaining weather data and filing flight plans.

Two general types of terminals were evaluated; relatively sophisticated terminals such as might be used at a Flight Service Station, and simpler terminals such as might be used remotely by a pilot from his home or office.

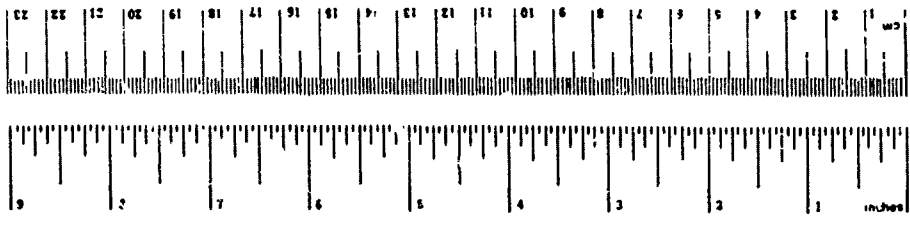
The assistance of Barbara Kolodziej in the reduction of the data is gratefully acknowledged.

This program is sponsored by the Department of Transportation through the Federal Aviation Administration, Systems Research and Development Service. The Laboratory experimentation and testing reported upon herein represents only a part of the overall FAA program to develop and evaluate pilot self-briefing concepts. In particular, subsequent field evaluations utilizing general aviation pilot participation has complemented this laboratory testing and has provided additional data concerning presentation formats and products for pilot self-briefing terminals. As such, the results presented in this report may not necessarily reflect the final conclusions concerning pilot self-briefing terminals.

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METRIC CONVERSION FACTORS

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
sq ft	square inches	6.5	square centimeters	cm ²
sq ft	square feet	0.09	square meters	m ²
sq yd	square yards	0.8	square meters	m ²
sq mi	square miles	2.6	square kilometers	km ²
acres	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	7	grams	g
lb	pounds (short tons)	0.45	kilograms	kg
		0.9	tonnes (2000 lb)	t
VOLUME				
gal	gallons	3.8	liters	l
qt	quarts	0.95	liters	l
pt	pints	0.47	liters	l
cup	cup	0.24	liters	l
fl oz	fluid ounces	29.6	milliliters	ml
oz	ounces	29.6	milliliters	ml
lb	pounds	454	milliliters	ml
TEMPERATURE (exact)				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C



Approximate Conversions from Metric Measures

When You Know	Multiply by	To Find	Symbol
LENGTH			
millimeters	0.04	inches	in
centimeters	0.4	inches	in
meters	3.3	feet	ft
kilometers	1.1	miles	mi
	0.6	miles	mi
AREA			
square centimeters	0.16	square inches	sq in
square meters	1.2	square feet	sq ft
square kilometers	0.4	square miles	sq mi
hectares (10,000 m ²)	2.5	acres	acres
MASS (weight)			
grams	0.035	ounces	oz
kilograms	2.2	pounds	lb
tonnes (1000 kg)	1.1	short tons	short tons
VOLUME			
milliliters	0.03	fluid ounces	fl oz
liters	2.1	pints	pt
liters	1.35	quarts	qt
liters	0.26	gallons	gal
cubic meters	35	cubic feet	cu ft
cubic meters	1.3	cubic yards	cu yd
TEMPERATURE (exact)			
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature

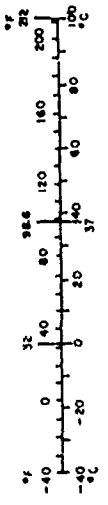


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I. INTRODUCTION

The Flight Service Station system of the Federal Aviation Administration provides a variety of services to airmen which may be grouped under three major headings: weather and NOTAM (notices to airmen) data dissemination, assistance in the filing of flight plans, and emergency assistance. The joint Office of the Secretary of Transportation/Federal Aviation Administration Flight Service Evaluation Team (FSSET), following an in-depth analysis, concluded in 1973 that the greatest improvement in service and cost reduction for the system modernization through the period projected into the mid 1980's could be obtained through automation of certain routine activities.

Functions readily amenable to automation, such as conducting pilot preflight weather briefings and filing flight plans, account for more than 50 percent of the cost of operating the entire FSS system. Pilot briefings are labor intensive, involving individualized face-to-face or telephone communications at the approximately 300 existing Flight Service Stations. Elimination or reduction of the one-to-one method of briefing through implementation of automated weather dissemination and self-briefing techniques were recommended by the FSSET.

The FSSET group emphasized the need to supply appropriate information particularly to the General Aviation community, since this group accounts for 94 percent of all pilot weather briefings. The near-term approach envisioned by the FSSET included widespread expansion and use of mass aviation weather dissemination through Transcribed Weather Broadcast (TWEB) and Pilot Automatic Telephone Weather Answering Service (PATWAS). It was also proposed that, ultimately, a broad system of automated, self-service stations should be implemented wherein pilots could obtain detailed, selected weather briefings and file flight plans through the use of Pilot Self-Briefing Terminals (PSBT) at some 2500 geographic locations.

Following this latter recommendation, a joint team of members from FAA Headquarters and NAFEC assembled a system consisting of a Tektronix 4012 terminal with storage CRT and keyboard, a Tektronix 4610 to provide hard copy printout, and a Sykes 3220 Cassette Recorder and Playback Unit for program storage. With this equipment, simulated pilot briefings were conducted at several Flight Service Stations. Here it was determined that pilot self-briefing appears to be a viable concept.

Since this original system provided nothing in the way of optional hardware configurations to permit comparative evaluation of relative pilot acceptability of possible options, the U.S. Department of Transportation/Transportation Systems Center (TSC) was asked to develop a variety of possible configurations, and to evaluate them under laboratory conditions. Furthermore, since a large proportion of briefings are presently conducted via telephone, it was determined that two broad classes of terminals should be evaluated: relatively complex terminals such as might be provided at Flight Service Stations or satellite airports, and simple terminals to permit the user to obtain a briefing from his home or office. The use of such remote terminals (RTs) would allow pilots to obtain a preliminary briefing without the necessity for travel to an airport facility equipped with a PSBT.

2. EXPERIMENTAL CONDITIONS

2.1 GENERAL APPROACH

An automated aviation weather pilot briefing system simulation facility and prototypes of a variety of potential user terminals were assembled at TSC for use by general aviation pilots in a structured evaluation to determine differences in user performance and preference. The format and content of meteorological and aeronautical data presented to the pilot subjects in the evaluation were kept constant. The briefing format was developed by the FAA and the version programmed into the TSC simulation facility was generally representative of the latest refinement of that development effort at the time of facility activation. The weather data base in the TSC simulation was a fixed sampling of existing conditions for a specific reporting period in October 1974.

A major goal of the evaluation was a comparison of the relative acceptability of PSBTs versus RTs. It was therefore necessary that each subject be exposed to and experience use of both classes of terminals. The most powerful experimental approach would have been the method of repeated measures, with all subjects experiencing the use of each candidate terminal. However, to avoid learning effects with this approach, it would have been necessary to program a different simulated flight for each experimental run. With a fixed weather data base and lack of any adequate criteria for the selection of equally difficult and demanding itineraries, the possibilities for different "trips" were extremely limited. Consequently, it was decided that each subject should be assigned to a single terminal in each class for a fully scored briefing, and then receive instruction as to the different characteristics of the others to provide a basis for subjective comparison of hardware preference.

Although a full factorial design would have made possible the measurement of all direct effects, differences in trip difficulty and order of exposure to each class of terminal, the use of such a design, or even one with partial replication was not possible within the time constraints for the experiment. The problem was further compounded by size of the available subject pool and the possibility that other candidate terminals might be added at a later date. Therefore, a simple randomized experimental design within classes was selected. Using a single travel itinerary for each class of user terminal, valid pilot performance measures may be obtained within classes and comparative acceptance measures from subjective preference scores.

All subjects were first exposed to training and use of a PSBT, followed by training and a test session with an RT. The rationale for this imposed bias was that formatted text presented visually is more comprehensible during the initial learning period than the same material presented aurally, as was necessary with certain of the remote terminals. Since the two classes of terminals are intended to be complementary rather than competitive, counter-balanced exposure was not considered necessary. Additionally, it was felt that the additional experience through exposure to textual material with a PSBT would be beneficial to RT training. A similar training protocol is likely to be a part of the ultimate system concept.

Performance measures recorded for each training and test session included total briefing time, time to input instructions and flight plan data, dwell time following data output for the assimilation of weather information, and input errors. A questionnaire was administered following each test session to obtain comparative preference and acceptance measures from the pilots. A continuous ten-point scale was used to permit the measurement of both direction and level of response.

2.2 THE SIMULATION FACILITY

The system configuration for the TSC simulation facility is shown in Figure 1. The heart of the facility was a dedicated Honeywell DDP-516, 16-bit word length, 32K core computer and CDC 9433, 3.6 million word disk storage drive linked by a direct memory access channel. Candidate user terminals were connected to the computer by direct dial-up through commercial telecommunication channels to an in-house designed telephone interface unit. Discrete dial-up numbers determined the appropriate I/O coding and format compatible with a particular terminal. Both ASCII and Bell TouchtoneTM tone codes were used. Control software was designed to accommodate only a single user at any one time. A data communication rate of 300 baud (approximately 30 characters per second) between computer and user terminals was selected to allow for subsidiary access to the facility for system demonstration via unconditioned telephone lines from remote geographic locations.

The entire available weather data base for the northeastern U.S. for October 11, 1974 at 1600 Zulu (Greenwich Mean Time) was stored in the computer, as well as control, operating, formatting, and data collection software. The weather data base was secured from the FAA, who arranged with the National Weather Service Weather Message Switching Center at Kansas City, MO, for its capture, translation, editing and storage.

Computerized voice output for remote terminal use was obtained through the use of a Sperry-Univac Voice Response System. Its 720 word plus 145 phrase vocabulary was stored on a random access, single channel disc and accessed through a Sperry-Univac 1616 computer under control from the DDP-516. Output messages were assembled from a previously recorded, digitized, stored and then reconstructed selection of relevant alpha-numerics, words and phrases (up to six seconds in length per item).

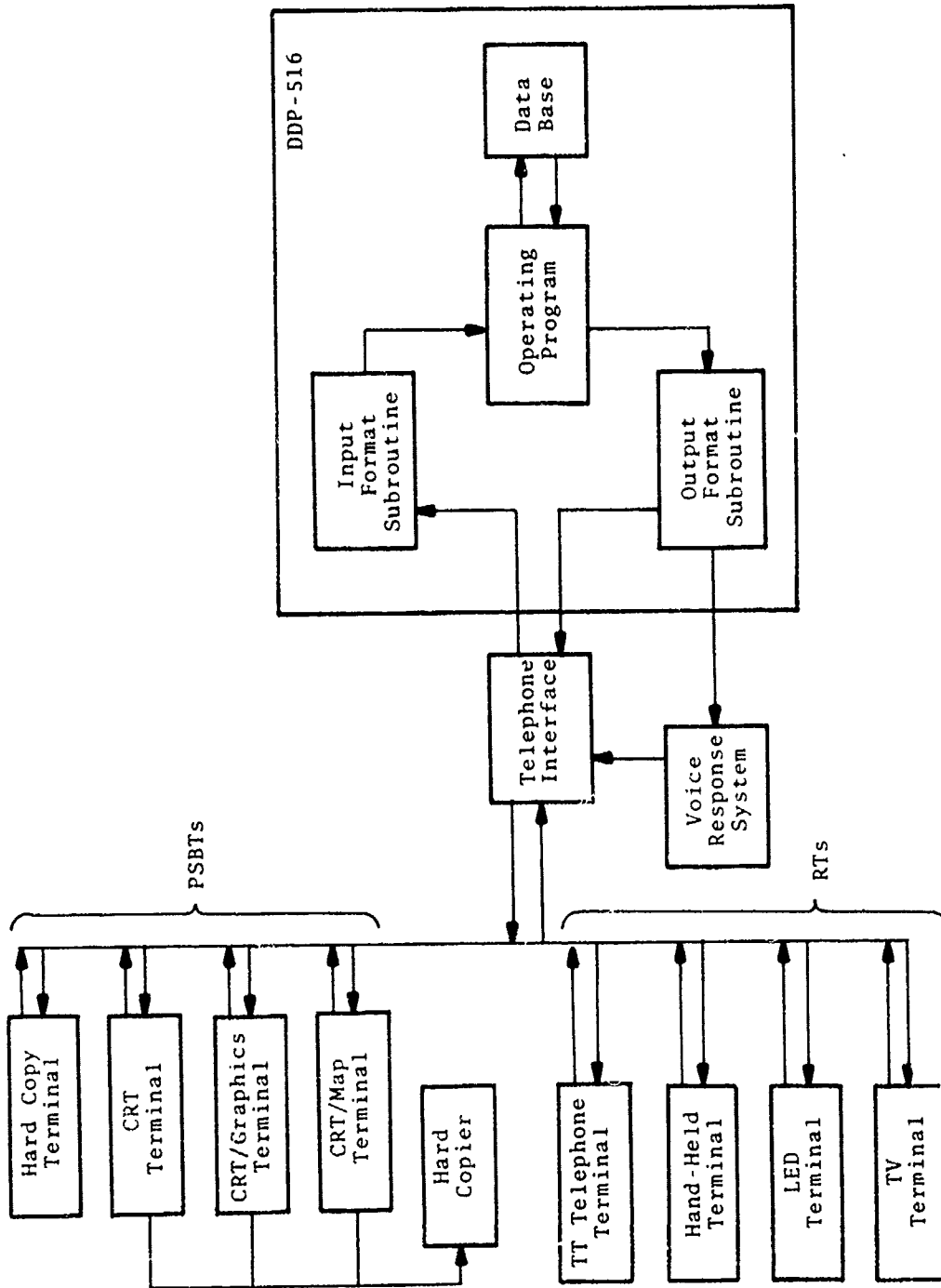


Figure 1. Terminal Evaluation Facility

2.3 TERMINALS

Terminals chosen for evaluation were intended to be demonstrative of alternative I/O characteristics available in current and projected state-of-the-art hardware, or reflecting a user/system interface concept offering a potential contribution toward system cost-effectiveness. Eight terminals were evaluated, four each for fixed (PSBT) and portable (RT) use.

2.3.1 Pilot Self-Briefing Terminals

The terminals selected for PSBT evaluation permitted study of general purpose versus dedicated keyboards, interactive versus burst input, requirements and preferences for hard versus soft copy and for graphic versus textual presentation of information. The individual terminals are described more completely below.

2.3.1.1 CRT Terminal - The CRT Terminal consisted of a pedestal mounted, general purpose, off-the-shelf Tektronix 4012 computer terminal, with an ASCII coded, standard typewriter keyboard, as indicated in Figure 2. The 11-inch bistable cathode ray tube display permitted the presentation of 35 lines of 74 characters each. Beside it was a Tektronix 4631 thermal hard copy printer for optional use, providing 8 1/2 by 11-inch copy. Connection to the computer was via an Omnitec 701B acoustic telephone coupler.

2.3.1.2 Graphics - Graphics capability could be added to the system described above by incorporating a Tektronix 4921 local flexible disc memory. Provision for local storage and transmission of graphic material (weather maps) was necessary because information requirements for vector drawing of pictorial material are much more extensive than for alpha-numeric. By operating locally at 6400 baud, weather maps having the desired detail and stored in flexible disc memory could be drawn in less than 20 seconds as compared with seven minutes at a 300 baud line rate from the central computer.

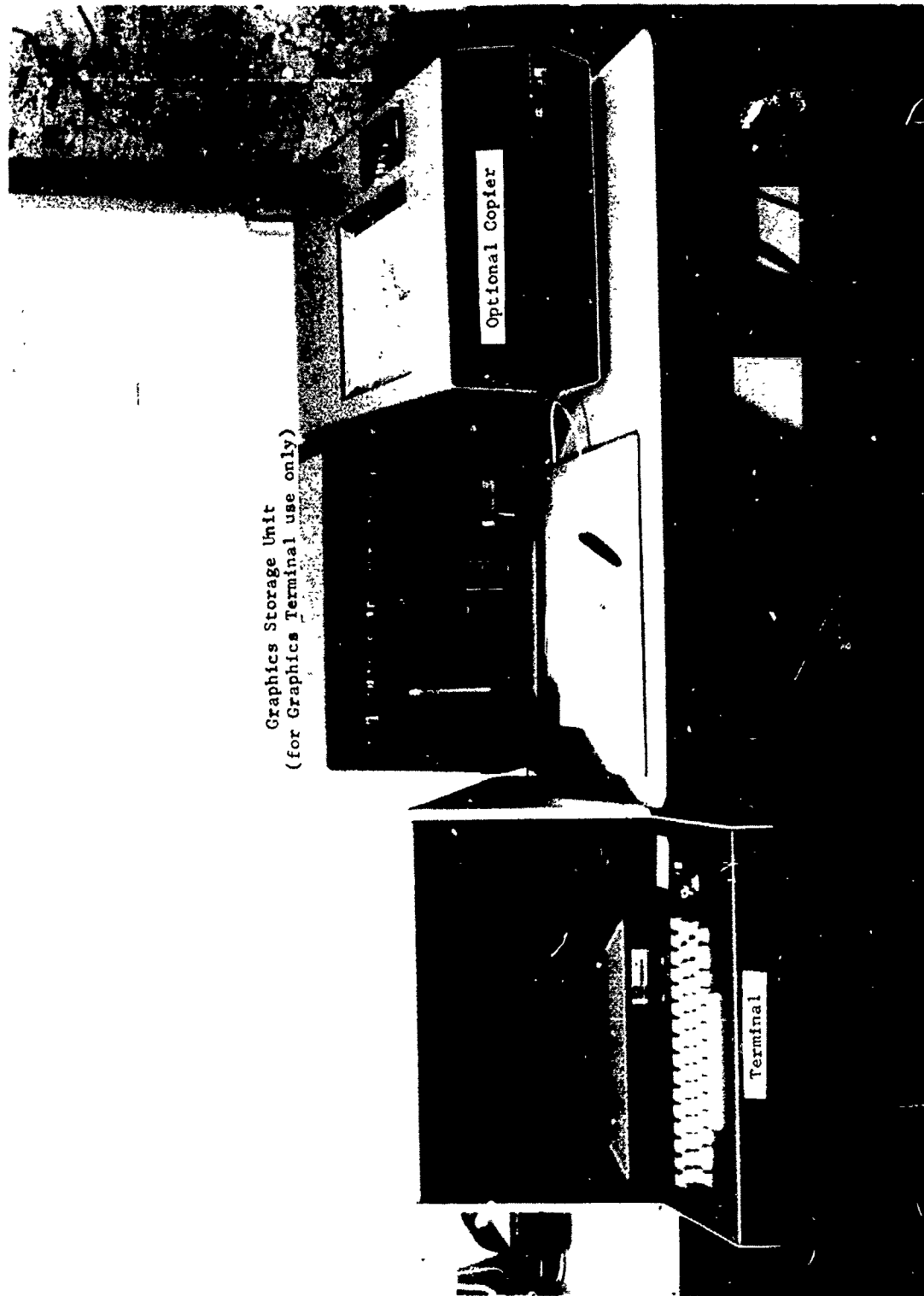


Figure 2. CRT and Graphics Pilot Self-Briefing Terminals

2.3.1.3 Map - In order to reduce keying requirements, and to assure that weather reports were requested only from actual weather reporting stations, a standard aeronautical chart covering the entire northeastern United States was wall mounted, and illuminated pushbuttons installed at each weather reporting station. A dedicated function keyboard was located in the lower right corner for selection of the type of briefing desired, as indicated in Figure 3. The assembly was linked to the CRT keyboard to permit entry of other types of information and for the display of the computer output on the CRT or on the hard printer copy. The graphics option was not available with this configuration.

2.3.1.4 Hard Copy - The fourth PSBT consisted of a Computer Devices, Inc. Teleterm Model 1030. This is a general purpose, off-the-shelf desk-top continuous thermal hard copy printer, consisting of an ASCII coded, standard typewriter keyboard and an asynchronous serial printer employing 7 x 9 dot matrix characters with 80 characters per line, as indicated in Figure 4. Acoustic coupling to the computer was again employed.

2.3.2 Remote Terminals

The use of existing, unconditioned commercial telecommunication lines was mandated in conjunction with the use of remote terminals. Therefore, all candidate RTs made use of or were interfaced with a telephone at a maximum of 300 baud. Candidate RTs differed in keystroking techniques, input feedback, output characteristics and cost.

