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TAFVER II

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By

Capt Christopher A. Donahue

MAY 1993

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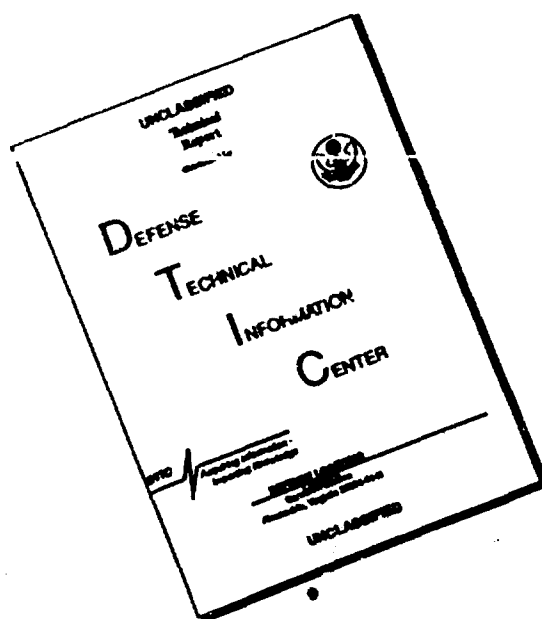


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13. Abstract: TAFVER II is an automated quality control program designed to provide headquarters staff (at HQ USAF/XOW, HQ Air Weather Service, and the Major Command Directorates of Weather) a tool they can use to measure the quality of weather forecasting support provided by the Air Force weather community. The TAFVER II program, run by the USAF Environmental Technical Applications Center (USAFETAC) at Scott AFB, verifies all Terminal Aerodrome Forecasts (TAFs) issued by Air Force weather forecasters, providing there are corresponding observations against which to verify them. TAFVER II accomodates customer-tailored output by incorporating command-unique category thresholds. This technical note tells users how the TAFVER II program verifies weather forecasts and explains the output statistics. Appendices provide major command verification categories and USAFETAC's weather station information databases.
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PREFACE

This users manual is based on the results of USAFETAC Project 920314, which was performed for HQ Air Weather Service by USAFETAC's Simulations and Techniques Branch (SYT). It is intended to help users understand and exploit the advantages of the latest weather forecasting quality control program, TAFVER II.

TAFVER II was designed to expand on the capabilities of the original automated Terminal Aerodrome Forecast Verification (TAFVER) program. TAFVER II includes several new features not available in the original; these include verification of five additional TAF elements, verification of combinations of TAF elements, verification of INTER groups, user-specified category thresholds, and a wide variety of grouping methods for the statistical output.

The author wishes to acknowledge those people most directly responsible for making TAFVER II a reality; they are Maj Walter Miller, Capt Norman Gonzales, Capt Kris McKinney, Capt Chris Cundiff, TSgt Robert Lehrman, SSgt C. Michael Whitney, A1C Douglas Stave, Amn Dean Waskom, Mr Vann Gibbs, Mr Tom Kotz, and the programmers at USAFETAC's Operating Location A in Asheville, NC.

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1. INTRODUCTION

1.1 Background. TAFVER II is an automated quality control program designed to provide headquarters staff (at HQ USAF/XOW, HQ Air Weather Service, and the Major Command Directorates of Weather) a tool they can use to measure the quality of weather forecasting support provided by the Air Force weather community. The TAFVER II program, run by USAFETAC at Scott AFB, verifies all Terminal Aerodrome Forecasts (TAFs) issued by Air Force weather forecasters, providing there are corresponding observations against which to verify them.

1.2 Verification Category Thresholds. TAFVER II was designed to provide customer-tailored output. Unique sets of category thresholds provided by each Major Command (MAJCOM) are used to verify TAFs for each MAJCOM's base weather stations. To facilitate comparisons among MAJCOMs, a separate set of thresholds provided by Air Weather Service (AWS) is used for verification at *all* USAF forecasting stations. TAFVER II verification category thresholds are given in Appendix A.

1.3 Output Groupings. Overall verification statistics are calculated for MAJCOMs as well as for each individual forecasting

station. Statistics can also be determined for a geographic region or for a specific type of aircraft supported. Appendices B and C give the station information database used by USAFETAC to calculate these grouped statistics. The accuracy of this database depends on timely inputs from the field.

1.4 Report Transmittal Procedures. TAFVER II reports are mailed to the field quarterly, about a month after the end of each quarter. Send requests for "non-standard" TAFVER II reports (i.e., those that require information not provided routinely in quarterly reports) to USAFETAC/DOO; see USAFETAC/TN--92/001, *Capabilities, Products, and Services of USAFETAC*, for specific request procedures and formats.

1.5 Feedback. Call AWS/XTA (DSN 576-4625) or USAFETAC/DOO (DSN 576-4024) with comments and suggestions on how the TAFVER II program can be modified to better suit your needs.

1.6 Future Capabilities. Eventually, users will have direct access to TAFVER II data through ETAC's "Dial-In" service, which will allow downloading of monthly TAFVER II reports via modem.

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2. VERIFICATION PROCEDURES

2.1 Overview. TAFVER II provides categorical skill scores and statistics, as well as non-categorical measures of accuracy (root mean square error and mean relative error). Every category of most TAF elements (wind direction, wind speed, wind gusts, visibility, ceiling, altimeter setting, and present weather) is verified for each TAF at every hour, using the observation at the corresponding cardinal hour. The "persistence forecast" is also verified for each element, each category, and each hour. Persistence forecasts assume that each element maintains the value it had in the observation at the time the forecast was issued. In addition, TAFVER II verifies

INTER groups and amended forecasts, as will be described later.

2.2 Categorical Verification--Contingency Tables. TAFs are verified by constructing contingency tables for each category of each weather element. Tables similar to the examples shown here are constructed for each TAF element and hour, and are used to calculate the statistical values shown later in 2.2.1.1 through 2.2.1.7. These tables make it possible to compare values calculated for observations vs. forecasts and for observations vs. persistence.