2.3.2.1 TouchtoneTM Telephone - For the potential user unwilling or unable to purchase more complex equipment, a system for full alphanumeric input using a standard 12-key touchtone telephone was developed and evaluated. Alpha's were specified by first hitting the key containing the desired letter and then specifying completely by a second keystroke on the left, center or right key in that same row on the keyboard as a function of the position of



Figure 3. Map Pilot Self-Briefing Terminal

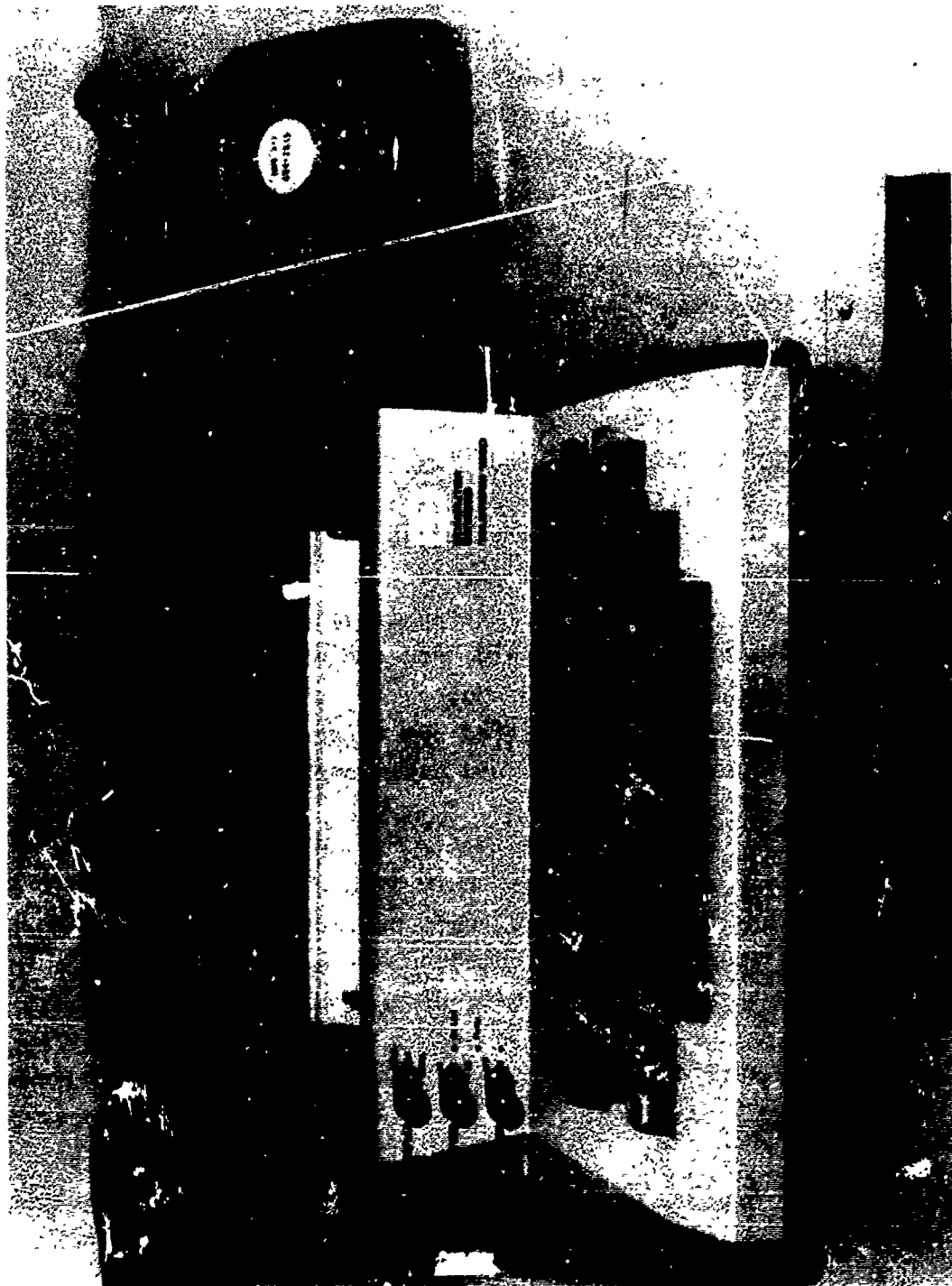


Figure 4. Hard-Copy Pilot Self-Briefing Terminal

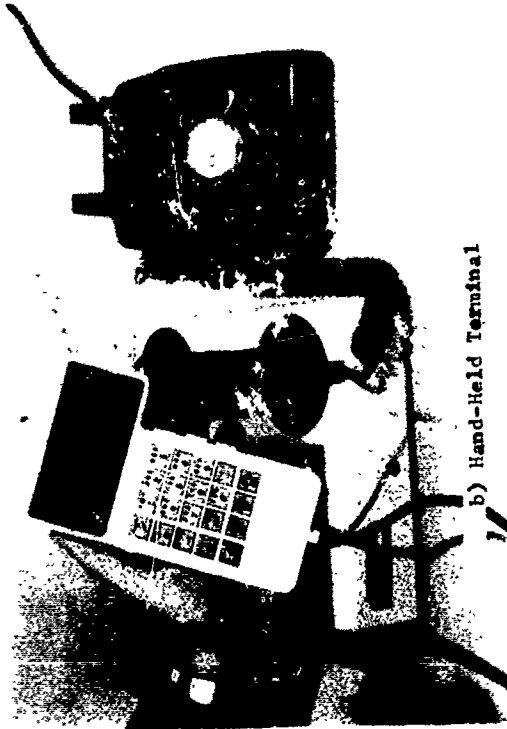
the desired letter on the first key struck. Numbers were specified by first striking the key containing the desired number and following this by a second keystroke on the "#" key. Various combinations of keystrokes on the "#", "0" and "*" keys provided control functions such as character delete. A more complete explanation of the use of a touchtone keyboard for alphanumeric input is given in the user instructions in Appendix B. Replies via the voice response system verified the correctness of user input. The TouchtoneTM terminal is shown in Figure 5a.

2.3.2.2 Hand Held Terminal - The Termiflex Corp. Model HT/2 and Termicoupler is an off-the-shelf item depicted in Figure 5b. It employs an ASCII code 16 key pad plus three extra keys on the side of the case to permit selection of the right, center or left of the three characters on each of the 16 keys. A display consisting of two lines of ten LED characters per line and with characters based upon a 5 x 7 dot matrix permits the monitoring of entries. A 1,000 character memory is included, and the display has scrolling capability. The terminal, as produced, has an acoustic coupler. For the experiment, it was modified for voice response system output by means of a self-contained audio amplifier and plug-in speaker.

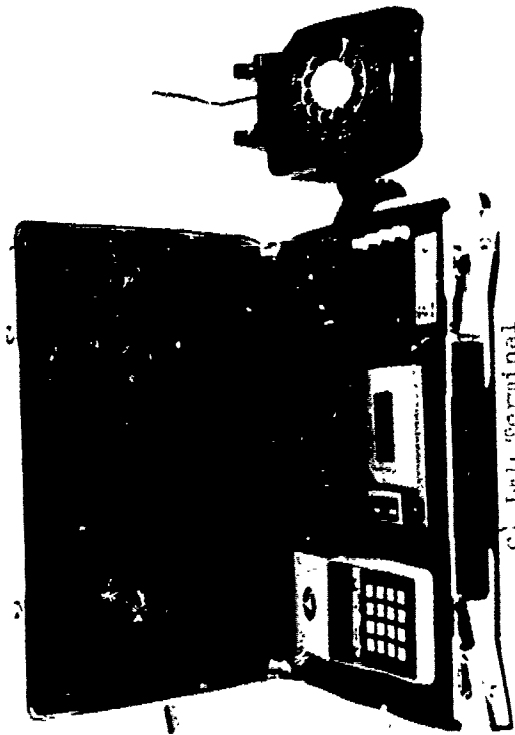
2.3.2.3 The LED Terminal - The LED Terminal, designed and built in-house, was intended to provide certain features not found on the TouchtoneTM telephone. Visual feedback for verification of the correctness of input was provided by an eight-character array of LED characters, each based upon a 5 x 7 dot matrix. Characters moved from right to left as additional characters were entered, until they finally disappeared on the left. All characters entered were stored, so that burst transmission was then possible as a means for reducing telephone line costs for those users forced to use long distance circuits. For ground-based use, the terminal was designed to operate from a 117 volt, 60 ~ A.C. source, but it was also designed to operate directly from a 28 volt D.C. supply, with the idea that it could be plugged into a light aircraft to



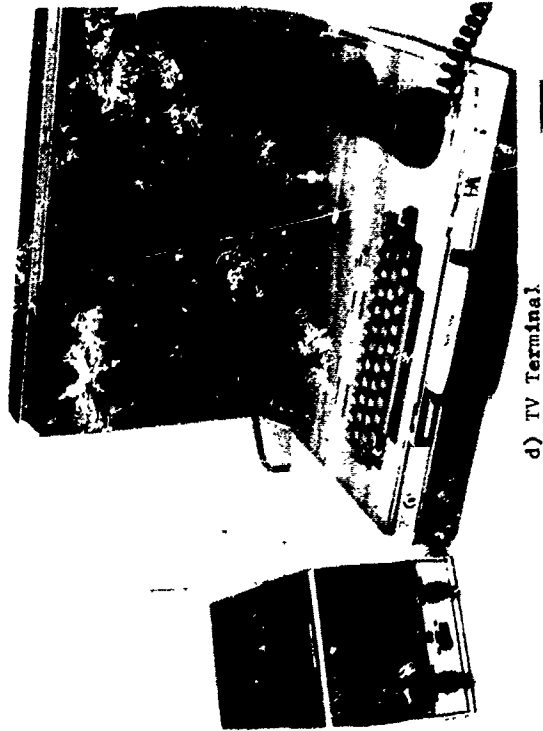
a) Tough-Tone Terminal



b) Hand-Held Terminal



c) Lab Terminal



d) TV Terminal

Figure 5. Remote Terminals

serve possible DABS or Data Link functions, provide airborne contact with Flight Service Stations, or even serve as a means for radio tuning. It should be noted that this terminal was designed for one-handed operation as would be necessary in an airborne environment, and as such, could not be replaced by the Termiflex terminal described above.

For experimental purposes, the LED terminal was mounted in a four-inch thick brief case which also contained an audio amplifier for monitoring of the voice response system, an acoustic coupler, an automatic cassette tape recorder and space for aeronautical charts. The complete unit is depicted in Figure 5c.

2.3.2.4 Television Terminal - The Hal Communications Corp. Model RVD-1005 AS, depicted in Figure 5d, is an off-the-shelf portable terminal packaged in a four-inch thick briefcase. It contains an ASCII coded standard typewriter keyboard, and suitable electronics for producing a commercial 525 line, 30 frame/second, 2 to 1 interlace television signal. Plug-in crystals tune the output to any television channel which might otherwise be unused in an area, so that it is merely necessary to connect to the antenna leads of any television set and tune to the appropriate channel. The system can then present 25 lines with 40 characters per line. For the experiment, the terminal was connected to a Shibaden VM-903 ten inch video monitor.

While this terminal might appear to be too expensive for many individual users, its use was studied because of its possible interest to flying clubs, where the cost could be shared among the members.

2.4 EXPERIMENTAL SUBJECTS

Subjects for the evaluation were drawn from a pool of volunteer, general aviation pilots previously solicited for another, unrelated experiment through public announcement. The pool was divided into two groups based upon flight proficiency (VFR versus IFR airman rating) and four equal sub-groups based on flight experience (total flying hours). Pilots were contacted on a random basis within these sub-groups, informed of the nature of the study, its time frame, and demands on the volunteers. They

were then scheduled on the basis of willingness and availability. New volunteers obtained through word-of-mouth publicity on the current study were added to appropriate sub-groups and used in the study when the original pool for a sub-group became depleted. Because of inherent differences in length of training between groups (IFR pilots almost by definition will have more flying hours than VFR pilots), it was not possible to achieve balanced representation in flight experience between groups. Equal numbers of pilots were scheduled for each sub-group to provide a reasonable distribution of flight experience within groups. A total of 32 pilots were scheduled for participation.

The mean age for VFR pilots participating in the study was 42 years (range 27 to 54) and 48 years (range 23 to 76) for IFR pilots. Mean flight experience for VFR pilots was 826 hours (range 100 to 4000) and 3181 hours (range 300-15,000) for IFR pilots.

2.5 EXPERIMENTAL PROCEDURE

Pilots were randomly assigned within sub-groups to the four PSBT treatments and scheduled on an availability basis for a two-hour test and evaluation session during any of four daily time slots. Prior to the initial session, subjects were given a general indoctrination and asked to read the instruction material reproduced in Appendix A. It contained a brief program description, instructions, sample formatted weather briefing material and an explanation of briefing request codes. This was normally read in an ante-room. A brief typing test was then administered using the Teleterm hard-copy teleprinter in local mode. Each subject was instructed to type a standard script at his own pace and informed that he was being timed to obtain comparative data on typing ability. The material to be typed was as follows:

THIS IS A DEMONSTRATION OF A TERMINAL CONCEPT
FOR THE FLIGHT SERVICE STATION AUTOMATION PROGRAM.
WEATHER DATA IS FOR FRIDAY, OCTOBER 11, 1974,
AT 1800 ZULU, OR 1 PM LOCAL TIME:

Subjects were scored for typing speed in terms of input characters, including spaces, per minute. This was followed by the issuance of a detailed instruction sheet for operation of the assigned terminal (Appendix B) which was read while seated at the selected terminal.

The performance test that followed consisted of three trials (simulated weather briefings): an indoctrination briefing in which subjects were acquainted with terminal usage, a practice briefing during which limited instructional feedback was provided, and a test briefing without aid. Subjects were given a written description of each proposed trip just prior to the trial (reproduced in Appendix C), appropriate aeronautical charts, and cue cards containing all pertinent input codes and information needed to complete a flight plan. Each trip was different, and all subjects experienced the trips in the same order. The textual and graphic material for all trips, as well as examples of the differences in format among terminals, are shown in Appendix D. Performance data were obtained from eight pilots for each candidate terminal. Comparative data were obtained on total briefing time, input time, dwell time, and input errors.

Following performance trials, each of the other three candidate PSBTs were demonstrated and pertinent differences described. Each subject then completed an evaluation form as reproduced in Appendix E. All forms contained certain general questions, as well as questions directed toward the specific terminal on which performance measures had been taken for that subject. Responses were made by placing a vertical mark on a ten-point horizontal scale where zero in the middle represented a neutral opinion and a five at either end represented a strong opinion concerning one or the other of two alternatives.

The procedure for the second (RT) experimental session was the same as for the PSBT evaluation except for the exclusion of general indoctrination. The trip itinerary used for the PSBT indoctrination flight was again used with the RTs, but new

itineraries were used for the practice and test trials. To the extent possible, these new itineraries were equated in complexity and I/O length with those used on the PSBT trials.

The Graphics PSBT was not operational until the latter part of the testing period, such that only the eight pilots assigned to performance trials on the terminal actually observed its operation prior to completion of the questionnaire. The remaining pilots were shown hard copy of all weather depictions (for different weather conditions) during the demonstration phase of their PSBT evaluation session.

Graphics presentation on the CRT was not used in the practice (2nd) trial on the Graphics PSBT because four of the five depictions would have been duplicated in the final test, with probable modification of performance on that test. Instead, during the practice trial, each subject was shown hard copy of similar weather depictions for familiarization with format and expected content.

An additional difficulty arose during the experiment so that the key pad on the TSC terminal became defective. It was replaced by a more reliable key pad which provided positive tactile feedback of key contact. All performance trials were conducted with the replacement key pad, but half of the subjects were exposed to the original key pad in the demonstration phase.

All flight plan inputs including mode of flight (VFR or IFR) were preselected for consistency in character input count to permit performance comparisons. Although no measures of goodness of briefing were planned for this evaluation, the itinerary for the PSBT Practice Flight involved extremely marginal flight weather conditions which should have dictated an IFR mode. The trip description, however, called for a VFR flight. This discrepancy was noted during preliminary, procedural validation trials and permitted to remain. All subjects were observed by the experimenter for signs of disagreement during the practice trial, and those found to comprehend the danger were given the opportunity (in the form of an alternative cue card) to file an IFR flight plan.

3. EXPERIMENTAL RESULTS

3.1 PERFORMANCE DATA

Summaries of mean performance data for PSBT and RT trials are shown in Tables 1 and 2 respectively. Flight briefings were described and compared in terms of character count and terminal occupancy time. A "character" was defined as any single I/O control or data element such as a letter, number, space or symbol. Character counts provided a comparative, quantitative measure of the amount of information requiring transfer. Significant component times for the briefing as well as the total briefing time were measured. Output time shown in the tables was the mean value of the sum of all increments of time during which instructions or weather data were being transmitted. Input time similarly was the sum of all time increments during which instructions or data were being keyed into the system. Finally, dwell time represents the sum of all time increments following output and prior to the next input. During this period, instructions or data were being assimilated by the user. Because all values shown in the tables were the calculated means of individual performance, the sum of component times does not necessarily equal the total briefing time in each case. Character input rate represents the mean value calculated for each pilot.

Certain apparent differences in character count and time among different terminals are attributable in a large part to differences in the instructional material required with the various terminal concepts. Appendix D provides material to substantiate this. For example, 1030 characters and 42 seconds of output time for display of initial option choices with the other PSBT concepts were eliminated with the use of the Map terminal, as well as 435 characters and 18 seconds for each additional option listing. For the test flight using the Graphics terminal, it was also found unnecessary to list the options, and this again resulted in a reduction in output character count. With soft copy (the CRT terminal), each page change instruction required 45 characters and two seconds output time.

TABLE 1. SUMMARY OF MEAN DEMOGRAPHIC AND PERFORMANCE DATA
FOR PERSONAL SELF-BRIEFING TERMINALS

N = 8 pilots per terminal

	<u>H/C</u>	<u>CRT</u>	<u>GR</u>	<u>MAP</u>
<u>Demographic Data</u>				
Age (yrs)	49	46	36	56
Flight Hours	2694	2197	2245	2056
Typing Speed*	73	75	63	83
<u>Performance Data</u>				
<u>Indoctrination Flight</u>				
Input Time (seconds)	110	136	140	125
Output Time	241	246	244	165
Dwell Time	373	387	363	412
Total Briefing Time	723	770	747	702
Total Input Characters	135	134	134	144
Total Output Characters	5537	5664	5668	3738
Character Input Rate*	80	63	61	72
<u>Practice Flight</u>				
Input Time	128	157	177	133
Output Time	150	153	150	96
Dwell Time	332	334	286	376
Total Briefing Time	589	644	612	593
Total Input Characters	147	152	157	160
Total Output Characters	3559	3667	3637	2284
Character Input Rate*	75	69	55	79
<u>Test Flight</u>				
Input Time	99	127	134	110
Output Time	198	196	262	155
Dwell Time	156	204	383	278
Total Briefing Time	451	526	779	543
Total Input Characters	132	138	145	154
Total Output Characters	4260	4341	3836	3329
Character Input Rate*	90	79	66	90

*= characters per minute

TABLE 2. SUMMARY OF MEAN DEMOGRAPHIC AND PERFORMANCE FOR REMOTE TERMINALS

N = 8 pilots per terminal

	<u>TT</u>	<u>HH</u>	<u>LED</u>	<u>TV</u>
<u>Demographic Data</u>				
Age (Years)	41	52	46	47
Flight Hours	3100	2137	2387	1578
Typing Speed*	58	81	72	75
<u>Performance Data</u>				
<u>Indoctrination Flight</u>				
Input Time (seconds)	304	265	465	133
Output Time	706	692	519	183
Dwell Time	162	157	-	310
Total Briefing Time	1172	1114	984**	625
Total Input Characters	156	133	140	141
Total Output Characters	5342	5370	5440	4462
Character Input Rate*	32	32	19	66
<u>Practice Flight</u>				
Input Time	283	223	416	142
Output Time	473	471	291	92
Dwell Time	108	88	-	305
Total Briefing Time	890	783	707**	539
Total Input Characters	170	140	157	139
Total Output Characters	3445	3433	3526	2350
Character Input Rate*	35	41	23	63
<u>Test Flight</u>				
Input Time	321	271	413	167
Output Time	583	581	442	147
Dwell Time	91	83	-	317
Total Briefing Time	995	910	855**	632
Total Input Characters	176	151	155	152
Total Output Characters	5789	5749	5845	3365
Character Input Rate	34	41	23	60

* = characters per minute

** includes off-line time. For on-line time, use OT only.

Words, phrases and sentences were added to remote terminal data output when the VRS was used in order to promote the feeling of normal conversational English. This added about 20 percent to the character count for RTs when the VRS was used, as shown in Table 2. Graphic material was not amenable to character count and was excluded from the total count for the graphics terminal. The substitution of graphics for the area weather forecast provided with the other PSBTs further reduced the character count when the graphics terminal was used. However, output time for graphic material was 68 seconds longer than for the textual material that it replaced. Output times and character counts between flights also differed because of flight itinerary and relevant weather data differences.

Input time and dwell time were the relevant, dependent variables used for comparison of pilot performance with the various I/O devices. Character input rate between trials was used as a measure of learning speed. Total briefing time on the different I/O devices was used to determine combined man/machine effectiveness.

Correlation coefficients were first computed to determine relationships among selected demographic and performance measures. This permitted statistical control for equating groups on possibly relevant variables where appropriate experimental control could not be exercised. The effects of typing speed, age, flight hours and airman rating were first examined. The only correlation that was significant was typing speed and input time for PSBTs. The level of statistical significance for this and other measures computed from the experimental data are presented in Table 3. Calculations are not included in the present publication but may be reviewed at TSC in Internal Report #KHL-TSC-75-1324.

An analysis of variance (ANOVA) was then performed on the typing speed scores for PSBT subjects. Mean scores between treatments did not differ significantly. Analysis of covariance

TABLE 3. SUMMARY OF STATISTICAL DATA

Comparison	R. F. O. L.	Newman-Keuls	Interpretation
PSBT Typing Speed vs Input Time	[R(31) = .684, p < .0005]		The better typists required shorter input times
PSBT Dwell Time	[F(3,28) = 9.20, p < .01]	{HC MAP CRT} {GRAPHICS}	Graphics yielded longer dwell time.
PSBT Total Briefing Time	[F(3,28) = 13.85, p < .01]	{HC MAP CRT} {GRAPHICS}	Graphics yielded longer total briefing time.
RT Input Time	[F(3,28) = 14.61, p < .01]	{TV HH} {HH TT} {TT TSC}	TV terminal was fastest and LED terminal slowest.
RT Total Briefing Time	[F(3,28) = 12.53, p < .01]	{TV} {TSC HH TT}	TV terminal was fastest and touchtone slowest.
Preferences among PSBT Terminals	[F(3,28) = 30.83, p < .001]	{MAP} {CRT} {GRAPHICS HC}	Graphics and HC were most highly favored.
Preferences for RTs.	[F(3,28) = 19.51, p < .01]	{HH} {L&D} {TT TV}	Touchtone & TV were preferred.
Visual display vs VRS.	[F(3,28) = 5.12, p < .01]	{VRS} {TV CRT}	Visual display preferred over VRS.
PSBTs versus RTs (all)	[t(254) = 3.15, p < .005]		PSBTs preferred.
PSBTs versus RTs (top two)	[t(126) = 2.40, p < .05]		PSBTs only slightly preferred.
PSBTs versus RTs (most preferred)	[t(62) = 1.15, Not Significant]		There was no significant difference when the preferred terminals in each group were compared.

A minimum acceptable confidence level of p < .01 was adopted as significant in this study because of the small sample size. Results are shown in brackets, including type of test, e.g., "R" for Correlation Coefficient, "F" for Variance Ratio and "t" for Student's t-test for difference between means. Degrees of Freedom are in parentheses, followed by actual score and the level of significant difference; e.g., p < .0005. For the Newman-Keuls test, terminals within a single pair of braces did not differ significantly for the measure being compared; terminals within different pairs of braces did differ significantly.

procedures were therefore considered unnecessary. Instead, performance measures were further examined by single factor ANOVA for main effects in the Test Flight. Significant differences between PSBTs were found for dwell time and total briefing time. No significant differences were found for input times.

In all cases where tests of main effects resulted in a significant F ratio, the Newman-Keuls procedure* was used for all possible comparisons between and among means. This is a conservative, middle-of-the-road procedure for making post hoc comparisons. Differences were found in pilot dwell time and total briefing time. Consequently, the 80 percent longer dwell time and 72 percent longer briefing time for the Graphics Terminal for this sample may be considered significant.

A similar procedure was applied to the RT Test Flight performance data. Mean typing speed scores between treatments did not differ significantly. Any comparison of RT dwell time was not meaningful because of differing output presentation concepts (aural versus visual). Dwell time was primarily that time used by a pilot for the assimilation of visually presented data during the PSBT trials. However, for RTs using the VRS, assimilation occurs both during the VRS output and the subsequent dwell time.

Significant differences were found in mean RT input time and total briefing time. The mean total briefing time for the TV RT was 46 percent shorter than the mean of the other RTs. When only on-line time is considered, the LED terminal was most efficient, utilizing 30 percent less time than the TV remote terminal.

The frequency of undetected input keying errors was too low for meaningful group comparisons or comparisons of individual performances. Therefore, only a cumulative summary of PSBT and RT input errors is given in Table 4. The mean total error rate per

*For a detailed explanation of the Newman-Keuls procedure, see Winer, B.J., Statistical Principles in Experimental Design. New York: McGraw-Hill, 1962, p. 80.

TABLE 4. SUMMARY OF CUMULATIVE INPUT ERROR DATA

<u>Personal Self-Briefing Terminals</u>												
Flight	H/C			CRT			GR			MAP		
	1	2	3	1	2	3	1	2	3	1	2	3
<u>Errors</u>												
Corrected	6*	1	4	6	5	2	6	10	6	12	9	2
Not Corrected	2	1	1	2	0	2	1	1	1	3	7	3
ΣE_c	11			13			22			23		
ΣE_n	4			4			3			3		
	Flight	ΣE_c		ΣE_n								
	1	30		8								
	2	25		9								
	3	14		7								
<u>Remote Terminals</u>												
Flight	TT			HH			LED			TV		
	1	2	3	1	2	3	1	2	3	1	2	3
<u>Errors</u>												
Corrected	17	12	14	19	9	9	29	33	37	3	7	3
Not Corrected	2	3	3	7	5	5	0	1	2	7	4	7
ΣE_c	43			37			99			14		
ΣE_n	8			17			3			18		
	Flight	ΣE_c		ΣE_n								
	1	68		16								
	2	61		13								
	3	64		17								

*=Total number of character or control input errors for N = 8 pilots.

trial (briefing) for PSBTs was less than one error, and for RTs about 2.5 errors per trial. No errors were recorded in a third of all PSBT trials and a fifth of RT trials. No more than one uncorrected error was committed in any single PSBT trial, and 70 percent of the uncorrected errors involved subsidiary elements of flight plan data such as aircraft type or color, or pilot's name or address. The uncorrected error rate for RTs was twice that for PSBTs, with the same ratio of significant errors.

The degree of learning or improvement in performance in keyboard use between trials was examined by comparing mean character input rates. As might be anticipated, no significant differences were found for any of the full keyboard terminals. However, with the remote terminals which involved keying concepts new to the user, the improvement in keying performance which might be expected with practice did not materialize. Instead, subjects apparently used more care in their input and keying rates were slightly slower on the latter trials.

The PSBT Practice Flight called for planning a VFR flight between Lebanon, NH and Caribou, ME. Predicted weather conditions for the estimated time of departure was LIFR with fog, improving to MVFR at Lebanon and MVFR and worsening conditions at Caribou. Discretion should have dictated extreme caution in considering a VFR flight. Twenty-nine of the 32 pilots participating in the evaluation expressed recognition of the hazard and decided to file an IFR flight plan. The mean dwell time for the three pilots who filed a VFR plan was 121 seconds, as compared with an overall mean dwell time of 332 seconds. Each of the three pilots received their briefing on a different PSBT.

3.2 RESULTS FROM QUESTIONNAIRE

The design of the questionnaire, wherein subjects were asked to express their opinion by drawing a mark on a line representing a continuum between two extremes made it possible to apply parametric methods for statistical analysis of the data. Since

these marks could be drawn at any place on the line, the data could be considered as having the potentiality for being continuous rather than discrete.

Analysis of variance and Newman-Keul procedures were used for inter-question comparisons. Student's t-test was used for within-question determinations of the direction and extent of deviation of a mean sample response from a neutral or zero position. Mean response scores and 95 percent confidence intervals for pilot's ratings of terminal characteristics for each question are shown on the sample evaluation form in Appendix E. Since the questionnaire provided for responses to 109 different questions, inclusion of the quantitative data for each of these is not feasible within the body of this report. However, it should be noted that two general types of questions were asked. One type for example explored a continuum from "like" to "dislike" for a device or a feature of a device, and here a significant deviation from the neutral position on the scale indicates acceptability or non-acceptability of the feature. For other questions, such as "Was the speed of presentation too slow or too fast?", a neutral position on the scale (a statistically non-significant difference) indicates that subjects considered the feature to be correct for their needs.

All candidate PSBTs were liked by this sampling of pilots except for the Map Terminal, which received a neutral rating. The Graphics and Hard-Copy Terminals were most highly favored. Some caution may be in order, however, in ruling out the Map Display from further consideration. Many of the experimental subjects used were local engineers or computer programmers with some knowledge of keyboards, and thus may not be representative of the pilot population at large.

A full typewriter format keyboard for command and data input was preferred over sequential alpha-numeric or dedicated function keyboards. The continuous hard-copy method of output was preferred over a CRT type display, and its copy preferred for "take-home"

use. Graphics were considered a definite contribution to comprehension, and the amount of graphic data presented was deemed sufficient. The scale of the Map Terminal display was considered appropriate, but the area of coverage of the map less than desirable. Instructions for all but the Map Terminal were rated easy to follow. Readability, speed of presentation, format, and editing ease were rated satisfactory for all PSBTs. Optional hard-copy was definitely rated necessary for soft-copy terminals and was expected to be used extensively. Pilots appeared to be willing to pay approximately \$.10 per page for such hard copy. Continuous hard copy as long as two or three pages was not considered too difficult to use.

The Touchtone and TV remote terminals were preferred by this sample of pilots, the LED terminal was rated neutrally, and the hand-held terminal was disliked. The TV terminal's full keyboard received the highest rating, followed closely by Touchtone telephone pad. The hard, short stroke and positive tactile feedback of the hand-held terminal elicited favorable responses, and the soft, short stroke and absence of tactile feedback in the early version of the LED terminal was generally disliked.

Pilots' comparative rating of the acceptability of the two means of RT data presentation, voice response and television, and the CRT presentation showed no significant difference between the CRT and TV concepts. The CRT and TV presentations scored higher than the VRS, but all were rated acceptable.

The VRS method of data presentation was rated acceptably understandable, with definite improvement in comprehension with experience. Phrasing posed no difficulty. Comprehension of data content as compared to a live telephone briefing by FSS personnel was rated only slightly harder. Pilots expressed a need to be able to break into the data stream, either for a repeat of certain data or to create a pause while they caught up with their note taking. The acceptability of tape recording in lieu of note taking as a means for obtaining a record of a briefing is

questionable. Voicing the station name was preferred by 72 percent of the subjects over individual alphabetic or phonetic characters, (e.g., Boston, instead of B-O-S or Bravo-Oscar-Sierra).

Ratings of individual terminal operating characteristics differed to a greater extent for RTs than for PSBTs. Instructions for use and editing capability were found easy only for the TV and LED Terminals. Responses relative to the Hand-held Terminal showed wide variance, but many found the terminal awkward to hold and to use. LED Terminal users considered the off-line input, burst transmit feature helpful. The fact that the TV Terminal display fills from the bottom, line-by-line, and "jumps" as each line fills was not rated detrimental, but pilots reacted somewhat less favorably to the TV display format: with a limitation of 40 characters per line, it was not possible to present tables in as neat a format as was possible with the greater character-per-line capability of the PSBT terminals. The scrolling feature of the Hand-held Terminal input display was not considered helpful, nor was the display, itself, rated helpful.

The present evaluation provided the first opportunity for exposure of remote briefing concepts to a sampling of a pilot population. As a measure of the relative acceptability of this complementary means for securing weather data, mean rating levels on the like-dislike scale were compared between PSBTs and RTs. The rationale for this test was based on the assumption that each subject would likely use a consistent personal scaling strategy in rating alternatives. The mean rating level for all terminals was found to be significantly in favor of PSBTs. For the two top-rated terminals in each group, differences were only slightly significant, and there was no significant difference between the rating levels for the most highly rated terminal in each group. Since PSBTs are more sophisticated and in general more convenient to use than are RTs, a difference in overall rating was expected. However, the lack of difference between the top-rated terminals in the two groups may be taken as encouragement that the overall RT concept, when viewed in the light of its intended application, can be equally acceptable.

Write-in comments were solicited on the evaluation form and encouraged. A total of 64 comments were received on the PSBT evaluation forms, and may be paraphrased as follows, with the number of such responses indicated in parentheses:

"Instructional materials, such as descriptions of briefing options, was time-consuming (4) and could be provided by a decal mounted on the terminal. The Map Terminal is too costly (5), clumsy (2), unnecessary, impractical and does not provide enough in the way of extra features. It is subject to vandalism (2), and necessitates undesirable dual keyboard input of data. A flight plan chart (similar to the Map Terminal display) near each PSBT would be desirable (2) for looking up station identifiers and for visualization of weather movement. Graphics are desirable for better weather overview (4) in some form (2). Local weather graphics should be provided (2). A written weather forecast is preferred because weather maps are confusing and extravagant (2), weather maps are available through other media. Graphics should be optional (2). The availability of take-home copy is mandatory at any cost (3). The optional copy approach is too expensive (2), can be forgotten to be made, is difficult to manage in separate sheets, and terminals will be tied up by pilots for longer times to avoid paying copying costs. (While no statement was made by the experimenter at any time that there would be a charge for hard copy, and in the questionnaire, most of the pilots indicated that they would be willing to pay a nominal amount for such hard copy, there was apparent concern that other pilots might tie up terminals in order to avoid copying costs).

The Hard-copy Terminal provided everything needed at the lowest cost (4), is simple and relatively maintenance-free, and provides automatic hard-copy (2) in a more desirable form (2), and cannot be forgotten. Hard-copy output can be pinned on a bulletin board for reuse by others to reduce terminal congestion. The overall automation concept was liked (4). Differences among terminals were considered minor. Preference for a particular terminal was influenced by expected cost (5). Difficulty was experienced because of the misuse of the lower case letter "L"

for the numeral "1". Dates on forecast in zulu time, narrower bands on winds aloft and better forecasting were wanted. Access to a specialist for veracity check and additional information and service should still be provided."

Similarly, the 96 comments which appeared on the RT evaluation form may be summarized as follows:

"The Touchtone Terminal is the least expensive (7), requires the least personal equipment (8), is available everywhere (6), is all that is necessary (8) and is entirely adequate (3). The Hand-held Terminal is awkward (4), uncomfortable, heavy, not for left-handed persons, but could be improved with a smaller grip and differentiated side keys. The keystroke feel of the Hand-held Terminal was liked. The LED Terminal offered only a minor advantage (2), and such personal investment is not needed for typical short general aviation flights. The TV Terminal's full keyboard input and visual output are much faster than all the other RT concepts making it most desirable as an RT (7), but costly to the individual when compared with the TT concept (9). It requires that personal equipment be carried around (2), and requires access to a TV receiver. A TV Terminal would be good for flying clubs and fixed base operators. A VRS option is desirable when a TV receiver is not available. The split line format of the TV data was difficult to read. The VRS output concept was too fast (2), too slow, too mechanical, and needs better timing (pauses) and inflection (2). Instructional material, such as descriptions of options, is excessive (3), and should be optional. A pause control is needed to allow for catching up in note taking and a repeat key to get missed information. VRS output contains too many "zulus", three digit winds are foolish, and format should be exactly as the current exam requires. Training sessions would be desirable (3) and formatted work sheets helpful in note-taking with the VRS output. Won't use a tape recorder (3). Access to a specialist should still be available (3) to supplement automated briefing, when needed. The RT concept should be implemented (2)."

Each participant in the evaluation was given the hard-copy from his PSBT briefings for personal retention. An unexpected outcome of this was a complaint from some pilots during their subsequent RT session that the copy had become degraded and unusable in a short time period. Both hard-copy production processes involved the use of thermally sensitive paper. The evaluation was conducted during the hot summer months and copy was left in automobiles and aircraft. In three cases, copy was reported to have become dark and unreadable within a period that was excessively short.

4. DISCUSSION

In 1973, the FSSET recommended that automation of flight weather briefings be investigated as part of the FSS modernization program for improving service and reducing cost. A prototype Pilot Self-Briefing Terminal was assembled and demonstrated at a number of Flight Service Stations. While pilots found this equipment to be generally acceptable, this original series of tests provided nothing in the way of equipment options which would permit assessments of the relative merits of such options. TSC was accordingly requested to investigate alternative means for system implementation, and to evaluate these alternative means.

The original system concept had envisioned locating PSBTs at existing Flight Service Stations, and at certain satellite airports. However, since approximately 90 percent of all pilot weather briefings are presently conducted via telephone, it was apparent that concepts which permitted remote access to weather information would be required as an adjunct to PSBTs if a viable system were to emerge. For this reason, the present study has included the evaluation both of PSBTs and RTs, and has included four possible configurations of each terminal type.

For PSBTs, the equipment configurations permitted the comparison of typewriter-like keyboards with dedicated function keys, hard copy versus soft copy (with a hard copy option), and presence or absence of graphic capability. RTs permitted exploration of such variables as full versus abbreviated keyboards, presence or absence of visual feedback during entry, real-time versus burst transmission of input, and responses either visually or by synthetic speech.

Pilots' equal preference for the Hard-Copy and Graphics PSBT reflects an apparent incongruity. The Hard-Copy terminal was known by all pilots participating in the evaluation to be incapable of producing graphic presentations such as weather maps. The soft copy terminal could produce both text and graphics (weather

maps), but when the output was limited to text, pilot opinions of the terminal were much less favorable. Some of this apparent incongruity may have resulted from the differential capability of various pilots to interpret weather maps. In comparative performance, the Graphics Terminal mean total briefing time was 72 percent longer than the mean of the other candidate PSBT terminals, and pilot dwell time was 80 percent longer.

Cost consciousness, both system and personal, could well be expressed in the Hard-Copy Terminal's high rating. It appears to be a less expensive terminal and inherently produces take-home copy. The continuous hard-copy terminal concept was also found to be attractive to pilots because of the elimination of the possibility of premature or accidental erasure of data, forgetting to operate the copier of the soft copy terminal, the elimination of time delays between pages for the copying process with the soft copy terminals' hard copy option, and the extended terminal dwell time to avoid page charges if such were to be levied. The hard copy terminal additionally eliminated the need for local storage and paging capability to review previously displayed data. It was also noted that higher terminal utilization rates could be achieved with continuous hard copy because, during periods of heavy traffic, weather data could be extracted from the system and data analysis shifted to and performed as an off-line activity, thereby reducing terminal dwell time.

Comparative performance, preference, and equipment capital costs would tend to support primary continued consideration of the Hard-Copy Terminal, particularly from a system cost-effectiveness viewpoint. However, caution is warranted in this interpretation. In the first place, part of the longer terminal time on the CRT is attributable to the additional time (68 seconds) required to display graphics. The process of graphics generation was not optimized in this simulation facility and a 40 percent reduction in output time is plausible through the use of less detail in the background map and conservation of data points in the weather portrayals. Graphics displayed in the latest FAA field

evaluation required 25 percent less time for a more complex weather data pattern. The Test Flight in this evaluation, as previously explained, was also the first occasion for subject pilots' use of graphic weather data in the current format for flight weather analysis. A reduction in mean dwell time should be expected with repeated exposure and experience in weather map interpretation. Finally, prevailing weather conditions in the simulated data base were generally favorable and the narrative area forecast, which graphics replaced, was comparatively short.

Provision of graphic weather depictions is a concept intended to enhance the quality of flight weather briefings. Few pilots have consistent access to weather maps for flight planning because of the high percentage of briefings that are conducted by telephone. The potential added value of graphic material toward safer flight planning has not been established, and was not studied in this evaluation. Consequently, the concept should be examined under a variety of weather conditions using pilots with varied experience before the validation of comparative effectiveness in terms of quality of briefing and terminal dwell time can be established.

Consideration of alternative means for the display of weather maps at PSBT sites may be warranted from a cost-effectiveness standpoint to reduce terminal dwell time and queuing. Except for the route-oriented depiction of cloud cover, all other graphics are common in content for all briefings. These could be made available for pilots' use, off line, by separate local storage and display methods and updated by a communication link common to the co-located PSBT. This could effect a substantial reduction in on-line dwell time. The vertical cloud profile depiction with minor format modification could be presented during the route-oriented briefing using the Hard-Copy Terminal, thereby negating the requirement for graphics generating capabilities in primary PSBT equipment.

In summary, provision of weather maps was found desirable to pilots but potentially less cost-effective, particularly due to protracted terminal dwell time. Hardware options embodying the

capability for presentation of weather maps lack distinctive operating characteristics inherent in the alternatively desirable continuous hard-copy terminal concept. The use of a primary PSBT user/system interface based on the continuous hard copy mode of operation, with graphic weather depictions presented off-line using separate local storage and display hardware offers a viable alternative.