Example Contingency Tables--Ceiling <200 feet at 3-hour Point

Forecasts			
	Yes	No	
O B S	Yes	# of occurrences (A)	# of occurrences (B)
	No	# of occurrences (C)	# of occurrences (D)

Persistence			
	Yes	No	
O B S	Yes	# of occurrences (A)	# of occurrences (B)
	No	# of occurrences (C)	# of occurrences (D)

2.2.1 Categorical Skill Scores and Statistics.

The categorical skill scores and verification statistics produced by TAFVER II are described below. The equations use "A, B, C, and D" as they are defined in the tables on page 2.

2.2.1.1 Heidke Skill Score (HSS). The Heidke skill score eliminates the number of forecasts that would have been correct by chance and computes a score (ranging from -1 to +1) based on the remainder. A negative score indicates performance worse than chance, while zero indicates performance equal to chance. A score of +1 indicates a totally accurate forecast.

$$HSS = \frac{2(AD - BC)}{(A+B)(B+D) + (A+C)(C+D)}$$

The Heidke skill score is "trial dependent," meaning that its outcome is biased by the ratio of occurrences vs non-occurrences. This bias is especially evident when computing skill scores for forecasts of rare events (events with a high number of non-occurrences). In these cases, high Heidke skill scores can be obtained even when the event is never correctly forecast. The "Discriminant V" skill score (described below) eliminates this bias.

2.2.1.2 Hanssen and Kuiper's Discriminant (V).

$$V = \frac{AD - BC}{(A+B)(C+D)}$$

The V discriminant yields skill scores that are independent of trial conditions, providing an unbiased estimate of forecast accuracy. The V score therefore performs better than the Heidke score when measuring the skill of

rare-event forecasting (Woodcock, 1976). It also ranges from -1 to +1.

Along with the skill scores described so far, TAFVER II also provides the following familiar measures of forecast accuracy:

2.2.1.3 Percent Correct. This is simply the number of correctly forecast events divided by the total:

$$\% \text{ Correct} = \frac{A + D}{A + B + C + D}$$

2.2.1.4 Capability is the number of correct forecasts divided by the number of observed occurrences of the event. It is calculated for "yes" and "no" forecasts separately, as discussed below.

- **Capability for "Yes" Forecasts.** In this case the capability shows the number of correctly classified forecasts over the total number of observed occurrences for a given category. The higher the capability, the fewer missed occurrences.

$$\text{Capability} = \frac{A}{A + B}$$

- **Capability for "No" Forecasts** is calculated as follows:

$$\text{Capability} = \frac{D}{C + D}$$

2.2.1.5 Reliability. This is the number of correct forecasts divided by the number of forecasts issued for the event. As with capability, reliability is calculated for "yes" and "no" forecasts separately. Note that the false alarm rate (FAR) = 1 - Reliability.

- *Reliability for "Yes" Forecasts.*

$$Reliability = \frac{A}{A + C}$$

In the "yes" forecast case, *reliability* shows the number of correctly classified forecasts over the total number of forecasts for a given category. The higher the reliability, the fewer false alarms.

- *Reliability for "No" Forecasts* is calculated as follows:

$$Reliability = \frac{D}{B + D}$$

2.2.1.6 Correlation coefficient (*r*). The correlation coefficient provides the linear correlation between observed and forecast events:

$$r = \frac{(AD - BC)}{\sqrt{(A + B)(A + C)(C + D)(B + D)}}$$

2.2.1.7 Critical Success Index (CSI) is the number of correct predictions divided by the sum of the hits, false alarms, and missed forecasts.

$$CSI = \frac{A}{A + B + C}$$

2.3 Non-Categorical Verification. In addition to categorical verification statistics (yes/no occurrences of various threshold values), TAFVER II also provides a root mean square error (RMSE) and a mean relative error (MRE). The RMSE can be thought of as the average difference between the forecast and observed values for a given element. The MRE is similar, except that it provides the mean percent error between the

forecast value and the observed value. RMSE and MRE are calculated for the following elements:

- Ceiling Height (feet)
- Wind Direction (degrees) (RMSE only)
 - Visibility (meters)
 - Altimeter Setting (inches)
 - Wind Speed and Gust Speed (knots)

2.3.1 RMSE and MRE. RMSE and MRE are calculated as follows for all elements except wind direction:

$$RMSE = \sqrt{\frac{\sum (F_i - O_i)^2}{N}}$$

$$MRE = \frac{\sqrt{\frac{\sum (F_i - O_i)^2}{N}}}{O}$$

where:

F_i = the forecast condition
 O_i = the observed condition
 N = the number of forecasts.

2.3.1.1 RMSE for Wind Direction. RMSE for wind direction is calculated as shown below:

$$RMSE = \sqrt{\frac{\sum (F_i - O_i)^2}{N}}$$

where:

If $(F_i - O_i) > 180$, Then
 $(F_i - O_i) = (360 - |F_i - O_i|)$

2.3.1.2 RMSE for Visibility. The following rules are used to calculate RMSE for visibility forecasts:

- If unrestricted visibility (9999) is forecast and the observed visibility is *7 miles or greater*, the error will be zero.
- If unrestricted visibility is forecast and the observed visibility is *less than 7 miles*, RMSE is calculated as if the forecast was for 7 miles (e.g., if the forecast was for 9999 and 9000 (6 miles) was observed, the error would be 1 mile (1,600 meters)).

2.3.1.3 RMSE for Ceilings. The following rules are used to calculate RMSE for ceiling forecasts:

- RMSE for ceilings is calculated individually for each category to remove the bias that occurs due to errors in forecasting high-cloud ceilings. For example, a forecast for a 15,000-foot ceiling with an observed 20,000-foot ceiling would result in a 5,000-foot error, which is normally not important operationally.
- RMSE is only calculated if a ceiling height is forecast. When no ceiling is forecast and a ceiling is observed (infinite error), no RMSE will be calculated.

2.4 Verification of INTER Groups. An INTER group successfully verifies if the conditions specified are observed, if they persist for no longer than 30 minutes at a time (45 minutes for thunderstorms), and if the total amount of time the conditions are observed is less than half the duration of the INTER group.

TAFVER II verifies INTER groups as follows:

- Were INTER group conditions observed?