The remote terminal concepts were envisioned for use in obtaining a preliminary, reduced scope briefing for a go-no-go decision prior to travel to an airport. However, because of software limitations in the experimental system, pilots were forced to interact at the level of a full PSBT briefing. Since this did not appear to adversely affect acceptance of the RT concepts, innovations should be considered to reduce total terminal use time, such as by the condensation of instructions and the elimination or optional use of briefing option descriptions. This should improve remote terminal cost-effectiveness and user acceptance through reduction of line use and potential reduction of toll call charges.

Among remote terminal concepts, pilots preferred equally the TouchtoneTM and TV terminals, even though 57 percent communication line time was needed with a TT briefing than a comparable TV briefing. Although efficiency favors the TV terminal concept, pilots' demonstrated concern for personal cost must be recognized. They liked the TV terminal because of its decided advantage in speed and convenience of use. However, a number of pilots commented, "The TV terminal would be nice to have, but I can get along very well with the Touchtone telephone." Neither of the other candidate RTs appear to offer sufficient merit in both performance and acceptance to justify further consideration at this time. Consequently, continued development of the TT concept and computerized voice response system appear to offer the best approach toward final implementation of a system which best meets the needs of the remote user. Concurrently, implementation

of system software for optional use of a TV-type terminal may be warranted in view of its system cost-effectiveness and possible market potential.

5. CONCLUSIONS

A variety of user terminal concepts for an automated flight weather briefing system and for flight plan filing were examined under controlled conditions in a system simulation facility. The following conclusions were derived from observation and analysis of performance data and preference measures taken during repeated briefings on candidate user terminals operated by a sampling of general aviation pilots:

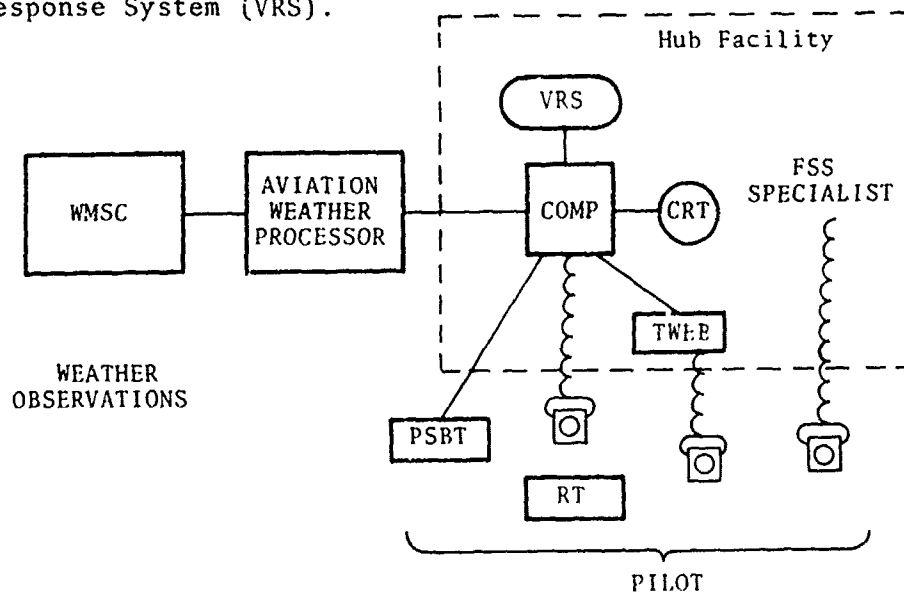
1. A soft-copy terminal with provision for graphic display of selected weather data with optional hard copy and a continuous hard-copy terminal limited to the display of textual data were rated equally and most desirable as a primary user/system interface.
2. User dwell time on the graphic weather data terminal was substantially longer than on terminals providing only textual data for the pilots sampled and for the weather data base employed. Some of this may be attributed to lack of optimization of the software for generating the weather maps such that map generation time was excessive, and to pilot's unfamiliarity with weather map interpretation.
3. The continuous hard-copy terminal concept appeared to offer inherent operating characteristics lacking in soft-copy terminals. The shorter briefing times obtained with the hard-copy terminal would permit higher terminal utilization rates.
4. An alternative hardware concept embodying a continuous hard-copy user terminal and a separate storage and display unit for off-line presentation of graphic weather data is conceived as a means for maximizing system cost-effectiveness.

5. Remote access to flight weather data by Touchtone telephone with replies from a computerized voice response data retrieval system was found feasible and desirable from the user's standpoint.
6. A two-stroke character input keying method used on the Touchtone telephone was favored for addressing the system over portable terminal concepts involving the same or similar input keying but requiring personal purchase.
7. Neither input keying skill nor operating errors were found to be sufficiently significant as to reduce system effectiveness.

APPENDIX A
GENERAL INSTRUCTIONS TO SUBJECTS
FLIGHT SERVICE STATION AUTOMATION PROGRAM

Transportation Systems Center is an agency of the U.S. Department of Transportation. Under the sponsorship of the Federal Aviation Administration, TSC is investigating several terminal concepts which have been proposed for the Flight Service Station Automation system in the 1980's/1990's.

FAA has proposed regional hub facilities, linked to an Aviation Weather Processor at the Weather Message Switch Center (WMSC) at Kansas City, Missouri where all weather observations from around the country are presently collected. Each hub facility will service a number of Pilot Self-Briefing Terminals (PSBT) and Remote Terminals (RT). The PSBT concept is designed to be an unmanned facility to handle full weather briefings and flight plan filing data at GA airports, former FSS facilities and FBO (fixed Base operator) locations. RT concepts are designed to allow the pilot to access the weather data from any telephone, may be user owned, and may interface with a computer controlled Voice Response System (VRS).



The purpose of the evaluation is measurement of the comparative effectiveness of various types and combinations of input/output methods. You, the potential user, will be asked to obtain sample briefings and file flight plans using a simulation of the automated system. Because it is a prototype, we desire your comments on how the overall system, or an individual terminal, may be improved.

During the part of your evaluation, we will be measuring the time needed for inputs, and to comprehend the data. Please do not rush, but do step through the briefing as quickly as you can, without causing excess errors. The statistical data will aid us in determining the average length of an automated briefing, and the average error rate.

For this evaluation, we are asking you to use standard inputs for weather selection and flight plan filing. This will make it easier to compare statistics on time to enter data.

The form and manner in which weather data is presented was developed by the FAA. It may differ in appearance in minor respects from weather material you may have used in the past. It is intended to be easier to assimilate. The order and form of presentation will be maintained consistent for all types of PSBT's and RT's throughout the evaluation. Feel free to clarify unknown abbreviations with the experimenter and comment on the quality of the form of presentation.

The weather based used for this experiment was collected Friday, October 11, 1974, at 1:00 PM local time (1800 Zulu time). All weather data will be presented in terms of Greenwich Mean Time (GMT) or Z time (Zulu). Please bear this in mind when you file your flight plan and check your weather.

Corrections may be made in two ways: if you realize immediately that you have entered an incorrect character, each device has an edit feature to correct it. If you have already gone by an item in the flight plan and realize it's incorrect you will be given an opportunity to correct it before filing.

TYPES OF WEATHER DATA AVAILABLE

At the beginning of each briefing, an "option list" is presented showing the several options available. They are:

Option L: Local Weather Briefing

The local weather briefing is intended to show the overall weather over a small region surrounding the reporting station. For this experiment, that is defined as a 25-mile radius around BOSTON, which includes BVY, BED, OWD and NZW. Weather data includes SA's, FT at Boston, and FA.

Option B: Route Oriented Briefing

This option is designed to facilitate obtaining a weather briefing and filing a flight plan. After requesting certain inputs, your route of flight will be searched for all reporting stations within 25 miles and those stations scanned for significant data. If no significant weather is encountered at any reporting station, the data is not displayed. SA's, FT's, FA's, NO's, WA's and FD data are given, after which you may complete your flight plan and file.

OPTION W: Selected Weather at Specific Locations

This option allows the pilot to select from several specific types of reports at any of the weather reporting stations (if available). The report types are:

- SA Hourly Aviation Weather: whether derived from a scheduled hourly surface observation (SA), a special aviation weather report (SP) or a supplementary report (SW), this report contains the time of observation, sky cover, visibility, weather, temperature, dew point, wind direction and speed, and altimeter setting.

- FI Terminal Forecast: shows the time period for which the forecast is valid and the forecasted weather at the specific location.

- FA Area Forecast: an extended summary of the forecast weather over a large geographic region.
- WA Airmets, Sigmet, and Weather Warnings: are meteorological data of importance to small aircraft and all aircraft, and severe storm warnings.
- NO Notams and Pireps: are Notices to Airmen and Pilot Reports for specific nav aids, airports and weather phenomena
- TR Tweb Route and Synopses: are Transcribed Weather Broadcasts along specific routes and synopses of weather at specific points. List of locations are in the Airman's Information Manual.
- FD Winds Aloft Forecast: contains the forecast wind direction and speed, and temperature in degrees centigrade, at altitude requested +4000 feet. The desired altitude must also be input. (eg, FD65 or FD7000).

Location: the weather reporting stations accessed are, in general, those where SA's are available, as well as NO, FA, WA and FD. FT and TR reports are available at selected stations only.

Option F: File Flight Plan

This option allows the pilot to enter line by line all the elements of a flight plan file, and receive verification.

Option C: Close Flight Plan

This option allows the pilot to identify his flight plan and cancel or close it.

Option U: File a Pilot Report

This option allows the pilot to file a PIREP indicating a hazard to flight encountered aloft.

EXAMPLE FORMATS

REPORT WEATHER DATA A
 101010Z OCTOBER 11, 1974 AT 1006Z
 ALL TIMES ARE GMT.....TO GET GMT, ADD 5 HOURS TO LOCAL TIME

OPTION LIST

OPTIONS ENTER
 TO TERMINATE THE USE OF THIS DEVICE AT ANY TIME P
 TO OBTAIN ONLY LOCAL WEATHER L
 TO OBTAIN A ROUTE ORIENTED BRIEFING B
 TO OBTAIN SELECTED WEATHER FOR SPECIFIC LOCATIONS . . . W
 TO FILE A FLIGHT PLAN F
 TO FILE A PILOT REPORT U
 TO CLOSE OR CANCEL A FLIGHT PLAN C
 **ENTER: (W)

LOC ID'S

*ENTER LOCATION IDENTIFIER AND OR ICAO CODE
 SEPARATE WITH SLASHES
 **ENTER: (JFK)

REPORT TYPES

**SELECT FROM THESE REPORT TYPES - ENTER TWO LETTER CODES (S)
 SEPARATE WITH SLASHES
 SA = HOURLY AVIATIONS NO = NOTAMS, PILOT REPORTS
 FA = AREA FORECASTS FT = TERMINAL FORECASTS
 WA = AIRMETS, SIGMETS, WEATHER WARNINGS
 TP = TWEB ROUTES, TWEB SYNOPSIS
 FD = WINDS ALOFT FORECASTS
 FOR WINDS AT ALTITUDE, INCLUDE AFTER FD, ALTITUDE IN HUNDREDS OF FEET
 OF FLIGHT LEVEL
 **ENTER: (SA/FA/WA/NO/FT/FD)

SA

**HOURLY AVIATION WEATHER
 SITE TIME SKY COVER WSBY /WEATHER TNP/ DP DIR/ SPD ALTH
 JFK 1800 TLT 15 65/ 42 030-94 3053

WA

AIRMET DELTA 2. FLIGHT PRECAUTIONS FOR 50 MILES
 EITHER SIDE OF AN ERI-APT LINE. GUSTY WINDS OCCASIONAL
 MODERATE TURBULENCE BELOW 7 THOUSAND FEET.
 ***SIGMETS
 ***WEATHER WARNINGS
 ***NOTAMS

NO

JFK 4P-22L UNUSABLE BELOW 200
 JFK 4P-22L CLOSED 1130-1900
 JFK 4L-22R CLOSED 1130-1900
 JFK ILS 13L OUT OF SERVICE
 JFK LOCALIZER/GP 2. OUT OF SERVICE 1130-2100

*****AREA FORECASTS (YQB)**

AREA FORECAST

OUTLOOK 18Z - 06Z....NORTH-SOUTH RIDGE THROUGH MONTREAL AT 02Z
MOVING EASTWARD TO BE THROUGH BY 06Z.

MODERATE NORTHERNLY FLOW

FA OVER EASTERN REGIONS BECOMING LIGHT TO MODERATE BY SUNSET.
GENERALLY DRY BUT BECOMING MOIST OVER WESTERN REGIONS BY MID PERIOD
WITH A LIGHT TO MODERATE SOUTHERNLY FLOW.

SIGNIFICANT CLOUDS AND WEATHER....GENERALLY 30-40 SCT

BU 60 BECOMING OVER REGION 25-35 SCT VARIABLE BKN.

10-100 BKN AC 140-160 GIVING OCCASIONAL RAIN SHOWERS

BY MID PRD. WINDS OCCASIONALLY GUSTING TO 30.

ICING....LIGHT RIME ICING IN CLOUDS. FREEZING LEVEL 90 IN

SOUTHERN REGIONS DOWN TO 40 IN NORTHERN REGIONS.

TURBULENCE.... OCCASIONAL LIGHT TO MODERATE GUSTY WINDS IN LOW LEVELS.

*****TEMPERATURE FORECASTS**

FT { YQB

1. 00Z - 06Z 30 VARIABLE SCT LOWERING TO SCT CL. SHAL BKN

(FD 90) Get requested altitude ± 4000 feet,

*REQ.	ALTITUDE	WIND	DIR/SP TMP	TMP
FD {	FOOT	FORECAST VALID 10/11 AT 1800Z		
	5000		257/17	-2
	9000		257/17	-2
	JFK	254/17	257/17	-11

(FD 40) except when request less than 6000 ft, in which case you set -2000, +4000

*WINDS ALOFT	ALTITUDE	DIR/SP TMP	TMP
FD {	WINDS ALOFT FORECAST VALID 10/11 AT 1800Z		
	2000	257/15	-2
	4000	265/18	-2
	8000	257/20	-2

APPENDIX B
INSTRUCTIONS FOR SPECIFIC TERMINAL USE
TELETERM KEYBOARD/HARD COPY UNIT

This terminal device presents a format similar to a standard typewriter, except all characters are upper case. The items in the option list, and headings indicating inputs for each of the options, will be printed out for you. Follow the instructions in the briefings.

If you make an error on input, hit the "RUB OUT" key immediately after the incorrect character, and a backslash (\) will indicate that the previous character has been eliminated and the correct character may be typed in.

If you have gone beyond the incorrect character, you will be given a chance to correct the entire line before the inputs are processed. Just proceed with the briefing.

At the end of each input line, hit carriage return. This will indicate to the computer the end of an input.

CRT

This terminal concept features a full keyboard, similar to a typewriter except all characters are upper case, and a CRT (Cathode Ray Tube) for output. The items in the option list, and headings indicating inputs for each of the options, will be printed out for you. Follow the instruction in the briefings.

If you make an error in input, hit the "RUB OUT" key immediately after the incorrect character, and a backslash (\) will indicate that the previous character has been eliminated and the correct character may be typed in.

If you have gone beyond the incorrect character, you will be given a chance to correct the entire line before the inputs are processed. Just proceed with the briefing.

At the end of each input line, hit carriage return. This will indicate to the computer the end of an input.

After each forty lines of input, the output will halt and await an input before continuing. This will allow you to scan the data and note any information you need. Don't rush, but do step through the data as quickly as possible. The total briefing time is important. The hard copy unit will provide a copy of data on the screen. Just press the button on the side of the CRT.

CRT GRAPHICS OPTION

The graphics display will replace the area forecast in the Route Oriented Briefing with a depiction of surface reports, predicted conditions, radar summary, predicted freezing levels, and a vertical route profile for cloud cover. As with the text, copies may be made using the hard copy unit.

MAP

The pushbutton map display is intended to simplify the data input procedure. The function panel in the lower right corner allows the pilot to select the type of briefing desired, and any other data required. When inputs are complete, select SC (Selection Complete) and data will appear on CRT. Follow directions

For L/Local Weather Only

select L and SC (Selections Complete)

For B/Route Oriented Briefing

select B, insert altitude, and push reporti.
stations IN THE ORDER of your flight. Select SC

For W/Selected Weather at Specific Locations

select W, select report type desired, select
reporting stations. Select SC.

For F/File Plan

select F and SC

For C/Close Flight Plan

select C and SC

For U/File Pilot Report

select U and SC

CORRECTIONS: If you push a wrong button hit the "START/RESET" button and begin over. If you enter an incorrect altitude, use the "clear" button on the numeric keyboard and reenter.

VOICE RESPONSE SYSTEM

The VRS unit for this evaluation is made by Sperry-Univac, St. Paul, Minnesota. It is representative of the larger capacity, digital data storage systems available today. The vocabulary items "spoken" by the VRS are generated in the following manner:

- a) the vocabulary items are spoken into a microphone and recorded as an analog signal.
- b) the voiceprint of the analog signal is displayed, and manual interpretation done to delineate the beginning and end of the word or phrase.
- c) the analog signal is then digitized and stored on disk.
- d) to recall the vocabulary item, the appropriate location is sent to the 1616 computer, which retrieves the digital data from the disk.
- e) the vocabulary item is then reproduced through a D/A converter and the audio unit. The "spoken word" output is not a recording, but true reconstruction of sound based upon digital sampling techniques.

The VRS unit is capable of storing 1200 vocabulary items per disk, and handling four simultaneous users.

TouchtoneTM Telephone

The keys on a TouchtoneTM Telephone may be used to enter alphanumeric data, using certain rules. We can define a keying method requiring two keystrokes for all characters entered, using the following scheme: On each of the nine top keys, there are three letters of the alphabet and a number. The first keystroke of each pair indicates the key on which the character appears. The second keystroke is either the left, center or right key in the same row to indicate the left, center or right letter on the first key, OR the # sign to indicate the number on the key. Thus,

ABC2 key followed by 1 is A,
ABC2 key followed by 2 is B,

ABC2 key followed 3 is C,
ABC2 key followed # is 2.

The letters of the alphabet follow in order, except for Q, Z and a space, which may be found on the 1 key.

By use of the * key, we may define additional functions:

- *0 is equivalent to a carriage return on a full keyboard, signalling the end of a line of input. After each, the VRS will echo back your input, which you must acknowledge either with a second *0 input (indicating OK) or a *2 input (allows you to reenter same line).
- *1 allows you to delete the previous input character
- *2 allows you to delete the entire previous line and begin over.
- *3 is a slash (/) to be used as a delimiter between successive entries.

The Voice Response System will prompt you for inputs, echo your inputs after each carriage return, and "read" the weather briefing. A tape recording capability will be given you, in order to listen to your briefing afterwards.

Hand Held Terminal

The Hand Held Terminal was designed as a remote terminal requiring two handed operation. On each key are three characters along the top and one in lower center. On the side of the terminal are three keys which allow you to enter either the left, center or right character along the top of each key by simultaneously depressing the appropriate side-key. If no side key is pressed, the single lower character is entered.

The LED display indicates which character has been entered. The scrolling key on the side of the terminal allows you to see previously entered data. The cursor indicates where the next character will be entered.

In addition to the alphanumeric characters, entries needed are the slash (/) to separate input items, space (SP) between characters,

carriage return (CR) to signal end of an entry item and delete character (DEL). DEL is on the SP key; its use will cause a character (☐) to appear on the display indicating the previously input character has been deleted and the correct character entered.

Alphanumeric Keyboard/LED Display

This Remote Terminal is designed to be a portable communications unit. Several of its features are:

- full alphanumeric keyboard, requiring two keystrokes per character. The first keystroke indicates the key the character is on; the second is either the left, center, or right key in the same row to indicate the left center or right letter on the first key, OR, the # sign to indicate the number on the key. Thus,
JKL5 key followed by 4 is J,
" " " " 5 " K,
" " " " 6 " L,
" " " " # " 5.

The letters of the alphabet follow in order, except for Q, Z and space, which may be found on the 1 key.

- The four function keys in the right are:
 - slash (/), to be used between input items
 - delete key, which allows you to cancel previous keystrokes
 - scroll backwards (->), which allows you to step backwards through memory continuously.
 - scroll forwards (+), to step forward continuously
- The combination ** is used during message composition for burst transmission, to indicate the end of an item.
- The transmit key is used to burst transmit the original message or to signal the end of a line of input when in conversational mode.
- The reset key is used to position the memory at the beginning.

- The tape recorder is automatically recording the VRS outputs. You may listen to the outputs through the speaker.
- A blank space is obtained by pushing Ø Ø.

TV Terminal

The TV Terminal is a portable unit designed to convert any TV set into a CRT device. It features a full typewriter keyboard for input, and 25 lines of 40 characters each on the face of the screen.

The option list is presented at the beginning of the briefing. After selection of the desired option, the weather briefing data will appear on the screen. After the screen fills, the phrase "TYPE P TO CONTINUE?" will appear, allowing you to scan the data before proceeding.

Corrections

If you make an error on input, hit the "RUBOUT" key to delete the previous character (a backslash \ will appear next to the deleted character) and continue entering data.

After each line of entry or character input, hit the "carriage return" to indicate finishing an input item.

APPENDIX C
FLIGHT DESCRIPTIONS & CUE CARDS

INDOCTRINATION FLIGHT (PSBT & RT)

You are proposing a VFR flight from Richmond, Va. to Dulles International Airport. The requested altitude is 5500 feet and estimated time enroute is forty-five minutes for the 80 mile route. You wish to leave at 2200 Z Friday (5 PM local time).

Your aircraft is a Cessna 172 equipped with DME. The CS 172/D has a true airspeed of 120 knots, and its tail number is N1573P. The aircraft is white and gold, is flying with three people on board, and will carry 3 1/2 hours of fuel. Use your own name and address on the flight plan.

You will select Option W, Selected Weather at Specific Locations, and request SA (Surface Observations) at RIC (Richmond, VA) and IAD (Dulles Int'l.), in order to get a quick picture of the weather.

Then request Option B, Route Oriented Briefing and enter the appropriate data. Following the briefing, you will complete and file your flight plan.

INDOCTRINATION FLIGHT

Option W (Selected Weather)

AT: RIC/IAD

Reports: SA (Surface Observations)

* Briefing*

Option B (Route Oriented Briefing)

A TYPE FLIGHT.....VFR

B AIRCRAFT ID.....N1573P

C DEPARTURE TIME...2200

D ALTITUDE.....5500

E ROUTE.... RIC/IAD

F Alternate.....

G TRUE AIRSPEED...120

* Briefing *

H TYPE AIRCRAFT...CS172/D

I EST TIME ENROUTE.0045

J FUEL ONBOARD....0330

K PERSONS ONBOARD..3

L COLOR AIRCRAFT...WHITE/GOLD

M NAME.....(your own)

N ADDRESS..... " "

O REMARKS.....

PSBT PRACTICE FLIGHT

You are proposing a VFR flight from Lebanon Regional Airport, New Hampshire to Caribou Municipal Airport, Maine, by way of Augusta. The requested altitude is 7500 feet and estimated time enroute is a little over two hours for the 295 mile route. You wish to leave at 1100 Z Saturday (6 AM local time).

Your aircraft is a Cessna 172, equipped with 64 code transponder. The CS 172/T has a true airspeed of 120 knots, and its tail number is N4971A. The aircraft is white, is flying with two people on board, and will carry four hours of fuel. The pilot's name is L. Harris, 55 Broadway, Cambridge.

You will select Option W, Selected Weather at Specific Locations and request SA (Surface Observations), FT (Terminal Forecasts) and FD75 (Winds Aloft Forecast at 7500 feet) for the locations LEB (Lebanon), AUG (Augusta) and CAR (Caribou).

Following your briefing you will select Option F (File Flight Plan) file your flight plan, and end your FSS contact.

PSBT PRACTICE FLIGHT

Option: W (Selected Weather)

At LEB/AUG/CAR

Report SA/FT/FD75

* Briefing *

Option F (File Flight Plan)

A Type Flight.....VFR

B Aircraft ID... N4971A

C Departure Time.. 1100

D Altitude.....7500

F Route.....LEB/AUG/CAR

I Alternate.....

G True Airspeed... 120

H Type Aircraft ..CS172/T

I Est Time Enroute.0210

Fuel Onboard .. .0400

K Persons Onboard..2

L Color Aircraft...WHITE

M Name.... L HARRIS

N Address ..55 BROADWAY CAMBRIDGE

O Remarks...

SA Surface Observations

FT Terminal Forecast

FD Winds Aloft Forecast

PSBT TEST FLIGHT

You are proposing an IFR flight from Norwood Memorial Airport, MA to Rochester - Monroe County Airport, NY. The route consists of radar vectors to WESTON intersection, VICTOR 14 to Gardner, MA, then VICTOR 2 to Rochester. Your alternate airport is Syracuse. The requested altitude is 8000 feet and estimated time enroute is an hour and three quarters for the 296 mile route. You wish to leave at 1900 Z Friday (2 PM local time).

Your aircraft is a Beechcraft Baron, equipped with DME and 4096 code transponder. The BE 55/A has a true airspeed of 190 knots, and its tail number is N3472B. The aircraft is white, with red trim, is flying with three people on board, and will carry 4 1/2 hours of fuel. The pilot's name is J. Robertson, 175 Riverway, Boston.

You will select Option B, Route Oriented Briefing, and enter the appropriate data. Following the briefing, you will complete and file your flight plan.

PSBT TEST FLIGHT

Option B (Route Oriented Briefing)

A Type Flight.....IFR
B Aircraft ID..... N3472B
C Departure Time. 1900
D Altitude... 8000
E Route ...06D/WEST/V11/GDM/V2/ROC
F Alternate.....SYR
G True Airspeed. ...190
* Briefing *
H Type Aircraft ...BE55/A
I Est time Enroute .0150
J Fuel Onboard.....0130
K Persons Onboard...3
L Color Aircraft. ...WHITE/RED
M Name ...J ROBERTSON
N Address ...175 RIVERWAY BOSTON
O Remarks...

RT PRACTICE FLIGHT

You are proposing a VFR flight plan from Wood County Airport (near Parkersburg, W.V.) to Toledo Express Airport, OH, by way of Mansfield, OH. The requested altitude is 4500 feet and estimated time enroute is an hour and a half for the 180 mile route. You wish to leave at 2100 Z Friday (4 PM local time).

Your aircraft is a Cessna 172, equipped with 64 code transponder. The CS 172/T has a true airspeed of 120 knots, and its tail number is N4971A. The aircraft is white, is flying with two people on board and will carry four hours of fuel. The pilots name is L. Harris, 55 Broadway, Cambridge.

You will select Option 2, selected weather at specific locations, and request SA (Surface Observations), FT (Terminal Forecasts) and FD 45 (winds aloft forecast at 4500 feet) for the locations PKB (Parkersburg, WV), MFD (Mansfield, OH) and TOL (Toledo, OH).

Following your briefing you will Select Option F (File Flight Plan) file your flight plan, and end your FSS contact.

RT PRACTICE FLIGHT

Option: W
At PKB/MFD/TOL
Reports: SA/FT/FD45
* Briefing *

Option: F
A Type Flight.....VFR
B Aircraft ID.....N4971A
C Departure Time....2100
D Altitude.....4500
E Route.....PKB/MFD/TOL
F Alternate.....
G True Airspeed.....120
H Type Aircraft.....CS172/T
I Est Time Enroute..0130
J Fuel Onboard.....0400
K Persons Onboard...2
L Color Aircraft...WHITE
M NameL. HARRIS
N Address...55 BROADWAY (CAMBRIDGE)
O Remarks...

RT TEST FLIGHT

You are proposing an IFR flight from Allegheny County Airport, PA, to Newark International Airport, NJ, by way of Johnstown, VICTOR 106, Wilkes-Barre, VICTOR 226 and BUDD intersection. Your alternate airport is Teterboro. The requested altitude is 9000 feet and estimated time enroute is 1 1/3 hours for the 286 mile route. You wish to leave at 1100 Z Saturday (6 AM local time).

Your aircraft is a Beechcraft Baron, equipped with DME and 4096 code transponder. The BE 55/A has a true airspeed of 190 knots, and its tail number is N3472B. The aircraft is white, with red trim, is flying with three people on board, and will carry 4 1/2 hours of fuel. The pilot's name is J. Robertson, 175 Riverway, Boston.

You will select Option B, Route Oriented Briefing, and enter the appropriate data. Following the briefing, you will complete and file your flight plan.

RT TEST FLIGHT

Option: B

A Type Flight.....IFR
B Aircraft ID.....N3472B
C Departure Time....1100
D Altitude.....9000
E Route.....AGC/JST/V106/AVP/
V226/BUDD/EWR
F Alternate.....TEB
G True Airspeed.....109
* Briefing *
H Type Aircraft.....BE55/A
I Est Time Enroute..0130
J Fuel Onboard.....0430
K Persons Onboard...3
L Color Aircraft....WHITE/RED
M Name.....J ROBERTSON
N Address...175 RIVERWAY BOSTON
O Remarks...

APPENDIX D

FLIGHT BRIEFING FORMATS & CONTENT

PBST INDOCTRINATION FLIGHT

-PRACTICE FLIGHT-

CURRENT WEATHER DATA AVAILABLE IS FOR
FRIDAY, OCTOBER 11, 1974 AT 1800Z.

ALL TIMES ARE GMT TO GET GMT, ADD 5 HOURS TO LOCAL TIME

OPTIONS	ENTER
TO TERMINATE THE USE OF THIS DEVICE AT ANY TIME	R
TO OBTAIN ONLY LOCAL WEATHER	L
TO OBTAIN A ROUTE ORIENTED BRIEFING	B
TO OBTAIN SELECTED WEATHER FOR SPECIFIC LOCATIONS	W
TO FILE A FLIGHT PLAN	F
TO FILE A PILOT REPORT	U
TO CLOSE OR CANCEL A FLIGHT PLAN	C
XXENTER?U	

Note: Format and text for all flights are common to all PBST terminals except as follows:

- 1) Hard Copy Terminal output differs in omission of the instruction that "more information follows, type P when ready" and provision of continuous print-out.
- 2) Graphics Terminal output differs in omission of Area Forecast in PBST Test Flight only, and inclusion of five graphic presentations.
- 3) Map Terminal output differs in omission of options print-out and substitut on of statement to "make selections on map".

***HOURLY AVIATION WEATHER
SITE TIME SKY COVER
RIC 1800 CLR
IAD 1800 CLR

USBY /WEATHER TMP/ DP DIR/ SPD ALTM
6 H 76/ 46 340/07 3030
15 73/ 45 140/05 3031

***END OF REPORTS
ADDITIONAL SELECTIONS NEEDED (ENTER YES OR NO)?N

OPTIONS
TERMINATE ENTER
LOCAL WEATHER R
ROUTE ORIENTED BRIEFING L
SELECTED WEATHER B
FILE A FLIGHT PLAN W
FILE A PILOT REPORT F
CLOSE A FLIGHT PLAN U
***ENTER?B C

*ENTER THREE LETTER LOCATION IDENTIFIER AND/OR TWEB ROUTE NUMBERS
SEPARATE WITH SLASHES
**ENTER?RIC/IAD

**SELECT FROM THESE REPORT TYPES - ENTER TWO LETTER CODE(S)
SEPARATE WITH SLASHES
SA = HOURLY AVIATIONS NO = NOTAMS, PILOT REPORTS
FA = AREA FORECASTS FT = TERMINAL FORECASTS
WA = AIRMETS, SIGMETS, WEATHER WARNINGS
TR = TWEB ROUTES, TWEB SYNOPSIS
FD = WINDS ALOFT FORECASTS
FOR WINDS AT ALTITUDE. INCLUDE AFTER FD. ALTITUDE IN HUNDREDS OF FEET
OR FLIGHT LEVEL
**ENTER?SA

A TYPE OF FLIGHT (IFR/UFR/DUFR) ... ?UFR
B AIRCRAFT IDENTIFICATION ... ?N1573P
C PROPOSED DEPARTURE TIME (GMT) ... ?2200
D ALTITUDE OR FLIGHT LEVEL ... ?5500
E ROUTE OF FLIGHT (DEP/ROUTE/DEST) ... ?RIC/IAD
F ALTERNATE AIRPORT (IF ANY) ... ?
G TRUE AIRSPEED (KNOTS) ... ?120

TO CORRECT ANY ENTRY ENTER APPROPRIATE LETTER (A, B, C, ETC.)
ENTER P TO CONTINUE?P

YOUR ROUTE IS BEING PROCESSED

***CONSIDER THE FOLLOWING DATA CAREFULLY BEFORE FLYING

***THE FOLLOWING DATA FOR 25 MILES ON EITHER SIDE OF ROUTE ARE

***NOTAMS

IAD 1L-19R CLOSED

***AIRMETs

AIRMET ALPHA 1. FLIGHT PRECAUTIONS OVER KENTUCKY, SOUTHERN OHIO.
OCCASIONAL VISIBILITIES BELOW 3 MILES AND 1000 FEET IN GROUND FOG.
ESPECIALLY IN OHIO RIVER VALLEY.

***SIGMETs

***WEATHER WARNINGS

NO SIGNIFICANT WEATHER, EXCEPT AT THE FOLLOWING LOCATIONS

***HOURLY AVIATION WEATHER

SITE TIME SKY COVER

RIC 1800 CLR

NYG 1726 CLR

DAA 1726 CLR

DCA 1800 CLR

IAD 1800 CLR

***PILOT REPORTS

***TERMINAL FORECASTS

RIC

1500Z-0900Z CLEAR.

0900Z-1500Z UFR..

DCA

MORE INFORMATION FOLLOWS. TYPE F WHEN READY?P

USBY	WEATHER	TMP/DP	DIR/ SPD	ALTM
6	H	76/ 46	340/07	3030
6	H	70/ 54	350/02	3035
7		71/ 47	000/00	3033
15		74/ 45	050/03	3032
15		73/ 45	140/05	3031

1500Z-0900Z CLEAR
0900Z-1500Z UFR...

IAD

1500Z-0900Z CLEAR
0900Z-1500Z UFR...

***WINDS ALOFT

WINDS ALOFT FORECAST VALID 10/11 AT 1800Z

ALTITUDE

3500

	DIR/SP TMP	5500	DIR/SP TMP
RIC	257/ 4 12		261/ 6 11
+50 MI	255/ 5 12		259/ 7 11
+86	252/ 6 11		256/ 8 10

9500

	DIR/SP TMP
	267/13 4
	268/14 4
	269/15 4

***AREA FORECASTS

AREA FORECAST

OUTLOOK 07Z-19Z SAT

OHIO ADJACENT GREAT LAKES WVA MD DC DEL VA NC SC AND ADJACENT COASTAL WATERS...

HEIGHTS ABOVE SEA LEVEL UNLESS NOTED...

SYNOPSIS... RIDGE OF HIGH PRESSURE OVER EASTERN U S WILL MOVE

EASTWARD 10-15 KNOTS. COOL AND DRY WESTERLY FLOW WILL PREVAIL OVER

FORECAST AREA. SIGNIFICANT CLOUDS AND WEATHER...

OHIO ADJACENT GREAT LAKES WVA...

CLEAR EXCEPT OCCASIONAL VISIBILITIES AND LOCAL CEILINGS BELOW 3 MILES

AND 1000 FT IN GROUND FOG AND STRATUS ESP IN VALLEYS AND OHIO RIVER

VALLEY IMPROVING TO 4 FH AFTER 14Z THEN 4-6 HAZE AND 30-50 SCT CUMULUS

16Z-23Z. SCT TO BROKEN AC 100 OVER WESTERN OHIO NEAR END OF PRD.

OUTLOOK... IFR FOG/HAZE BECOMING MVFR HAZE. VA MD DC DEL NC SC

ADJACENT COASTAL WATERS...

CLEAR EXCEPT OCCASIONAL VISIBILITIES AND LOCAL CEILINGS BELOW 3 MILES

AND 1000 FT IN GROUND FOG AND STRATUS ESP SOUTHEASTERN VA AND THE

MORE INFORMATION FOLLOWS. TYPE P WHEN READY??

CAROLINAS IMPROVING AFTER 14Z TO 4-6 HAZE AND SCT 40 CUMULUS 16Z-23Z.
OUTLOOK MUFR HAZE AND FOG. ICING... FREEZING LEVEL 120
OHIC RISING TO 145 OJER CAROLINAS. NO ICING.

*END OF ROUTE BRIEFING. ENTER P TO CONTINUE?P

YOUR DATA ENTERED FROM ROUTE BRIEFING
A TYPE OF FLIGHT (IFR/UFRR/DUFR) UFR
B AIRCRAFT IDENTIFICATION N1573P
C PROPOSED DEPARTURE TIME (GMT) 2200
D ALTITUDE OR FLIGHT LEVEL 5500
E ROUTE OF FLIGHT (DEP/ROUTE/DEST) RIC/IAD/
F ALTERNATE AIRPORT (IF ANY)
G TRUE AIRSPEED (KNOTS) 120
COMPLETE YOUR FLIGHT PLAN
H TYPE OF AIRCRAFT/SPECIAL EQUIPMENT ?CS172/D
I ESTIMATED TIME ENROUTE (HRS/MINS) ?0045
J FUEL ON BOARD (HRS/MINS) ?0330
K NO PERSONS ABOARD ?3
L COLOR OF AIRCRAFT ?WHITE/GOLD
M PILOTS NAME ?
N PILOTS ADDRESS ?
O REMARKS ?

TO CORRECT ANY ENTRY ENTER APPROPRIATE LETTER (A,B,...ETC)
ENTER X TO FILE FLIGHT PLAN?X
YOUR FLIGHT PLAN HAS BEEN FILED

ENTER P TO CONTINUE?P

OPTIONS
 TERMINATE ENTER
 LOCAL WEATHER R
 ROUTE ORIENTED BRIEFING L
 SELECTED WEATHER B
 FILE A FLIGHT PLAN W
 FILE A PILOT REPORT F
 CLOSE A FLIGHT PLAN U
 **ENTER?S C

PSBT TEST FLIGHT

CURRENT WEATHER DATA AVAILABLE IS FOR
FRIDAY, OCTOBER 11, 1974 AT 1800Z.

ALL TIMES ARE GMT TO GET GMT, ADD 5 HOURS TO LOCAL TIME

OPTIONS
 TO TERMINATE THE USE OF THIS DEVICE AT ANY TIME ENTER
 TO OBTAIN ONLY LOCAL WEATHER R
 TO OBTAIN A ROUTE ORIENTED BRIEFING I
 TO OBTAIN SELECTED WEATHER FOR SPECIFIC LOCATIONS B
 TO FILE A FLIGHT PLAN W
 TO FILE A PILOT REPORT F
 TO CLOSE OR CANCEL A FLIGHT PLAN U
 **ENTER?J C

ENTER THREE LETTER LOCATION IDENTIFIER AND/OR TWEB ROUTE NUMBERS
SEPARATE WITH SLASHES
**ENTER?LEB/AUG/CAR

**SELECT FROM THESE REPORT TYPES - ENTER TWO LETTER CODE(S)

SEPARATE WITH SLASHES

SA - HOURLY AVIATIONS NO - NOTAMS, PILOT REPORTS

FA - AREA FORECASTS FT - TERMINAL FORECASTS

WA - AIRMETS, SIGMETS, WEATHER WARNINGS

TR - TWEB ROUTES, TWEB SYNOPSIS

FD - WINDS ALOFT FORECASTS

FOR WINDS AT ALTITUDE. INCLUDE AFTER FD. ALTITUDE IN HUNDREDS OF FEET

OR FLIGHT LEVEL

**ENTER?SA/FT/FD75

***HOURLY AVIATION WEATHER
 SITE TIME SKY COVER USBY /WEATHER TMP/ DP DIR/ SPD ALTM
 LEB 1800 350- BKN 30+ 54/ 25 000/00 3033
 AUG 1800 CLR 15+ 48/ 16 040/10 3026
 CAR 1800 CLR 30 45/ 16 290/17 3013
 ***TERMINAL FORECASTS

LEB 1500Z-0600Z 300 SCT.
 0600Z-0800Z PARTLY OBSCURED 3 GF.
 0800Z-0900Z CEILING OBSCURED FOG.
 0900Z-1500Z LIFR CEILING FOG BECOMING MVFR CEILING...

AUG 1500Z-0000Z CLEAR WINDS 320/15.
 0000Z-0900Z 250 SCT.
 0900Z-1500Z VFR.

CAR 1500Z-2300Z 50 SCT WINDS 300/20 GUSTS 30.
 2300Z-0400Z 250 SCT WINDS 290/12.
 0400Z-0700Z 100 SCT CEILING 250 BKN SCT VARIABLE BKN.
 0700Z-0900Z 25 SCT CEILING 80 OVC CHANGE CEILING 25 BKN LIGHT
 RAIN SHOWERS.

0900Z-1500Z VFR BECOMING I. VFR CEILING RAIN SHOWERS.
 ***WINDS ALOFT
 WINDS ALOFT FORECAST VALID 10/11 AT 1800Z

ALTITUDE	DIR/SP TMP	DIR/SP TMP
3500	264/13 5	251/25 -2
7500	259/16 4	241/28 -3
	231/22 -0	219/34 -7
		11500

MORE INFORMATION FOLLOWS. TYPE P WHEN READY??