If NO, the entire INTER group verifies as a "miss" (all INTER hours verify as a miss).

If YES, do conditions persist for longer than 30 minutes (45 for TSTMS), and/or does the sum of the time the conditions occur equal half or more of the total time for the INTER group?

If YES, the entire INTER group verifies as a "miss" (all INTER hours verify as a miss).

If NO, and if the previous two conditions have been met, determine whether or not (YES or NO) the conditions specified actually occurred for each hour within the INTER group. If "YES," that hour verifies as a "hit". If "NO," that hour verifies as a "miss". Count the total number of hours of "hits" and "misses" and report as the number of INTER hours successfully verified divided by the number of INTER hours forecast, which equals percent successfully verified.

2.5 Verification of Amendments. Amendments are verified in the the same way as regular TAFs, except that only the first 6 hours of the amended forecast is verified, starting from the time the amendment is issued. This is done to avoid unfairly biasing the statistics for long-term forecasts (at the 12-, 18-, and 24-hour points). An amended forecast will often be identical to a previously issued forecast at the 12- through 24-hour points. If these conditions turn out to be incorrect, the verification statistics are calculated using two "busted" forecasts; they will therefore be biased toward unsuccessful verification. If both the original TAF and the amendment were correct, the verification statistics at the 12-through 24-hour point will

be incorrectly biased toward *successful* verification. TAFVER II provides a count of the total number of amendments issued, as well as the total number of "regular" TAFs issued, as shown below.

<u># of TAFs</u>	<u># of Amendments</u>
750	135

Note that all elements are included in the statistics for amended TAFs, even those that were not changed by the amendment.

2.6 Elements to be Verified. The TAF elements verified and the types of statistical output generated are described below.

2.6.1 Wind Direction. RMSE is computed in degrees. If requested, it can be provided in up to eight categories; it is verified with a contingency table.

2.6.2 Wind Speed. RMSE is computed in knots. TAFVER II can provide wind speeds in up to eight categories, and can vary the threshold values for those categories based on customer requirements. It is also verified with contingency tables.

2.6.3 Wind Gusts. Same as wind speed.

2.6.4 Surface Visibility. MSE is calculated in meters. To compute RMSE, Airways observations are converted from miles to meters. Up to eight categories can be verified with contingency tables.

2.6.5 Present Weather. If requested, TAFVER II can verify up to three present

weather types per forecast. It is also verified with contingency tables. Unless specified by the user, present weather forecasts are verified using the code groupings shown in the following list; for example, a forecast of "62RA" will be successfully verified by an observation of any of the code values listed for liquid precipitation.

<u>Weather</u>	<u>Code(s)</u>
Smoke	04
Haze	05
Dust	06-08
Fog	10-12, 42-49
Funnel Cloud	19
Liquid Precip	50-55, 58-65, 80-82, 91-92
Frozen Precip	56-57, 66-75, 77, 79, 83-90, 93-94
Thunderstorm	17, 95-99

2.6.6 Altimeter Setting. RMSE is calculated in hundredths of inches.

2.6.7 Ceiling. A maximum of eight categories (again with thresholds specified by MAJCOMs) are verified with contingency tables. RMSE is computed in feet for each category.

2.6.8 Combinations of Elements. TAFVER II can also verify the joint occurrence of any two weather elements specified by a customer. Examples of combinations are ceiling/visibility and precipitation/crosswind. Up to five combinations can be provided, with up to eight categories specified for each combination.

3. TAFVER II OUTPUT

3.1 Contingency Tables. TAFVER II has the capability to display contingency tables containing raw data for each category of each TAF element, at each hour, followed by the statistics for that category. It can also display the same output for the persistence forecast. The figure at the bottom of this page is an example of this type of output.

Because of the size of the output, only the 3-, 6-, 12-, 18-, and 24-hour points are normally included. Verification statistics for any other hour (or for all 24 hours) are available on request. MAJCOMs can request modifications to the types of information in their reports; for example, which statistics to include and which categories to display in tabular output.

3.2 Summary Tables. In addition to displaying each category of each element individually, TAFVER can also display summary tables that show verification results

for each element with the categories combined; for example, "hits" and "misses" for all categories of ceiling combined.

3.3 Groupings. The database USAFETAC uses to determine TAFVER II output stratification is shown in Appendices A and B. The data can be grouped in a variety of ways, including:

- MAJCOM
- Geographic Region
- Climatic Region
- Aircraft Type
- Customer-Specified Station List (such as providing Army support).

3.4 Reports. Reports are sent quarterly, but results are displayed for each month within the quarter. Verification data and statistics are archived for future use.

Example Single-Category Output Format

CEILING HEIGHT BETWEEN 0 AND 200 FEET AT THE 1 HOUR POINT

FORECASTS				AMENDMENTS				PERSISTENCE			
	YES	NO	SUM		YES	NO	SUM		YES	NO	SUM
YES	48	2	50	YES	28	3	29	YES	50	0	50
NO	6	249	255	NO	2	121	123	NO	0	255	255
SUM	54	251	305	SUM	28	124	152	SUM	50	255	305

STATISTICAL RESULTS FROM CONTINGENCY TABLES

	%	CAP		REL		R	CSI	H	V	RMSE	MRE
		YES	NO	YES	NO						
FCST	97	.98	.98	.89	.99	.91	.86	.91	.94	55.25	.10
AMND	97	.90	.98	.93	.98	.89	.84	.89	.88	N/A	N/A
PERS	100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0

% = PERCENT CORRECT
CAP = CAPABILITY (RANGE = 0 to 1)
REL = RELIABILITY (RANGE = 0 TO 1)
R = CORRELATION COEFFICIENT (RANGE = -1 TO 1)
CSI = CRITICAL SUCCESS INDEX (RANGE = 0 TO 1)

H = HEDKE SKILL SCORE (RANGE = -1 TO 1)
V = V DISCRIMINANT SKILL SCORE (RANGE = -1 TO 1)
RMSE = ROOT MEAN SQUARE ERROR
MRE = MEAN RELATIVE ERROR (%)

4. POSSIBLE SOURCES OF DISCREPANCIES

4.1 Overview. Because of the techniques used, TAFVER II statistics may occasionally differ slightly from those calculated by hand at individual weather stations. Possible sources for these discrepancies are discussed below.