***END OF REPORTS
ADDITIONAL SELECTIONS NEEDED (ENTER YES OR NO)?N

OPTIONS	
TERMINATE	ENTER
LOCAL WEATHER	R
ROUTE ORIENTED BRIEFING	L
SELECTED WEATHER	B
FILE A FLIGHT PLAN	W
FILE A PILOT REPORT	F
CLOSE A FLIGHT PLAN	U
***ENTER?F	C

A TYPE OF FLIGHT (IFR / UFR / DUFR) ? IFR
 B AIRCRAFT IDENTIFICATION ?N4971A
 C PROPOSED DEPARTURE TIME (GMT) ?1100
 D ALTITUDE OR FLIGHT LEVEL ?7000
 E ROUTE OF FLIGHT (DEP / ROUTE / DEST) ?LEB / U141 / CON / U39 / PQI / CAR
 F ALTERNATE AIRPORT (IF ANY) ?PQI
 G TRUE AIRSPEED (KNOTS) ?120
 H TYPE OF AIRCRAFT / SPECIAL EQUIPMENT ?CS172 / T
 I ESTIMATED TIME ENROUTE (HRS / MINS) ?0210
 J FUEL ON BOARD (HRS / MINS) ?0400
 K NO. PERSONS ABOARD ?2
 L COLOR OF AIRCRAFT ?WHITE
 M PILOTS NAME ?L HARRIS
 N PILOTS ADDRESS ?55 BROADWAY CAMBRIDGE
 O REMARKS ?

TO CORRECT ANY ENTRY ENTER APPROPRIATE LETTER (A , B , . . . ETC)
 ENTER X TO FILE FLIGHT PLAN?X
 YOUR FLIGHT PLAN HAS BEEN FILED

ENTER P TO CONTINUE??

OPTIONS ENTER
 TERMINATE R
 LOCAL WEATHER L
 ROUTE ORIENTED BRIEFING B
 SELECTED WEATHER W
 FILE A FLIGHT PLAN F
 FILE A PILOT REPORT U
 CLOSE A FLIGHT PLAN C
 XXXENTER?S

PSBT PRACTICE FLIGHT

-FLIGHT \$4-

CURRENT WEATHER DATA AVAILABLE IS FOR
FRIDAY, OCTOBER 11, 1974 AT 1800Z.

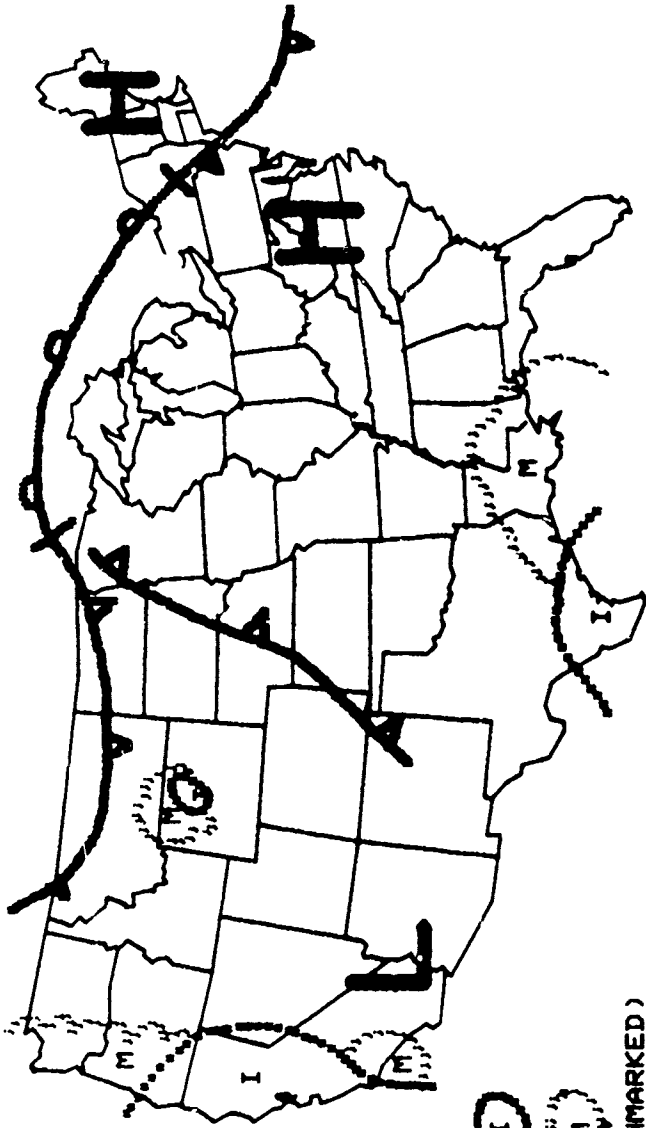
ALL TIMES ARE GMT..... TO GET GMT, ADD 5 HOURS TO LOCAL TIME

OPTIONS
TO TERMINATE THE USE OF THIS DEVICE AT ANY TIME ENTER
TO OBTAIN ONLY LOCAL WEATHER R
TO OBTAIN A ROUTE ORIENTED BRIEFING L
TO OBTAIN SELECTED WEATHER FOR SPECIFIC LOCATIONS B
TO FILE A FLIGHT PLAN W
TO FILE A PILOT REPORT F
TO CLOSE OR CANCEL A FLIGHT PLAN U
**ENTER?B C

A TYPE OF FLIGHT (IFR/UFR/DUFR) ?IFR
B AIRCRAFT IDENTIFICATION ?N3472B
C PROPOSED DEPARTURE TIME (GMT) ?1900
D ALTITUDE OR FLIGHT LEVEL ?8000
E ROUTE OF FLIGHT (DEP/ROUTE/DEST) ?OWD/WEST/U14/GDM/U2/ROC
F ALTERNATE AIRPORT (IF ANY) ?SYR
G TRUE AIRSPEED (KNOTS) ?190

TO CORRECT ANY ENTRY ENTER APPROPRIATE LETTER (A, B, C, ETC.)
ENTER P TO CONTINUE?P

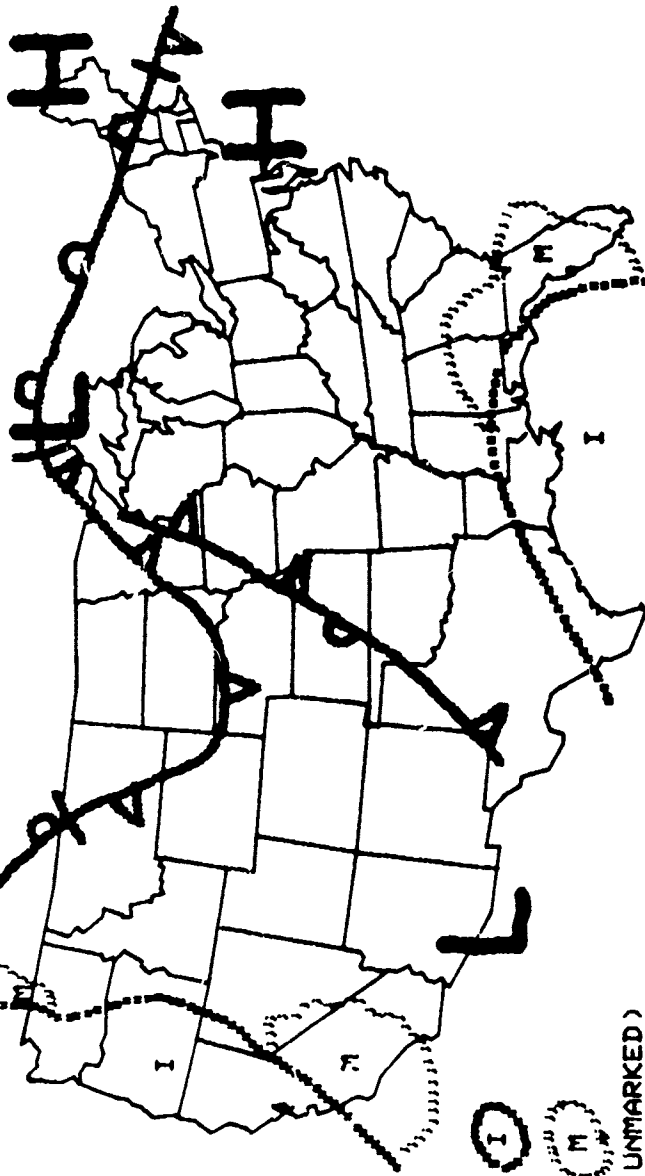
FLIGHT CONDITIONS VALID 1600Z



IFR - (I)
 MUFR - (M)
 UFR - (UNMARKED)

FRONTS -
 COLD - (solid line with triangles)
 WARM - (solid line with semicircles)
 STATIONARY - (dashed line with alternating triangles and semicircles)
 SQUALL LINE - (dashed line with triangles)

PREDICTED FLIGHT CONDITIONS VALID 0000Z



I
I M
IFR -
MUFR -
UFR - (UNMARKED)

SHOWER AND
THUNDERSTORM AREAS

FRONTS -
COLD

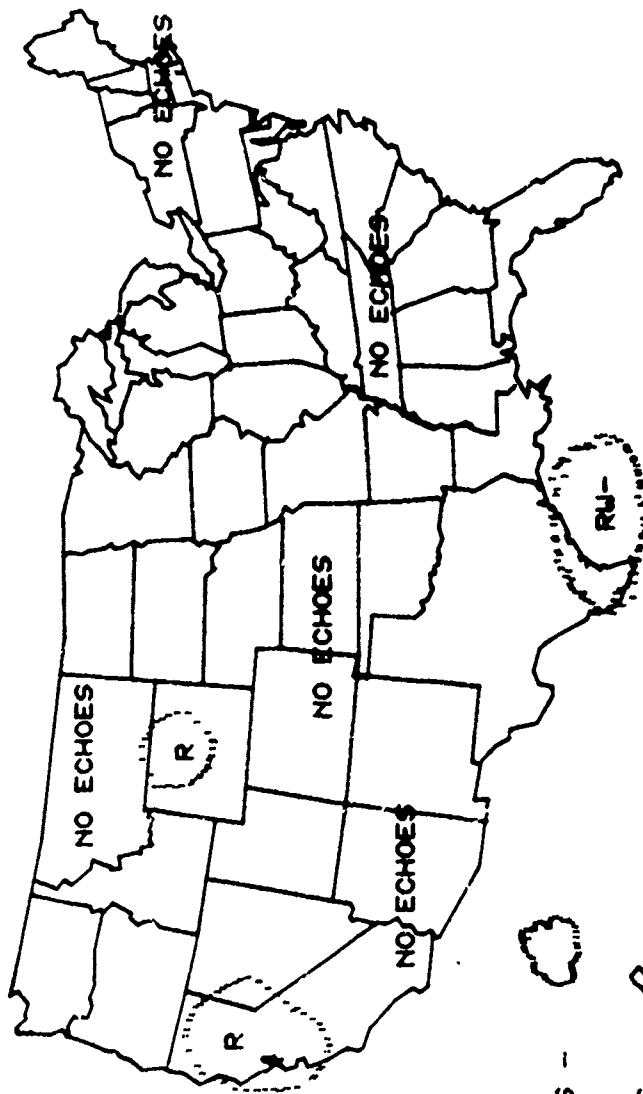
WARM

TROF

OCCLUDED STATIONARY

SQUALL LINE

RADAR SUMMARY VALID 1700Z



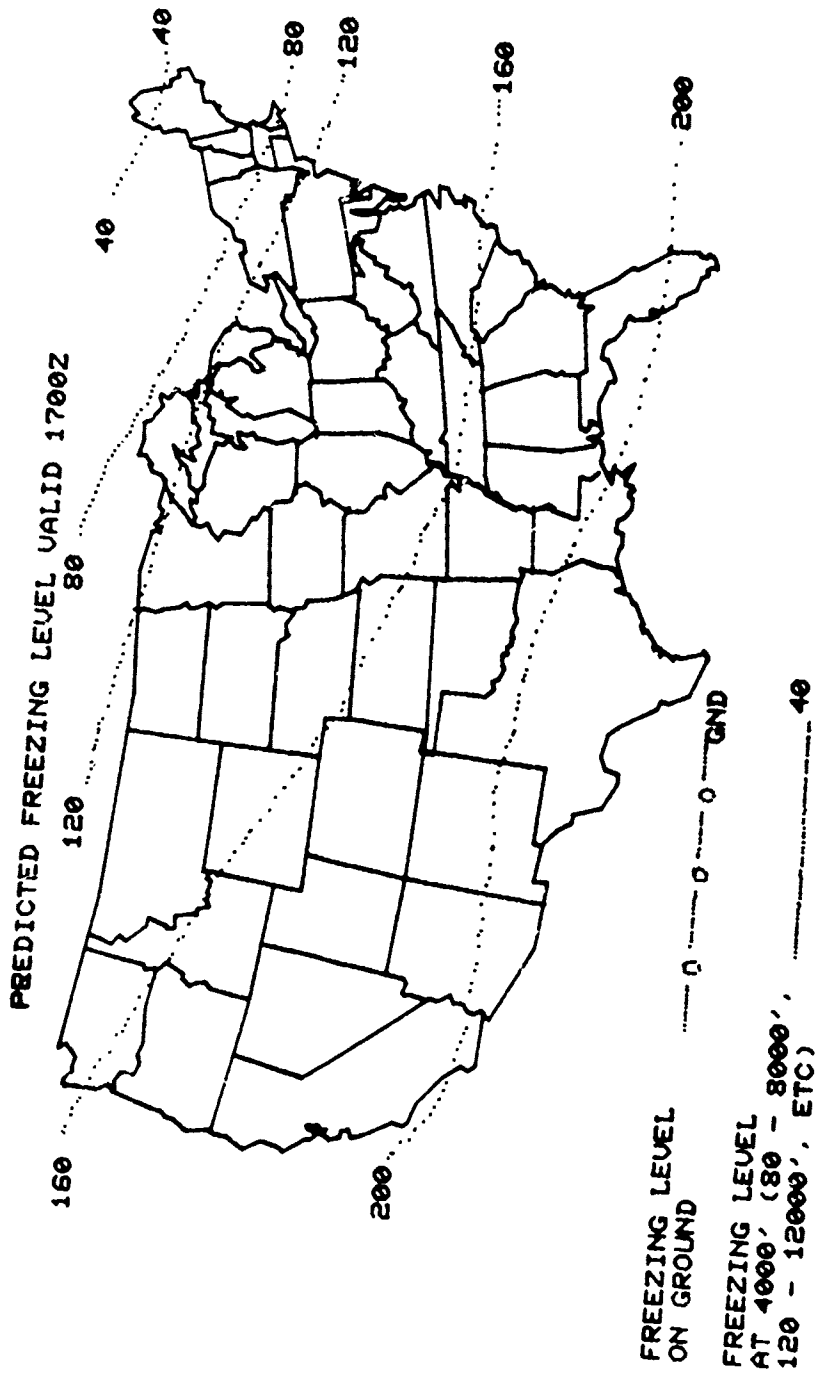
ECHO AREAS -

ECHO LINES -

DIRECTION & SPEED (KTS) → KK

STATUS OF EQUIPMENT -

NE- NO ECHOES NA- OB NOT AVAILABLE OM- OUT FOR MAINTENANCE



YOUR ROUTE IS BEING PROCESSED

***CONSIDER THE FOLLOWING DATA CAREFULLY BEFORE FLYING

***THE FOLLOWING DATA FOR 25 MILES ON EITHER SIDE OF ROUTE ARE

***NOTAMS

PSF SIMPLIFIED DIRECTIONAL FACILITY OUT OF SERVICE
SYR RUNWAY CENTERLINE LIGHTS SYSTEM 28 OUT OF SERVICE
ROC WEST 1500 FT 10-28 CLOSED
ROC LOCALIZER/GP 22 OUT OF SERVICE
ROC LOCALIZER 28 OUT OF SERVICE
***AIRMETs

AIRMET DELTA 2. FLIGHT PRECAUTIONS FOR 50 MILES
EITHER SIDE OF AN ERI-ART LINE. GUSTY WINDS OCCASIONAL
MODERATE TURBULENCE BELOW 7 THOUSAND FEET.

***SIGMETs

***WEATHER WARNINGS

NO SIGNIFICANT WEATHER, EXCEPT AT THE FOLLOWING LOCATIONS
***HOURLY AVIATION WEATHER

SITE	TIME	SKY COVER	USBY	WEATHER	TMP/DP	DIR/ SPD	ALTM
OWD	1600	CLR	15+		54/ 32	020/10	E3037
BED	1800	200-SCT	17		49/31	120/09	3029
SYR	1800	CLR	10		61/ 48	090/04	3028
ROC	1800	250- SCT	10		67/ 49	000/00	3029

***PILOT REPORTS

***TERMINAL FORECASTS

SYR

MORE INFORMATION FOLLOWS, TYPE P WHEN READY??

1500Z-0300Z 250 THIN SCT
 0300Z-0900Z CEILING 250 BKN WINDS 200/11.
 0900Z-1500Z VFR.

ROC 1500Z-0300Z 250 THIN SCT WINDS 220/12.
 0300Z-0900Z CEILING 250 BKN 4 HAZE WINDS 220/13.
 0900Z-1500Z MVFR HAZE.

***WINDS ALJFT
 WINDS ALOFT FORECAST VALID 10/11 AT 1800Z

ALTITUDE	DIR/SP	TMP	8000	DIR/SP	TMP	12000
OWD	239/12	5	241/21	0	242/25	-3
+50 MI	268/11	6	256/20	1	263/24	-2
+190	243/13	8	259/20	2	263/24	-2
+298	230/18	10	256/24	3	264/27	-1

***AREA FORECASTS

AREA FORECAST
 OUTLOOK 07Z-23Z SAT.
 NEW ENG NY PA ADJACENT GREAT LAKES NJ COASTAL WATERS...
 HEIGHTS ABOVE SEA LEVEL UNLESS NOTED
 SYNOPSIS... RIDGE OF HIGH PRESSURE AREA 13Z DRIFTING
 EAST-SOUTHEASTWARD.
 SIGNIFICANT CLOUDS AND WEATHER...
 NO SIGNIFICANT CLOUDS EXCEPT PATCHY 40-50 SCT VARIABLE BROKEN 70 TIL
 22Z. VISIBILITY UNRESTRICTED EXCEPT LOCAL 2 MILES IN PATCHY
 GROUND FOG LOW LYING AREAS TIL 23Z. OUTLOOK... VFR.
 ICING... FREEZING LEVEL 10-20 NORTHERN NEW ENG NORTHEASTERN
 NY SLOPING TO 100 SW PA. NO ICING.

*END OF ROUTE BRIEFING. ENTER P TO CONTINUE??

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**YOUR DATA ENTERED FROM ROUTE BRIEFING**
A TYPE OF FLIGHT . . . . . ( IFR/VFR/DUFR ) . . . . . IFR
B AIRCRAFT IDENTIFICATION . . . . . N3472B
C PROPOSED DEPARTURE TIME (GMT) . . . . . 1900
D ALTITUDE OR FLIGHT LEVEL . . . . . 8000
E ROUTE OF FLIGHT (DEP/ROUTE/DEST) . . . . . OJD/WES/U14/GDM/U2 /ROC/
F ALTERNATE AIRPORT (IF ANY) . . . . . SYR/
G TRUE AIRSPEED (KNOTS) . . . . . 190
**COMPLETE YOUR FLIGHT PLAN**
H TYPE OF AIRCRAFT/SPECIAL EQUIPMENT . . . . . ?BE55/A
I ESTIMATED TIME ENROUTE (HRS/MINS) . . . . . ?0150
J FUEL ON BOARD (HRS/MINS) . . . . . ?0430
K NO. PERSONS ABOARD . . . . . ?3
L COLOR OF AIRCRAFT . . . . . ?WHITE/RED
M PILOTS NAME . . . . . ?J ROBERTSON
N PILOTS ADDRESS . . . . . ?175 RIVERWAY BOSTON
O REMARKS . . . . . ?

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TO CORRECT ANY ENTRY ENTER APPROPRIATE LETTER (A,B,... ETC)
 ENTER X TO FILE FLIGHT PLAN?
 YOUR FLIGHT PLAN HAS BEEN FILED

ENTER P TO CONTINUE?

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OPTIONS
TERMINATE . . . . . ENTER
LOCAL WEATHER . . . . . R
ROUTE ORIENTED BRIEFING . . . . . L
SELECTED WEATHER . . . . . B
FILE A FLIGHT PLAN . . . . . W
FILE A PILOT REPORT . . . . . F
CLOSE A FLIGHT PLAN . . . . . U
**ENTER?S . . . . . C

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RT INDOCTRINATION FLIGHT (VRS OUTPUT FORMAT)

THIS IS A DEMONSTRATION OF A COMPUTER CONTROLLED VOICE RESPONSE SYSTEM FOR THE FLIGHT SERVICE STATION AUTOMATION PROGRAM CONDUCTED BY THE TRANSPORTATION SYSTEMS CENTER FOR THE FEDERAL AVIATION ADMINISTRATION. FLIGHT SERVICE STATION WEATHER IS FOR FRIDAY, OCTOBER 11, 1974, AT 1800 GMT, 1 PM LOCAL TIME. ALL TIMES ARE ZULU TIMES, THAT IS, LOCAL TIME PLUS 5 HOURS. PLEASE ENTER LETTER TO SELECT TYPE OF BRIEFING. ENTER L FOR LOCAL WEATHER ONLY, B FOR A ROUTE ORIENTED BRIEFING, W FOR SELECTED WEATHER AT SPECIFIC LOCATIONS, S TO FILE A FLIGHT PLAN, C TO CLOSE A FLIGHT PLAN, OR U TO FILE A PILOT REPORT. ENTER LETTER- (W)

ENTER THREE LETTER STATION CODE OR AIRWAYS. SEPARATE EACH ENTRY WITH A SLASH- (RIC/IAD)

ENTER TYPES OF REPORTS DESIRED. SEPARATE EACH ENTRY WITH A SLASH. ENTER SA FOR SURFACE OBSERVATIONS; FT FOR TERMINAL FORECASTS; FA FOR AREA FORECASTS; FD FOR WINDS ALOFT FORECAST, INCLUDE ALTITUDE AFTER FD; NO FOR NOTAMS AND PIREPS; WA FOR AIRMETS, SIGMETS, AND WEATHER WARNINGS; AND TR FOR TWEB ROUTE AND SYNOPSES- (SA)

SURFACE OBSERVATIONS...RIC AT 1800Z, CLEAR, VISIBILITY 8 MILES, HAZE, TEMPERATURE 76, DEWPOINT 46, WIND FROM 340 AT 7 KNOTS, ALTIMETER 3030. IAD AT 1800Z, CLEAR, VISIBILITY 15 MILES, TEMPERATURE 75, DEWPOINT 45, WIND FROM 140 AT 05 KNOTS, ALTIMETER 3031. END OF REPORT. IS MORE DATA NEEDED? ENTER YES OR NO- (N)

PLEASE ENTER LETTER TO SELECT TYPE OF BRIEFING. ENTER L FOR LOCAL WEATHER ONLY, B FOR A ROUTE ORIENTED BRIEFING, W FOR SELECTED WEATHER AT SPECIFIC LOCATIONS, S TO FILE A FLIGHT PLAN, C TO CLOSE A FLIGHT PLAN, OR U TO FILE A PILOT REPORT. ENTER LETTER- (B)

ENTRY D, ENTER ALTITUDE- (5500)

ENTRY E, ENTER ROUTE OF FLIGHT. SEPARATE EACH ENTRY WITH A SLASH- (RIC/IAD)

YOUR ROUTE IS BEING PROCESSED.

THE WEATHER FOR 25 MILES ON EITHER SIDE OF YOUR ROUTE IS***NOTAMS, IAD, 1L-19R CLOSED***AIRMETS. AIRMET ALPHA 1. FLIGHT PRECAUTIONS OVER KENTUCKY. SOUTHERN OHIO. OCCASIONAL VISIBILITY BELOW 3 MILES AND 1000 FEET IN GROUND FOG, ESPECIALLY IN OHIO RIVER VALLEY. NO SIGNIFICANT WEATHER, EXCEPT AT THE FOLLOWING LOCATIONS.***SURFACE OBSERVATIONS. RIC AT 1800Z, CLEAR, VISIBILITY 6 MILES, TEMPERATURE 76, DEWPOINT 46, WIND FROM 340 AT 07 KNOTS, ALTIMETER 3030. NYG AT 1726Z, CLEAR, VISIBILITY 6 MILES, HAZE, TEMPERATURE 70, DEWPOINT 54, WIND FROM 350 AT 02 KNOTS, ALTIMETER 3035. DAA AT 1726Z, CLEAR, VISIBILITY 7 MILES, TEMPERATURE 71, DEWPOINT 47, WIND CALM, ALTIMETER 3033. DCA AT 1800Z, CLEAR, VISIBILITY 15 MILES, TEMPERATURE 74, DEWPOINT 45, WIND FROM 050 AT 03 KNOTS, ALTIMETER 3032. IAF AT 1800Z, CLEAR, VISIBILITY 15 MILES, TEMPERATURE 73, DEWPOINT 45,

ALTIMETER 3031.***TERMINAL FORECASTS. RIC 1500Z UNTIL 0900Z, CLEAR; 0900Z UNTIL 1500Z, VFR. DCA 1500Z UNTIL 0900Z, CLEAR; 0900Z UNTIL 1500Z VFR. IAD 1500Z UNTIL 0900Z CLEAR; 0900Z UNTIL 1500Z VFR.***FORECAST WINDS ALOFT AND TEMPERATURE IN DEGREES CENTIGRADE. DATA IS FOR 3500, 5500, 9500. FOR RIC, WIND FROM 257 AT 4, TEMPERATURE 12; WIND FROM 261 AT 6, TEMPERATURE 11; WIND FROM 267 AT 13, TEMPERATURE 4. FOR RIC PLUS 50 MILES, WIND FROM 255 AT 5, TEMPERATURE 12; WIND FROM 259 AT 7, TEMPERATURE 11; WIND FROM 268 AT 14, TEMPERATURE 4. FOR RIC PLUS 86 MILES, WIND FROM 252 AT 6, TEMPERATURE 11; WIND FROM 256 AT 8, TEMPERATURE 10; WIND FROM 269 AT 15, TEMPERATURE 4. ***AREA FORECAST. OUTLOOK 07Z UNTIL 19Z SATURDAY. OHIO ADJACENT GREAT LAKES WVA MD DC DEL VA NC SC AND ADJACENT COASTAL WATERS...HEIGHTS ABOVE SEA LEVEL UNLESS NOTED...SYNOPSIS... RIDGE OF HIGH PRESSURE OVER EASTERN U S WILL MOVE EASTWARD 10 TO 15 KNOTS. COOL AND DRY WESTERLY FLOW WILL PREVAIL OVER FORECAST AREA. SIGNIFICANT CLOUDS AND WEATHER...OHIO ADJACENT GREAT LAKES WVA...CLEAR EXCEPT OCCASIONAL VISIBILITIES AND LOCAL CEILINGS BELOW 3 MILES AND 1000 FT IN GROUND FOG AND STRATUS ESP IN VALLEYS AND OHIO RIVER VALLEY IMPROVING TO 4 FOG AND HAZE AFTER 14Z THEN 4 TO 6 HAZE AND 30 TO 50 SCT CUMULUS 16Z UNTIL 23Z. SCT TO BROKEN AC 100 OVER WESTERN OHIO NEAR END OF PERIOD. OUTLOOK...IFR FOG/HAZE BECOMING MVFR HAZE. VA MD DC DEL NC SC ADJACENT COASTAL WATERS...CLEAR EXCEPT OCCASIONAL VISIBILITIES AND LOCAL CEILINGS BELOW 3 MILES AND 1000 FT IN GROUND FOG AND STRATUS ESP SOUTHEASTERN VA AND THE CAROLINAS IMPROVING AFTER 14Z TO 4 TO 6 HAZE AND SCT 40 CUMULUS 16Z UNTIL 23Z. OUTLOOK...MVFR HAZE AND FOG. ICING... FREEZING LEVEL 120 OHIO RISING TO 145 OVER CAROLINAS. NO ICING.

END OF ROUTE ORIENTED BRIEFING. YOU MAY NOW ENTER YOUR FLIGHT PLAN. EACH LETTER INDICATES AN ITEM IN YOUR FLIGHT PLAN.

ENTRY A, ENTER TYPE OF FLIGHT, IFR OR VFR- (VFR)

ENTRY B, ENTER AIRCRAFT IDENTIFICATION NUMBER- (N1573P)

ENTRY C, ENTER DEPARTURE TIME IN ZULU TIME- (2200)

ENTRY D, ENTER ALTITUDE- (5500)

ENTRY E, ENTER ROUTE OF FLIGHT. SEPARATE EACH ENTRY WITH A SLASH- (RIC/IAD)

ENTRY F, ENTER ALTERNATE AIRPORT-

ENTRY G, ENTER TRUE AIRSPEED- (120)

ENTRY H, ENTER TYPE OF AIRCRAFT AND SPECIAL EQUIPMENT- (CS172/D)

ENTRY I, ENTER ESTIMATED TIME ENROUTE IN HRS AND MINS- (0045)

ENTRY J, ENTER FUEL ON BOARD IN HRS AND MINS- (0330)

ENTRY K, ENTER NUMBER OF PERSONS ON BOARD- (3)

ENTRY L, ENTER AIRCRAFT COLOR- (WHITE/GOLD)

ENTRY M, ENTER PILOTS NAME- ()

ENTRY N, ENTER ADDRESS- ()

ENTRY O, ENTER ANY REMARKS-

TO CORRECT ANY ENTRY ENTER APPROPRIATE LETTER (A,B,C,...ETC). IF NO
CHANGE, ENTER X TO FILE FLIGHT PLAN- (X)

YOUR FLIGHT PLAN HAS BEEN FILED.

PLEASE ENTER LETTER TO SELECT TYPE OF BRIEFING. ENTER L FOR LOCAL WEATHER
ONLY, B FOR A ROUTE ORIENTED BRIEFING, W FOR SELECTED WEATHER AT SPECIFIC
LOCATIONS, S TO FILE A FLIGHT PLAN, C TO CLOSE A FLIGHT PLAN, OR U TO FILE
A PILOT REPORT. ENTER LETTER- (S)

RT PRACTICE FLIGHT (VRS OUTPUT FORMAT)

THIS IS A DEMONSTRATION OF A COMPUTER CONTROLLED VOICE RESPONSE SYSTEM FOR THE FLIGHT SERVICE STATION AUTOMATION PROGRAM CONDUCTED BY THE TRANSPORTATION SYSTEMS CENTER FOR THE FEDERAL AVIATION ADMINISTRATION. FLIGHT SERVICE STATION WEATHER IS FOR FRIDAY, OCTOBER 11, 1974, AT 1800 GMT, 1 PM LOCAL TIME. ALL TIMES ARE ZULU TIMES, THAT IS, LOCAL TIME PLUS 5 HOURS. PLEASE ENTER LETTER TO SELECT TYPE OF BRIEFING. ENTER L FOR LOCAL WEATHER ONLY, B FOR A ROUTE ORIENTED BRIEFING, W FOR SELECTED WEATHER AT SPECIFIC LOCATIONS, S TO FILE A FLIGHT PLAN, C TO CLOSE A FLIGHT PLAN, OR U TO FILE A PILOT REPORT. ENTER LETTER- (W)

ENTER THREE LETTER STATION CODE OR AIRWAYS. SEPARATE EACH ENTRY WITH A SLASH- (PKB/MFD/TOL)

ENTER TYPES OF REPORTS DESIRED. SEPARATE EACH ENTRY WITH A-SLASH. ENTER SA FOR SURFACE OBSERVATIONS; FT FOR TERMINAL FORECASTS; FA FOR AREA FORECASTS; FD FOR WINDS ALOFT FORECAST, INCLUDE ALTITUDE AFTER FD; NO FOR NOTAMS AND PIREPS; WA FOR AIRMETS, SIGMETS, AND WEATHER WARNINGS; AND TR FOR TWEB ROUTE AND SYNOPSES- (SA/FT/FD45)

SURFACE OBSERVATIONS...PKB AT 1800Z, CLEAR. VISIBILITY 10 MILES, TEMPERATURE 76, DEWPOINT 44, WIND FROM 260 AT 07 KNOTS, ALTIMETER 3026. MFD AT 1800Z, CEILING 250, THIN, BROKEN, VISIBILITY 7 MILES, TEMPERATURE 71, DEWPOINT 52, WIND FROM 200 AT 15 KNOTS, ALTIMETER 3026. TOL AT 1800Z, CEILING 150 SCATTERED, CEILING 250 OVERCAST, VISIBILITY 7 MILES, TEMPERATURE 73, DEWPOINT 46, WIND FROM 220 AT 10 KNOTS GUSTING TO 17, ALTIMETER 3018, REMARKS...THIN SPOTS IN OVERCAST.

TERMINAL FORECAST...PKB 1500Z UNTIL 0300Z 250 SCATTERED, 0300Z UNTIL 0600Z CLEAR 5 HAZE SMOKE, 0600Z UNTIL 0800Z PARTLY OBSCURED 2 GF, 0800Z UNTIL 0900Z CEILING 2 OBSCURED HALF FOG, 0900Z UNTIL 1500Z LOW IFR FOG BECOMING VFR. MFD 1800Z UNTIL 0400Z CLEAR, 0400Z UNTIL 1000Z VFR CEILINGS ABOVE 100. TOL 1700Z UNTIL 0400Z CLEAR, 0400Z UNTIL 1000Z VFR CEILINGS ABOVE 100.

FORECAST WINDS ALOFT AND TEMPERATURE IN DEGREES CENTIGRADE. DATA IS FOR 2500, 4500, AND 8500. FOR PKB, WIND FROM 215 AT 15, TEMPERATURE 12; WIND FROM 223 AT 18, TEMPERATURE 12; WIND FROM 245 AT 17, TEMPERATURE 6. FOR MFD, WIND FROM 226 AT 20, TEMPERATURE 11; WIND FROM 232 AT 21, TEMPERATURE 12; WIND FROM 243 AT 22, TEMPERATURE 5. FOR TOL, WIND FROM 231 AT 25, TEMPERATURE 11; WIND FROM 236 AT 26, TEMPERATURE 12, WIND FROM 241 AT 25, TEMPERATURE 5. END OF REPORT. IS MORE DATA NEEDED? ENTER YES OR NO- (NO)

ALL TIMES ARE ZULU TIMES, THAT IS, LOCAL TIME PLUS 5 HOURS. YOU MAY NOW ENTER YOUR FLIGHT PLAN. EACH LETTER AN ITEM IN YOUR FLIGHT PLAN.

ENTRY A, ENTER TYPE OF FLIGHT, IFR OR VFR- (VFR)
ENTRY B, ENTER AIRCRAFT IDENTIFICATION NUMBER- (N4971A)
ENTRY C, ENTER DEPARTURE TIME IN ZULU TIME- (2100)
ENTRY D, ENTER ALTITUDE- (4500)
ENTRY E, ENTER ROUTE OF FLIGHT. SEPARATE EACH ENTRY WITH A SLASH- (PKB/MFD/TOL)
ENTRY F, ENTER ALTERNATE AIRPORT-
ENTRY G, ENTER TRUE AIRSPEED- (120)
ENTRY H, ENTER TYPE OF AIRCRAFT AND SPECIAL EQUIPMENT- (CS172/T)
ENTRY I, ENTER ESTIMATED TIME ENROUTE IN HRS AND MINS- (0130)
ENTRY J, ENTER FUEL ON BOARD IN HRS AND MINS- (0400)
ENTRY K, ENTER NUMBER OF PERSONS ON BOARD- (2)
ENTRY L, ENTER AIRCRAFT COLOR- (WHITE)
ENTRY M, ENTER PILOTS NAME- (L HARRIS)
ENTRY N, ENTER ADDRESS- (55 BROADWAY CAMBRIDGE)
ENTRY O, ENTER ANY REMAPKS-

TO CORRECT ANY ENTRY ENTER APPROPRIATE LETTER (A,B,C,...ETC). IF NO
CHANGE, ENTER X TO FILE FLIGHT PLAN- (X)

PLEASE ENTER LETTER TO SELECT TYPE OF BRIEFING. ENTER L FOR LOCAL WEATHER
ONLY, B FOR A ROUTE ORIENTED BRIEFING, W FOR SELECTED WEATHER AT SPECIFIC
LOCATIONS, S TO FILE A FLIGHT PLAN, C TO CLOSE A FLIGHT PLAN, OR U TO FILE
A PILOT REPORT. ENTER LETTER- (S)

RT TEST FLIGHT (VRS OUTPUT FORMAT)

THIS IS A DEMONSTRATION OF A COMPUTER CONTROLLED VOICE RESPONSE SYSTEM FOR THE FLIGHT SERVICE STATION AUTOMATION PROGRAM CONDUCTED BY THE TRANSPORTATION SYSTEMS CENTER FOR THE FEDERAL AVIATION ADMINISTRATION. FLIGHT SERVICE STATION WEATHER IS FOR FRIDAY, OCTOBER 11, 1974, AT 1800 GMT, 1 PM LOCAL TIME. ALL TIMES ARE ZULU TIMES, THAT IS, LOCAL TIME PLUS 5 HOURS. PLEASE ENTER LETTER TO SELECT TYPE OF BRIEFING. ENTER L FOR LOCAL WEATHER ONLY, B FOR A ROUTE ORIENTED BRIEFING, W FOR SELECTED WEATHER AT SPECIFIC LOCATIONS, S TO FILE A FLIGHT PLAN, C TO CLOSE A FLIGHT PLAN, OR U TO FILE A PILOT REPORT. ENTER LETTER- (B)

ENTRY D, ENTER ALTITUDE- (9000)

ENTRY E, ENTER ROUTE OF FLIGHT. SEPARATE EACH ENTRY WITH A SLASH- (AGC/V106/AVP/V226/BUDD/EWR)

YOUR ROUTE IS BEING PROCESSED.

THE WEATHER FOR 25 MILES ON EITHER SIDE OF YOUR ROUTE IS***NOTAMS, EWR, 11, 29 CLOSED***AIRMETS. AIRMET DELTA 2. FLIGHT PRECAUTIONS FOR 50 MILES EITHER SIDE OF AN ERI TO ART LINE. GUSTY WINDS OCCASIONAL MODERATE TURBULENCE BELOW 7 THOUSAND FEET. NO SIGNIFICANT WEATHER, EXCEPT AT THE FOLLOWING LOCATIONS.***SURFACE OBSERVATIONS. AGC AT 1800Z, CLEAR, VISIBILITY 7 MILES, TEMPERATURE 76, DEWPOINT 50, WIND FROM 150 AT 02 KNOTS, ESTIMATED ALTIMETER 3030. AVP AT 1800Z, CLEAR, VISIBILITY 13 MILES, TEMPERATURE 64, DEWPOINT 47, WIND FROM 290 AT 05 KNOTS, ALTIMETER 3031, REMARKS - FEW CIRRUS. EWR AT 1800Z, CLEAR, VISIBILITY 10 MILES, TEMPERATURE 65, DEWPOINT 41, WIND FROM 040 AT 08 KNOTS, ALTIMETER 3031.***TERMINAL FORECASTS. AGC 1800Z UNTIL 0000Z, 40 SCATTERED, WINDS 200 AT 10; 0000Z UNTIL 0400Z, CLEAR; 0400Z UNTIL 1500Z, BECOMING MARGINAL VFR. HAZE, SMOKE AFTER 08Z. PIT 0400Z UNTIL 1000Z, BECOMING MARGINAL VFR, HAZE, SMOKE AFTER 1500Z. ABE 0900Z UNTIL 1500Z IFR FOG BECOMING VFR AFTER 14Z. AVP 0900Z UNTIL 1500Z, MARGINAL VFR, FOG. EWR 1500Z UNTIL 1900Z, CLEAR, WINDS 030 AT 10; 1900Z UNTIL 2300Z, CLEAR, WINDS 180 AT 10; 2300Z UNTIL 0900Z, CLEAR; 0900Z UNTIL 1500Z, VFR.***FORECAST WINDS ALOFT AND TEMPERATURE IN DEGREES CENTIGRADE. DATA IS FOR 5000, 9000, 13000. FOR AGC, WIND FROM 226 AT 15, TEMPERATURE 12; WIND FROM 248 AT 19, TEMPERATURE 5; WIND FROM 270 AT 25, TEMPERATURE MINUS 10. FOR AGC PLUS 50 MILES, WIND FROM 230 AT 13, TEMPERATURE 12; WIND FROM 252 AT 18, TEMPERATURE 4; WIND FROM 268 AT MINUS 10; FOR AGC PLUS 150 MILES, WIND FROM 249 AT 8, TEMPERATURE 11, WIND FROM 266 AT 16, TEMPERATURE 4; WIND FROM 262 AT 25, TEMPERATURE MINUS 10. FOR AGC PLUS 193 MILES, WIND FROM 261 AT 7, TEMPERATURE 8; WIND FROM 258 AT 17, TEMPERATURE 2; WIND FROM 255 AT 28, TEMPERATURE MINUS 11.***AREA FORECAST. OUTLOOK 07 UNTIL 23Z SATURDAY. NEW ENGLAND NY PA ADJACENT GREAT LAKES NJ COASTAL WATERS. HEIGHTS ABOVE SEA LEVEL UNLESS NOTED...SYNOPSIS... RIDGE OF HIGH PRESSURE AREA 13Z DRIFTING EAST TOSOUTHEASTWARD. SIGNIFICANT CLOUDS AND WEATHER...NO SIGNIFICANT CLOUDS EXCEPT PATCHY 40 TO 50 SCATTERED VARIABLE BROKEN 0 UNTIL 22Z. VISIBILITY UNRESTRICTED EXCEPT LOCAL 2 MILES IN PATCHY GROUND FOG LOW LYING AREAS TIL 23Z. OUTLOOK...VFR. ICING...FREEZING LEVEL 10 TO 20 NORTHERN NEW ENGLAND NORTHEASTER NY SLOPING TO 100 SW PA. NO ICING.