4.2 Missing Data. Although USAFETAC makes every effort to ensure receipt of as complete a set of TAFs and observations as possible, absolute serial completeness is impossible because of hardware and communications problems, coding errors, etc. Since the missing observations and TAFs are randomly distributed, the statistics calculated from an incomplete dataset will still be valid. However, if a missing observation is the one that verifies (or busts) a rare event forecast, it will show up as a discrepancy between TAFVER II and in-house verification statistics.

4.3 Coding Errors. The TAF decoder rejects any TAF that does not strictly adhere to the TAF code. Since verification is performed weeks after the TAF was issued, error messages to the field are impractical. Although the automated TAFVER program at AFGWC will remain operational for now and will continue to flag certain types of

errors, it will not guarantee that a TAF is successfully decoded by TAFVER II. USAFETAC monitors the database for trends in rejected TAFs, and notifies affected base weather stations whenever there are consistent coding errors.

4.4 Short-Lived Changes in Weather Conditions. Forecasts do not need to be amended to reflect weather conditions that don't persist for more than 20 minutes. If these short-lived conditions occur at a verification hour, however, they will be reflected as "unforecast."

4.5 Amendments. As explained previously, only the first 6 hours of amended forecasts are verified by TAFVER II. The reason for this is to avoid unfairly biasing the statistics for long-term forecasts (i.e., at the 12-, 18-, and 24-hour point).

4.6 Remarks. TAFVER II neither decodes nor verifies conditions specified in the REMARKS section of the TAF. For example, a remark such as "WND 25005 AFT 12" is not read by the verification software, and verification statistics will not reflect such a change.

Appendix A

USER VERIFICATION CATEGORY THRESHOLDS

Air Mobility Command (AMC)

1. Wind Speed.

	A < 5 kts
5 kts ≤	B < 15 kts
15 kts ≤	C < 25 kts
25 kts ≤	D < 35 kts
	E ≥ 35 kts

2. Wind Gusts.

	A < 25 kts
25 kts ≤	B < 35 kts
35 kts ≤	C < 50 kts
	D ≥ 50 kts

3. Visibility.

	A < 0.5 mi (< 0800 meters)
0.5 mi ≤	B < 1 mi (1600 meters)
1 mi ≤	C < 2 mi (3200 meters)
2 mi ≤	D < 3 mi (4800 meters)
	E ≥ 3 mi

4. Ceiling.

	A < 200 ft
200 ft ≤	B < 1000 ft
1000 ft ≤	C < 1500 ft
1500 ft ≤	D < 3000 ft
	E ≥ 3000 ft

5. Ceiling/Visibility Combinations.

	A < 200/5
200/5 ≤	B < 1000/2
1000/2 ≤	C < 3000/3
	D ≥ 3000/3

6. **Miscellaneous.** AMC requests that *hail* (present weather codes 87-90, 93- 94, 96, and 99) be verified separately.

Headquarters Air Weather Service

1. Wind Speed.

	A < 25 kts
25 kts ≤	B < 35 kts
35 kts ≤	C < 50 kts
	D ≥ 50 kts

2. Wind Gusts.

	A < 25 kts
25 kts ≤	B < 35 kts
35 kts ≤	C < 50 kts
	D ≥ 50 kts

3. Visibility.

	A < 0.5 mi (0800 meters)
0.5 mi ≤	B < 1 mi (1600 meters)
1 mi ≤	C < 2 mi (3200 meters)
2 mi ≤	D < 3 mi (4800 meters)
	E ≥ 3 mi

4. Ceiling.

	A < 200 ft
200 ft ≤	B < 1000 ft
1000 ft ≤	C < 3000 ft
	D ≥ 3000 ft

5. Ceiling/Visibility Combinations.

	A < 200/5
200/5 ≤	B < 500/1
500/1 ≤	C < 1000/2
1000/2 ≤	D < 3000/3
	E ≥ 3000/3

6. **Present Weather.** Verify forecasts of the following present weather code types:

TSTM: Codes 17, 95, 96, 97, 98, 99

Frzg Precip: Codes 48, 49, 56, 57, 66, 67,

Rain: Codes 50-55, 58-65, 68, 69, 80-84, 91

Snow: Codes 36-39, 68-79, 83-90, 93, 94

Air Force Materiel Command (AFMC)

1. Wind Speed.

A < 25 kts
25 kts ≤ B < 35 kts
C ≥ 35 kts

2. Wind Gusts.

A < 35 kts
35 kts ≤ B < 50 kts
C ≥ 50 kts

3. Visibility.

A < .5 mi (0800 meters)
.5 mi ≤ B < 2 mi (3200 meters)
2 mi ≤ C < 3 mi (4800 meters)
D ≥ 3 mi

4. Ceiling.

A < 200 ft
200 ft ≤ B < 1000 ft
1000 ft ≤ C < 1500 ft
1500 ft ≤ D < 3000 ft
E ≥ 3000 ft

5. Ceiling/Visibility Combinations.

A < 200/.5
200/.5 ≤ B < 1500/3
1500/3 ≤ C < 3000/3
D ≥ 3000/3

Air Combat Command (ACC)

1. Wind Speed.

A < 10 kts
10 kts ≤ B < 20 kts
20 kts ≤ C < 30 kts
30 kts ≤ D < 40 kts
40 kts ≤ E < 50 kts
F ≥ 50 kts

2. Wind Gusts.

A < 15 kts
15 kts ≤ B < 30 kts
30 kts ≤ C < 45 kts
45 kts ≤ D < 60 kts
E ≥ 60 kts

3. Visibility.

A < .5 mi (0800 meters)
.5 mi ≤ B < 1 mi (1600 meters)
1 mi ≤ C < 2 mi (3200 meters)
2 mi ≤ D < 3 mi (4800 meters)
E ≥ 3 mi

4. Ceiling.

A < 200 ft
200 ft ≤ B < 600 ft
600 ft ≤ C < 1000 ft
1000 ft ≤ D < 1500 ft
1500 ft ≤ E < 2000 ft
2000 ft ≤ F < 2500 ft
2500 ft ≤ G < 3000 ft
H ≥ 3000 ft

5. Ceiling/Visibility Combinations.

A < 200/.5
200/.5 ≤ B < 1000/2
1000/2 ≤ C < 3000/3
D ≥ 3000/3

Air Education and Training Command (AETC)

1. Wind Speed.

A < 20 kts
20 kts ≤ B < 25 kts
C > 25 kts

2. Wind Gusts.

A < 25 kts
25 kts ≤ B < 35 kts
C > 35 kts

3. Visibility.

A < .5 mi (0800 meters)
.5 mi ≤ B < 1 mi (1600 meters)
1 mi ≤ C < 3 mi (4800 meters)
D ≥ 3 mi

4. Ceiling.

A < 200 ft
200 ft ≤ B < 500 ft
500 ft ≤ C < 1500 ft
1500 ft ≤ D < 3000 ft
E ≥ 3000 ft

5. Ceiling/Visibility Combinations.

A < 200/.5
200/.5 ≤ B < 500/1
500/1 ≤ C < 1500/3
1500/3 ≤ D < 3000/3
E ≥ 3000/3

6. Miscellaneous. Verify joint occurrences of wind speed > 20kts with precipitation (present weather codes > 50). AETC would also like to verify crosswinds ≥ 17kts; this requires cross-referencing with runway headings.

Air Force Special Operations Command (AFSOC)

1. Wind Speed.

A < 13 kts
13 kts ≤ B < 30 kts
C ≥ 30 kts

2. Visibility.

A < .5 mi (0800 meters)
.5 mi ≤ B < 1 mi (1600 meters)
1 mi ≤ C < 3 mi (4800 meters)
D ≥ 3 mi

3. Ceiling.

A < 200 ft
200 ft ≤ B < 500 ft
500 ft ≤ C < 1000 ft
1000 ft ≤ D < 1500 ft
1500 ft ≤ E < 3000 ft
3000 ft ≤ F < 5000 ft
G ≥ 5000 ft

4. Ceiling/Visibility Combinations.

A < 200/.5
200/.5 ≤ B < 500/2
500/2 ≤ C < 1500/3
D ≥ 1500/3

USAF in Europe (USAFE)

1. Wind Speed.

	A < 5 kts
5 kts ≤	B < 10 kts
10 kts ≤	C < 15 kts
15 kts ≤	D < 20 kts
20 kts ≤	E < 25 kts
25 kts ≤	F < 30 kts
30 kts ≤	G < 40 kts
	E ≥ 40 kts

2. Wind Gusts.

	A < 15 kts
15 kts ≤	B < 25 kts
25 kts ≤	C < 30 kts
30 kts ≤	D < 35 kts
35 kts ≤	E < 40kts
40 kts ≤	F < 45 kts
45 kts ≤	G < 50 kts
50 kts ≤	H < 65 kts
	I ≥ 65 kts

3. Visibility.

	A < .25 mi (0400 meters)
.25 mi ≤	B < .5 mi (0800 meters)
.5 mi ≤	C < 1 mi (1600 meters)
1 mi ≤	D < 1.5 mi (2400 meters)
1.5 mi ≤	E < 2 mi (3200 meters)
2 mi ≤	F < 3 mi (4800 meters)
3 mi ≤	G < 5 mi (8000 meters)
	H ≥ 5 mi

4. Ceiling.

	A < 200 ft
200 ft ≤	B < 300 ft
300 ft ≤	C < 500 ft
500 ft ≤	D < 700 ft
700 ft ≤	E < 1000 ft
1000 ft ≤	F < 3000 ft
3000 ft ≤	G < 10,000 ft
10,000 ft ≤	H < 20,000 ft
	I ≥ 20,000 ft

5. Ceiling/Visibility Combinations.

	A < 200/.5
200/.5 ≤	B < 300/.5
300/.5 ≤	C < 500/1
500/1 ≤	D > 1000/2
1000/2 ≤	E < 1000/3
1000/3 ≤	F < 3000/3
	G ≥ 3000/3

6. Miscellaneous. Verify "any precipitation" as a "YES/NO," based on whether or not present weather codes ≥ 50 are forecast/observed. USAFE has requested verification statistics calculated for the first 6 hours of the TAF, as well as for the 12th and 24th hour.

Pacific Air Forces (PACAF)

1. Wind Speed

	A < 15 kts
15 kts ≤	B < 20 kts
20 kts ≤	C < 25 kts
	D ≥ 25 kts

2. Wind Gusts.

	A < 20 kts
20 kts ≤	B < 25 kts
25 kts ≤	C < 30 kts
30 kts ≤	D < 35 kts
	E ≥ 35 kts

3. Visibility.

	A < .5 mi (0800 meters)
.5 mi ≤	B < 1 mi (1600 meters)
1 mi ≤	C < 2 mi (3200 meters)
2 mi ≤	D < 3 mi (4800 meters)
	E ≥ 3 mi

4. Ceiling.

	A < 200 ft
200 ft ≤	B < 500 ft
500 ft ≤	C < 700 ft
700 ft ≤	D < 1000 ft
1000 ft ≤	E < 1500 ft
1500 ft ≤	F < 3000 ft
	G ≥ 3000 ft

5. Ceiling/Visibility Combinations.

	A < 200/.5
200/.5 ≤	B < 500/1
500/1 ≤	C < 700/2
700/2 ≤	D < 1000/2
1000/2 ≤	E < 1500/3
1500/3 ≤	F < 3000/3
	G ≥ 3000/3

Air Force Space Command (AFSPACECOM)

1. Wind Speed.

	A < 10 kts
10 kts ≤	B < 25 kts
25 kts ≤	C < 35 kts
35 kts ≤	D < 50 kts
	E ≥ 50 kts