END OF ROUTE ORIENTED BRIEFING. YOU MAY NOW ENTER YOUR FLIGHT PLAN. EACH LETTER INDICATES AN ITEM IN YOUR FLIGHT PLAN.

ENTRY A, ENTER TYPE OF FLIGHT, IFR OR VFR- (IFR)

ENTRY B, ENTER AIRCRAFT IDENTIFICATION NUMBER- (N3472B)

ENTRY C, ENTER DEPARTURE TIME IN ZULU TIME- (1100)

ENTRY D, ENTER ALTITUDE- 5500

ENTRY E, ENTER ROUTE OF FLIGHT. SEPARATE EACH ENTRY WITH A SLASH- AGC/JST/V10/
AVP/V22/BUD/EWR

ENTRY F, ENTER ALTERNATE AIRPORT- (TEB)

ENTRY G, ENTER TRUE AIRSPEED- (190)

ENTRY H, ENTER TYPE OF AIRCRAFT AND SPECIAL EQUIPMENT- (BE55/A)

ENTRY I, ENTER ESTIMATED TIME ENROUTE IN HRS AND MINS- (0130)

ENTRY J, ENTER FUEL ON BOARD IN HRS AND MINS- (0430)

ENTRY K, ENTER NUMBER OF PERSONS ON BOARD- (3)

ENTRY L, ENTER AIRCRAFT COLOR- (WHITE/RED)

ENTRY M, ENTER PILOTS NAME- (J ROBERTSON) -

ENTRY N, ENTER ADDRESS- (175 RIVERWAY BOSTON)

ENTRY M, ENTER ANY REMARKS-

TO CORRECT ANY ENTRY ENTER APPROPRIATE LETTER (A,B,C,...ETC). IF NO CHANGE, ENTER X TO FILE FLIGHT PLAN- (X)

YOUR FLIGHT PLAN HAS BEEN FILED.

PLEASE ENTER LETTER TO SELECT TYPE OF BRIEFING. ENTER L FOR LOCAL WEATHER ONLY, B FOR A ROUTE ORIENTED BRIEFING, W FOR SELECTED WEATHER AT SPECIFIC LOCATIONS, S TO FILE A FLIGHT PLAN, C TO CLOSE A FLIGHT PLAN, OR U TO FILE A PILOT REPORT. ENTER LETTER- (S)

RT PRACTICE FLIGHT (TV RT FORMAT)

TU FSSA PROGRAM IS RUNNING
CURRENT WEATHER DATA AVAILABLE IS FOR
FRIDAY, OCTOBER 11, 1974 AT 1800Z.
ENTER... FOR OPTION
L... LOCAL WEATHER BRIEFING ONLY
B... ROUTE ORIENTED BRIEFING
W... SELECTED WEATHER AT SPCFC LOCATIONS
F... FILE FLIGHT PLAN
C... CLOSE FLIGHT PLAN
U... FILE PILOT REPORT
R... TERMINATE ANY OPTION
**ENTER?W

*ENTER 3-LETTER STATION ID OR AIRWAYS
SEPARATE WITH / BETWEEN CODES
*RIC/IAD
*SELECT REPORT TYPES. SEPARATE WITH /
SA-HOURLY AVIATION NO-NOTAMS,PIREPS
FT-TERMINL FORECAST WA-AIRMETS,SIGMETS
FA-AREA FORECAST TR-TWEB ROUTE,SYNOP
FD-WINDS ALOFT(INCLUDE ALTITUDE 1005 FT.
OR FLIGHT LEVEL)

?SA
***HOURLY AVIATION WEATHER
SITE TIME SKY COVER
USBY /WEATHER TMP/ DP DIR/ SPD ALTM
RIC 1800 CLR 76/ 46 340/07 3030
IAD 1800 CLR 73/ 45 140/05 3031
15
*END REPORTS. MORE SELECTIONS(Y-N)?N

ENTER/OPTION R/TERMINATE
 L/LOCAL WEATHER ONLY F/FILE FP
 B/ROUTE ORIENTED BRFG C/CLOSE FP
 W/SEL WX-SPEC LOCATION U/FILE PIREP
 **ENTER?B
 A/TYPE OF FLIGHT?UFR
 B/AC IDENTIFICATION.....?N1573P
 C/DEPARTURE TIME(GMT) ?2200
 D/ALTITUDE.....?5500
 E/ROUTE(DP/DEST)?
 RIC/IAD
 F/ALTITE AIRPORT.....?
 G/TRUE AIRSPEED.....?120
 CORRECT ANY ENTRY BY APPROPRIATE LETTER
 (A.B.ETC) IF NO CHANGE. TYPE P??

*YOUR ROUTE IS BEING PROCESSED
 *CONSIDER DATA CAREFULLY BEFORE FLYING
 WEATHER 25 MILES EITHER SIDE OF ROUTE IS
 ***NOTAMS
 IAD 1L-19R CLOSED
 ***AIRMETS

AIRMET ALPHA 1. FLIGHT PRECAUTIONS OVER
 KENTUCKY, SOUTHERN OHIO.
 OCCASIONAL VISIBILITIES BELOW 3 MILES
 AND 1000 FEET IN GROUND FOG,
 ESPECIALLY IN OHIO RIVER VALLEY.
 ***SIGMETS

***WEATHER WARNINGS
 NO SIGNIFICANT WEATHER,
 EXCEPT AT THE FOLLOWING LOCATIONS
 ***HOURLY AVIATION WEATHER
 SITE TIME SKY COVER

USBY	WEATHER	TMP	DP	DIR	SPD	ALTM
RIC	1800	CLR				
6	H	76	46	340	07	3030
NYG	1726	CLR				
6	H	70	54	350	02	3035

*MORE DATA FOLLOWS. TYPE P WHEN READY??

DAA 7 1726 CLR 71/ 47 000/00 3033
 DCA 15 1800 CLR 74/ 45 050/03 3032
 IAD 15 1800 CLR 73/ 45 140/05 3031

***PILOT REPORTS
 ***TERMINAL FORECASTS

RIC 1500Z-0900Z CLEAR.
 0900Z-1500Z UFR...

DCA 1500Z-0900Z CLEAR.
 0900Z-1500Z UFR...

IAD 1500Z-0900Z CLEAR.
 0900Z-1500Z UFR...

***WINDS ALOFT
 WIND ALOFT FORECAST VALID 10/11 AT 1800Z
 ALTITUDE 3500 5500
 DIR/SP TMP DIR/SP TMP DIR/SP TMP
 257/ 4 12 261/ 6 11 267/13 4
 +50 MI 255/ 5 12 259/ 7 11 268/14 4
 *MORE DATA FOLLOWS. TYPE P WHEN READY??

+86 252/ 6 11 256/ 8 10 269/15 4
***AREA FORECASTS

AREA FORECAST
OUTLOOK 07Z-19Z SAT
OHIO ADJACENT GREAT LAKES WVA MD DC DEL
VA NC SC AND ADJACENT COASTAL
WATERS
HEIGHTS ABOVE SEA LEVEL UNLESS NOTED...
SYNOPSIS... RIDGE OF HIGH PRESSURE OVER
EASTERN U S WILL MOVE
EASTWARD 10-15 KNOTS. COOL AND DRY
WESTERLY FLOW WILL PREVAIL OVER
FORECAST AREA. SIGNIFICANT CLOUDS AND
WEATHER.
OHIO ADJACENT GREAT LAKES WVA...
CLEAR EXCEPT OCCASIONAL VISIBILITIES AND
LOCAL CEILINGS BELOW 3 MILES
AND 1000 FT IN GROUND FOG AND STRATUS
ESP IN VALLEYS AND OHIO RIVER
VALLEY IMPROVING TO 4 FH AFTER 14Z THEN
4-6 HAZE AND 30-50 SCT CUMULUS
16Z-23Z. SCT TO BROKEN AC 100 OVER
WESTERN OHIO NEAR END OF PRD.
*MORE DATA FOLLOWS. TYPE P WHEN READY**

OUTLOOK. IFR FOG/HAZE BECOMING MUFR
HAZE UA MD DC DEL NC SC
ADJACENT COASTAL WATERS...
CLEAR EXCEPT OCCASIONAL VISIBILITIES AND
LOCAL CEILINGS BELOW 3 MILES
AND 1000 FT IN GROUND FOG AND STRATUS
ESP SOUTHEASTERN VA AND THE
CAROLINAS IMPROVING AFTER 14Z TO 4-6
HAZE AND SCT 40 CUMULUS 16Z-23Z.
OUTLOOK... MUFR HAZE AND FOG.
ICING... FREEZING LEVEL 120
OHIO RISING TO 145 OVER CAROLINAS. NO
ICING.
XEND ROUTE BRFG. TYPE P WHEN READY??

XYOUR DATA ENTERED FROM ROUTE BRFG

A/TYPE OF FLIGHT... UFR
B/AC IDENTIFICATION... N1573P
C/DEPARTURE TIME(GMT)... 2200
D/ALTITUDE... 5500
E/ROUTE(DP/DEST)RIC/IAD/
F/ALTNTE AIRPORT...
G/TRUE AIRSPEED... 120
XCOMPLETE YOUR FLIGHT PLANX
H/TYPE AC-SPEC EQUIP... 70S172/D
I/TIME ENROUTE(HR.MN)... 70045
J/FUEL ONBOARD(HR.MN)... 70339
K/NO. PERSONS ABOARD... 73
L/AC COLOR... 7WHITE/GOLD
M/NAME... ?
N/ADDRESS?

O/REMARKS?
CORRECT ANY ENTRY BY APPROPRIATE LETTER
(A,B,ETC). IF NO CHANGES
ENTER X TO FILE FP?L

L/AC COLOR... 7WHITE/GOLD
CORRECT ANY ENTRY BY APPROPRIATE LETTER
(A,B,ETC) IF NO CHANGES
XMORE DATA FOLLOWS. TYPE P WHEN READY??

ENTER X TO FILE FP?X
YOUR FLIGHT PLAN HAS BEEN FILED
ENTER P TO CONTINUE?P
ENTER/OPTION
L/LOCAL WEATHER ONLY
B/ROUTE ORIENTED BRFG
W/SEL WX-SPEC LOCATIONS
**ENTER?S

R/TERMINATE
F/FILE FP
C/CLOSE FP
U/FILE PIRE.?

RT TEST FLIGHT (TV RT FORMAT)

TU
FSSA PROGRAM IS RUNNING

CURRENT WEATHER DATA AVAILABLE IS FOR
FRIDAY, OCTOBER 11, 1974 AT 1800Z.

ENTER... FOR OPTION
L... LOCAL WEATHER BRIEFING ONLY
B... ROUTE ORIENTED BRIEFING
W... SELECTED WEATHER AT SPCFC LOCATIONS
F... FILE FLIGHT PLAN
C... CLOSE FLIGHT PLAN
U... FILE PILOT REPORT
R... TERMINATE ANY OPTION
**ENTER?B

ENTER 3-LETTER STATION ID OR AIRWAYS

SEPARATE WITH / BETWEEN CODES

?PKB/MFD/TOL

*SELECT REPORT TYPES. SEPARATE WITH /

NO=NOTAMS, PIREPS

SA=HOURLY AVIATION

WA=AIRMETS, SIGMETS

FT=TERMINL FORECAST

TR=TWEB ROUTE, SYNOP

FA=AREA FORECAST

FD=WINDS ALOFT (INCLUDE ALTITUDE 1000 FT.

OR FLIGHT LEVEL)

?SA/FT/FD45

?SA/FT/FD45

***HOURLY AVIATION WEATHER

***HOURLY AVIATION WEATHER

SITE TIME SKY COVER DIR/ SPD ALTM

USBY /WEATHER TMP/ DP 3026

PKB 1800 CLR 74/ 44 260/07 3026

10 1800 250- BKN 71/ 52 200/15 3026

MFD 7 1800 150 SCT E250 OVC 220/10017 3018

TOL 7 1800 150 SCT E250 OVC 220/10017 3018

REMARKS /THN SPTS IOUC

***TERMINAL FORECASTS

PKB 1500Z-0300Z 250 SCT.

0300Z-0600Z CLEAR 5 HAZE SMOKE.

0600Z-0800Z PARTLY OBSCURED 20F

0800Z-0900Z CEILING 2 OBSCURED HALF

FOG. 0900Z-1500Z LIFR FOG BECOMING UFR.

MFD 1800Z-0400Z CLEAR.

0400Z-1000Z UFR CEILINGS ABU 100.

TOL 1700Z-0400Z CLEAR. TYPE P WHEN READY?

XMORE DATA FOLLOWS.

0400Z-1000Z UFR CEILINGS ABU 100
 **WINDS ALOFT
 WIND ALOFT FORECAST VALID 10/11 AT 1800Z
 ALTITUDE 2500 4500 8500 TMP
 DIR/SP TMP DIR/SP TMP DIR/SP TMP
 215/15 12 223/16 12 245/17 6 5
 226/20 11 232/21 12 243/22 5 5
 231/25 11 236/26 12 241/25

TOL
 XEND REPORTS. MORE SELECTIONS(Y-N)PN
 R/TERMINATE
 F/FILE FP
 C/CLOSE FP
 U/FILE PIREP

ENTER/OPTION
 L/LOCAL WEATHER ONLY
 B/ROUTE ORIENTED BRFG
 U/SEL WX-SPEC LOCATIONS

**ENTER/F
 A/TYPE OF FLIGHT ?UFR
 B/AC IDENTIFICATION ?N4971A
 C/DEPARTURE TIME(GMT) ?2100
 D/ALTITUDE ?4500
 E/ROUTE(DP/DEST)?

PKB/MFD/TOL
 F/ALTITE AIRPORT ?
 G/TRUE AIRSPEED ?120
 H/TYPE AC--SPEC EQUIP ?C5172/T
 I/TIME ENROUTE(HR.MN) ?0130
 J/FUEL ONBOARD(HR.MN) ?0400
 K/NO. PERSONS ABOARD ?2
 L/AC COLOR ?WHITE

M/NAME ?L HARRIS
 N/ADDRESS ?65 BROADWAY CAMBRIDGE
 O/REMARKS?

CORRECT ANY ENTRY BY APPROPRIATE LETTER
 (A,B,ETC). IF NO CHANGES
 ENTER X TO FILE FP*
 YOUR FLIGHT PLAN HAS BEEN FILED
 ENTER P TO CONTINUE

RT PRACTICE FLIGHT (TV RT FORMAT)

TU
FSSA PROGRAM IS RUNNING

CURRENT WEATHER DATA AVAILABLE IS FOR
FRIDAY, OCTOBER 11, 1974 AT 1800Z.

- ENTER... FOR OPTION
- L... LOCAL WEATHER BRIEFING ONLY
- B... ROUTE ORIENTED BRIEFING
- W... SELECTED WEATHER AT SPCFC LOCATIONS
- F... FILE FLIGHT PLAN
- C... CLOSE FLIGHT PLAN
- U... FILE PILOT REPORT
- R... TERMINATE ANY OPTION
- XXENTER?J

- A/TYPE OF FLIGHT ?15R
- B/AC IDENTIFICATION... ?N3472B
- C/DEPARTURE TIME(GMT) ?1100
- D/ALTITUDE ?9000
- E/ROUTE(DP/DEST)?
- AGC/JST/U106/AUP/U226/BUDD/EWR
- F/ALTITE AIRPORT ?TEB
- G/TRUE AIRSPEED ?190
- CORRECT ANY ENTRY BY APPROPRIATE LETTER
(A,B,ETC). IF NO CHANGE, TYPE P??

YOUR ROUTE IS BEING PROCESSED
*CONSIDER DATA CAREFULLY BEFORE FLYING
WEATHER 25 MILES EITHER SIDE OF ROUTE IS
***NOTAMS
ELR 11-29 CLOSED
***AIRNETS

AIRMET DELTA 2. FLIGHT PRECAUTIONS FOR
50 MILES
EITHER SIDE OF AN ERI-ART LINE. GUSTY
WINDS OCCASIONAL
MODERATE TURBULENCE BELOW 7 THOUSAND
FEET.

***SIGNETS
***WEATHER WARNINGS
NO SIGNIFICANT WEATHER,
EXCEPT AT THE FOLLOWING LOCATIONS
***HOURLY AVIATION WEATHER
SITE TIME SKY COVER
WSBY WEATHER TYP/ DP DIR/ SPD ALTM
MCG 7 1800 CLR 76/ 50 150/04 E3030
MUP 10 1800 CLR 64/ 47 200/05 3931
*MORE DATA FOLLOWS. TYPE P WHEN READY*P

REMARKS /FEW CI
 EWR 1800 CLR 65/ 41 040/08 3031
 10
 ***PILOT REPORTS
 ***TERMINAL FORECASTS
 AGC 1800Z-0000Z 40 SCT WINDS 200/10.
 0000Z-0400Z CLEAR.
 0400Z-1500Z BECOMING MUFR HAZE SMOKE
 AFTER 08Z
 PIT 0400Z-1000Z BECOMING MUFR HAZE SMOKE
 AFTER 1500Z.
 ABE 0900Z-1500Z IFR FOG BECOMING UFR
 AFTER 14Z..
 AJP 0900Z-1500Z MUFR FOG..
 EWR 1900Z-1900Z CLEAR WINDS 230/10.
 1900Z-2300Z CLEAR WINDS 180/10.
 2300Z-0900Z CLEAR.
 0900Z-1500Z IFR
 *MORE DATA FOLLOWS. TYPE P WHEN READY?P

***WINDS ALOFT
 WIND ALOFT FORECAST VALID 10/11 AT 1300Z
 9000 13000
 ALTITUDE 5000 DIR/SP TMP DIR/SP TMP DIR/SP TMP
 226/15 12 248/19 5 270/25 -10
 +50 MI 230/13 12 252/18 4 268/25 -10
 +100 251/ 7 11 269/16 4 268/25 -10
 +293 261/ 7 8 258/17 2 255/28 -11
 ***AREA FORECASTS

AREA FORECAST
 OUTLOOK 07Z-23Z SAT.
 NEW ENG NY PA ADJACENT GREAT LAKES NJ
 COASTAL WATERS... SEA LEVEL UNLESS NOTED...
 HEIGHTS ABOVE... RIDGE OF HIGH PRESSURE AREA
 SYNOPSIS...
 13Z DRIFTING
 EAST-SOUTHEASTWARD... AND WEATHER...
 SIGNIFICANT CLOUDS EXCEPT PATCHY
 NO SIGNIFICANT CLOUDS EXCEPT PATCHY
 40-50 SCT VARIABLE BROKEN TO TIL
 22Z VISIBILITY UNRESTRICTED EXCEPT LOCAL
 2 MILES IN PATCHY
 XMORE DATA FOLLOWS. TYPE P WHEN READY?P

GROUND FOG LOW LYING AREAS TIL 23Z.
 OUTLOOK... UFR.
 ICING... FREEZING LEVEL 10-20 NORTHERN
 NEW ENG NORTHEASTERN
 NY SLOPING TO 100 SU PA. NO ICING.
 XEND ROUTE BRFG. TYPE P WHEN READY?P

YOUR DATA ENTERED FROM ROUTE BRFG
A/TYPE OF FLIGHT . . . IFR
B/AC IDENTIFICATION . . . N3472B
C/DEPARTURE TIME(GMT) . 1100
D/ALTITUDE . . . 9000
E/ROUTE(OP/DEST)AGC/JST/110/AUP/V22/BUD/
EUR/
F/ALTITE AIRPORT . . . FEB/
G/TRUE AIRSPEED . . . 190
XCOMPLETE YOUR FLIGHT PLANX
H/TYPE AC-SPEC EQUIP . 72555/A
I/TIME ENROUTE(HR:MN) . 701:30
J/FUEL ONBOARD(HR:MN) . 70430
K/NO. PERSONS ABOARD . 73
L/AC COLOR . . . WHITE/RED
M/NAME . . . PJ ROBERTSON
N/ADDRESS?ITS RIVERWAY BOSTON
O/REMARKS?
CORRECT ANY ENTRY BY APPROPRIATE LETTER
(A,B,ETC) . . . IF NO CHANGES
ENTER X TO FILE FP7X
YOUR FLIGHT PERSON HAS BEEN FILED
ENTER P TO CONTINUE?R