2. Wind Gusts.

	A < 25 kts
25 kts ≤	B < 35 kts
35 kts ≤	C < 50 kts
	D ≥ 50 kts

3. Visibility.

	A < .25 mi (0400 meters)
25 mi ≤	B < .5 mi (0800 meters)
.5 mi ≤	C < 1 mi (1600 meters)
1 mi ≤	E < 3 mi (3200 meters)
3 mi ≤	F < 7 mi (9000 meters)
	G ≥ 7 mi (9000 meters)

4. Ceiling.

	A < 200 ft
200 ft ≤	B < 700 ft
700 ft ≤	C < 1000 ft
1000 ft ≤	D < 1500 ft
1500 ft ≤	E < 3000 ft
3000 ft ≤	F < 10,000 ft
10,000 ft ≤	H < 18,000 ft
	I ≥ 18,000 ft

5. Ceiling/Visibility Combinations.

	A < 700/1
700/1 ≤	B < 1500/3
1500/3 ≤	C < 3000/3
	D ≥ 3000/3

Appendix B

TAFVER II STATION INFORMATION

<u>MAJCOM</u>	<u>BASE</u>	<u>UNIT</u>	<u>ICAO</u>	<u>CLIMATIC REGION</u>	<u>RNWX</u>	<u>BLKSTN</u>	<u>GEO-REGION</u>
ACC	BARSDALE AFB, LA	2 OSS/DOW	BAD	GULF COAST MARITIME	150	722485	GULF COAST
ACC	BEALE AFB, CA	9 OSS/DOW	BAB	WEST COAST CONTINENTAL	150	724837	WEST COAST
ACC	BERGSTROM AFB, TX	67 RW/DOMS	BSM	GULF COAST MARITIME	170	722545	GULF COAST
ACC	CANNON AFB, NM	7 OSS/OSW	CVS	S PLAINS CONTINENTAL	40	722686	GREAT PLAINS
ACC	CASTLE AFB, CA	93 OSS/DOW	MER	WEST COAST CONTINENTAL	130	724810	WEST COAST
ACC	DAVIS-MONTHAN AFB, AZ	355 OSS/OSW	DMA	DESERT CONTINENTAL	120	722745	SOUTHWEST
ACC	DYESS AFB, TX	96 OSS/DOW	DYS	S PLAINS CONTINENTAL	160	690190	GREAT PLAINS
ACC	ELLINGTON FIELD, TX	ANG	EFD	GULF COAST MARITIME	40	722436	GULF COAST
ACC	ELLSWORTH AFB, SD	28 OSS/OSAW	RCA	HIGH PLAINS CONTINENTAL	130	726625	GREAT PLAINS
ACC	FAIRCHILD, AFB WA	92 OSS/OSW	SKA	INTER MTN CONTINENTAL	50	727855	ROCKY MTNS
ACC	GRAND FORKS, AFB ND	319 OSS/DOW	RDR	N PLAINS CONTINENTAL	170	727575	GREAT PLAINS
ACC	GRIFFISS, AFB NY	416 OSS/DOW	RME	GREAT LAKES	150	725196	NORTHEAST
ACC	HOLLOMAN, AFB NM	49 OSS/OSW	HMN	DESERT CONTINENTAL	160	747320	SOUTHWEST
ACC	HOWARD, AFB PM	24 WS	MPHO	Not Assigned	180	788060	NONE
ACC	JACKSONVILLE ANGB, FL	ANG	JAX	FLORIDA MARITIME	70	722060	SOUTHEAST
ACC	K.I. SAWYER, AFB MI	410 OSS/DOW	SAW	GREAT LAKES	10	727435	CENTRAL U.S.
ACC	LANGLEY, AFB VA	1 OGWS	LFI	ATLANTIC COAST MARITIME	80	745980	SOUTHEAST
ACC	LORING, AFB ME	42 OSS/DOW	LIZ	NONE	10	727125	NORTHEAST
ACC	LUKE, AFB AZ	58 OSS/OSSW	LUF	DESERT CONTINENTAL	30	722785	SOUTHWEST
ACC	MACDILL, AFB FL	56 OSS/WF	MCF	FLORIDA MARITIME	40	747880	SOUTHEAST
ACC	MCCONNELL, AFB KS	384 OSS/DOW	IAB	N PLAINS CONTINENTAL	10	724505	GREAT PLAINS
ACC	MCENTIRE ANGB, SC	ANG	MMT	ATLANTIC COAST MARITIME	140	723105	SOUTHEAST
ACC	MINOT, AFB ND	5 OSS/DOW	MIB	N PLAINS CONTINENTAL	110	727675	GREAT PLAINS
ACC	MOODY, AFB GA	347 OSS/DOFW	VAD	FLORIDA MARITIME	180	747810	SOUTHEAST
ACC	MOUNTAIN HOME, AFB ID	366 OSS/OSW	MUO	INTER MTN CONTINENTAL	120	726815	ROCKY MTNS
ACC	NELLIS, AFB NV	57 OSS/OSW	LSV	DESERT CONTINENTAL	30	723865	SOUTHWEST
ACC	OFFUTT, AFB NE	55 OSS/DOW	OFF	N PLAINS CONTINENTAL	120	725540	GREAT PLAINS
ACC	OTIS ANGB, MA	ANG	FMH	NORTHEAST MARITIME	140	725060	NORTHEAST
ACC	POPE, AFB NC	317 OSS/WXF	POB	ATLANTIC COAST MARITIME	50	723030	SOUTHEAST
ACC	SEYMOUR JOHNSON, NC	4 OPG/OSW	GSB	ATLANTIC COAST MARITIME	80	723066	SOUTHEAST
ACC	SHAW, AFB SC	363 OSS/OSW	SSC	ATLANTIC COAST MARITIME	40	747900	SOUTHEAST

<u>MAJCOM</u>	<u>BASE</u>	<u>UNIT</u>	<u>ICAO</u>	<u>CLIMATIC REGION</u>	<u>RNWX</u>	<u>BLKSTN</u>	<u>GEO-REGION</u>
ACC	TYNDALL, AFB FL	325 OSS/DOW	PAM	FLORIDA MARITIME	130	747750	GULF COAST
ACC	WHITEMAN, AFB MO	351 OSS/DOW	SZL	MIDWEST CONTINENTAL	10	724467	GREAT PLAINS
ACC (USA)	FORT BELVOIR, VA	DET 2, 1 WXG	DAA	NORTHEAST MARITIME	140	724037	NORTHEAST
ACC (USA)	FORT BENNING, GA	DET 10, 1 WXG	LSF	GULF COAST MARITIME	140	722250	GULF COAST
ACC (USA)	FORT BLISS, TX	OL-A, DET 14	BIF	DESERT CONTINENTAL	30	722704	SOUTHWEST
ACC (USA)	FORT BRAGG, NC	DET 3, 1 WXG	FBG	ATLAN COAST MARITIME	90	746930	SOUTHEAST
ACC (USA)	FORT CAMPBELL, KY	DET 1, 1 WXG	HOP	MIDWEST CONTINENTAL	40	746710	GULF COAST
ACC (USA)	FORT CARSON, CO	DET 58, 1 WXG	FCS	HIGH PLAINS CONTINENTAL	130	724680	ROCKY MTNS
ACC (USA)	FORT DRUM, NY	DET 4, 1 WXG	GTB	GREAT LAKES	30	743700	NORTHEAST
ACC (USA)	FORT EUSTIS, VA	DET 13, 1 WXG	FAB	ATLAN COAST MARITIME	140	723087	SOUTHEAST
ACC (USA)	FORT HOOD, TX	DET 14, 1 WXG	GRK	S PLAINS CONTINENTAL	150	722576	GREAT PLAINS
ACC (USA)	FORT KNOX, KY	DET 5, 1 WXG	FTK	MIDWEST CONTINENTAL	180	724240	CENTRAL U.S.
ACC (USA)	FORT LEWIS, WA	DET 6, 1 WXG	GRF	NONE	150	742070	WEST COAST
ACC (USA)	FORT ORD, CA	DET 7, 1 WXG	OAR	NONE	110	690070	WEST COAST
ACC (USA)	FORT POLK, LA	DET 31, 1 WXG	POE	GULF COAST MARITIME	150	723390	GULF COAST
ACC (USA)	FORT RILEY, KS	DET 8, 1 WXG	FRI	N PLAINS CONTINENTAL	40	724550	GREAT PLAINS
ACC (USA)	FORT RUCKER, AL	DET 9, 1 WXG	OZR	GULF COAST MARITIME	180	722289	GULF COAST
ACC (USA)	FORT SILL, AIN, OK	DET 11, 1 WXG	FSI	S PLAINS CONTINENTAL		723550	GREAT PLAINS
ACC (USA)	HUNTER AAF, GA	DET 21, 1 WXG	SVN	FLORIDA MARITIME	90	747804	SOUTHEAST
ACC (USA)	INDIANTOWN GAP, PA	OL-B, DET 2	MUI	NORTHEAST MARITIME	70	725144	NORTHEAST
AETC	COLUMBUS AFB, MS	14 OSS/DOW	CBM	GULF COAST MARITIME	130	723306	GULF COAST
AETC	KEESLER AFB, MS	393 SPTG/OSFWX	BIX	GULF COAST MARITIME	30	747888	GULF COAST
AETC	LAUGHLIN AFB, TX	47 OSS/DOW	DLF	DESERT CONTINENTAL	130	722815	GULF COAST
AETC	MAXWELL AFB, AL	HQ AU/WE	MXF	GULF COAST MARITIME	150	722265	GULF COAST
AETC	RANDOLPH AFB, TX	12 OSS/DOW	RND	GULF COAST MARITIME	140	722536	GULF COAST
AETC	REESE AFB, TX	64 OSS/DOW	REE	S PLAINS CONTINENTAL	170	722875	GREAT PLAINS
AETC	SHEPPARD AFB, TX	80 FTW/DOOW	W12	S PLAINS CONTINENTAL	150	723513	GREAT PLAINS
AETC	VANCE AFB, OK	71 OSS/DOW	END	S PLAINS CONTINENTAL	170	723535	GREAT PLAIN
AFMC	EDWARDS AFB, CA	412 OSSWE	EDW	DESERT CONTINENTAL	40	723810	SOUTHWEST
AFMC	EGLIN AFB, FL	46 WS/DOW	VPS	FLORIDA MARITIME	120	722210	GULF COAST
AFMC	HILL AFB, UT	649 SG/DOW	HIF	INTER MTN CONTINENTAL	140	725755	ROCKY MTNS
AFMC	KELLY AFB, TX	651 SG/DOW	SKF	GULF COAST MARITIME	150	722535	GULF COAST
AFMC	MCCLELLAN AFB, CA	652 SPTG/DOW	MCC	WEST COAST CONTINENTAL	160	724836	WEST COAST
AFMC	ROBINS AFB, GA	653 SPTG/DOW	WRB	GULF COAST MARITIME	150	722175	SOUTHEAST
AFMC	TINKER AFB, OK	654 SG/DOW	TIK	S PLAINS CONTINENTAL	170	723540	GREAT PLAINS
AFMC	WRIGHT-PATTERSON, OH	645 WS	FFO	MIDWEST CONTINENTAL	50	745700	CENTRAL U.S.

<u>MAJCOM</u>	<u>BASE</u>	<u>UNIT</u>	<u>ICAO</u>	<u>CLIMATIC REGION</u>	<u>RNWX</u>	<u>BLKSTN</u>	<u>GEO-REGION</u>
AFSOC	HURLBURT FIELD, FL	834 ABW/WXF	HRT	FLORIDA MARITIME	180	747770	GULF COAST
AMC	ALTUS AFB, OK	97 OSS/WXF	LTS	S PLAINS CONTINENTAL	170	723520	GREAT PLAINS
AMC	ANDREWS AFB, MD	89 OSS/WX	ADW	NORTHEAST MARITIME	10	745940	NORTHEAST
AMC	CHARLESTON AFB, SC	437 OSS/SSW	IGC	ATLAN COAST MARITIME	150	722083	SOUTHEAST
AMC	DOVER AFB, DE	436 OSS/WXF	DOV	NORTHEAST MARITIME	140	724088	NORTHEAST
AMC	GRISCOM AFB, IN	305 OSS/DOW	GUS	MIDWEST CONTINENTAL	50	725335	CENTRAL U.S.
AMC	KIRTLAND AFB, NM	542 OSS/WXF	IKR	DESERT CONTINENTAL	80	723849	ROCKY MTNS
AMC	LAJES FIELD, PO	65 ALSS/WXF	LPLA	NONE	150	85090	NONE
AMC	LITTLE ROCK AFB, AR	314 OSS/OSW	LRF	MIDWEST CONTINENTAL	70	723405	GULF COAST
AMC	MALMSTROM AFB, MT	43 OSS/DOW	GFA	HIGH PLAINS CONTINENTAL	30	727755	ROCKY MTNS
AMC	MARCH AFB, CA	22 OSS/DOW	RIV	NONE	140	722860	WEST COAST
AMC	MCCHORD AFB, WA	62 OSS/WXF	TCM	NONE	160	742060	WEST COAST
AMC	MCGUIRE AFB, NJ	438 OSS/WXF	WRI	NORTHEAST MARITIME	60	724096	NORTHEAST
AMC	NORTON AFB, CA	63 OSS/WXF	SBD	NONE	60	722866	WEST COAST
AMC	PLATTSBURGH AFB, NY	380 OSS/DOW	PBG	GREAT LAKES	170	726225	NORTHEAST
AMC	RICKENBACKER ANGB, OH	ANG	LCK	MIDWEST CONTINENTAL	50	724285	CENTRAL U.S.
AMC	SCOTT AFB, IL	375 WS	BLV	MIDWEST CONTINENTAL	140	724338	CENTRAL U.S.
AMC	SELFRIEDGE ANGB, MI	ANG	MTC	GREAT LAKES	10	725377	CENTRAL U.S.
AMC	TRAVIS AFB, CA	60 OSS/WX	SUU	WEST COAST CONTINENTAL	30	745160	WEST COAST
AMC	WESTOVER, MA	375 WS	CEF	NORTHEAST MARITIME	50	744910	NORTHEAST
PACAF	ANDERSEN AFB, GU	633 OSS/DOW	PGUA	NONE	60	912180	PACIFIC
PACAF	CAMP CASEY, KO	OL-B, DET 3	RKST	KOREA		471066	PACIFIC
PACAF	CAMP HUMPHREYS, KO	DET 2, 51 WS	RKSG	KOREA		471270	PACIFIC
PACAF	CAMP PAGE, KO	OL-A, DET 1	RKNC	KOREA		471040	PACIFIC
PACAF	CAMP RED CLOUD, KO	DET 3, 51 WS	RKSB	KOREA		471060	PACIFIC
PACAF	CAMP STANLEY, KO	OL-A, DET 3	RKXK	KOREA		471084	PACIFIC
PACAF	EIELSON AFB, AK	343 WS/CC	PAEI	NONE	130	702650	ALASKA
PACAF	ELMENDORF AFB, AK	3 OSS/WE	PAED	NONE	50	702720	ALASKA
PACAF	FORT RICHARDSON AIN, AK	OL-A, DET 1	PAFR	NONE		702700	ALASKA
PACAF	FORT WAINWRIGHT, AK	DET 1, 343 WS	PAFB	NONE	60	702615	ALASKA
PACAF	HICKAM AFB, HI	15 WS	PHIK	NONE	80	911803	HAWAII
PACAF	KADENA AB, JP	18 OSS/WE	RODN	NONE	50	479310	PACIFIC

<u>MAJCOM</u>	<u>BASE</u>	<u>UNIT</u>	<u>ICAO</u>	<u>CLIMATIC REGION</u>	<u>RNWX</u>	<u>BLKSTN</u>	<u>GEO-REGION</u>
PACAF	KUNSAN AB, KO	8 OSS/MX	RKJK	KOREA	180	471410	KOREA
PACAF	MISAWA AB, JP	432 OSSWE	KQSM	NONE	100	475805	PACIFIC
PACAF	OSAN AB, KO	51 OSSWE	RKSO	KOREA	90	471220	KOREA
PACAF	SCHOFIELD BRKS, HI	DET 1, 15 WS	PHHI	NONE	60	911700	HAWAII
PACAF	SHENYA AFB, AK	673 OPSWE	PASY	NONE	100	704140	ALASKA
PACAF	YOKOTA AB, JP	374 OSSWE	RJTY	NONE	180	476420	PACIFIC
PACAF	YONG SAN AB, KO	DET 1, 51 WS	RKSY	KOREA		471105	KOREA
SPCOM	CAPE CANAVERAL AFS, FL	45 WS	X68	FLORIDA MARITIME	130	747945	SOUTHEAST
SPCOM	PATRICK AFB, FL	5 WS	COF	FLORIDA MARITIME	20	747950	SOUTHEAST
SPCOM	PETERSON AFB, CO	21 OSS/OGSW	PEF	HIGH PLAINS CONTINENTAL	170	724663	ROCKY MTNS
SPCOM	VANDENBERG AFB, CA	30 WS	VBG	NONE	120	723930	WEST COAST
USAFE	AVIANO AB, IT	401 OSS/OGSW	LIYW	NONE	50	160365	Mediterranean
USAFE	BITBURG AB, GE	36 OSS/DOM	EDAB	GERMAN CONTINENTAL	60	106100	GERMANY
USAFE	INCIRLIK AB, TU	39 OSS/WS	KQDG	NONE	50	691464	Mediterranean
USAFE	RAF ALCONBURY, UK	10 TFW/DOM	EGWZ	UK MARITIME	120	35623	ENGLAND
USAFE	RAF LAKENHEATH, UK	48 OSS/DOM	EGUL	UK MARITIME	60	35833	ENGLAND
USAFE	RAF MILDENHALL, UK	100 OSS/DOW	EGUN	UK MARITIME	110	35773	ENGLAND
USAFE	RAF UPPER HEYFORD	20 OSS/DOM	EGUA	UK MARITIME	90	036553	ENGLAND
USAFE	RAMSTEIN AB, GE	A FLT, 86 WS	EDAR	GERMAN CONTINENTAL	90	106140	GERMANY
USAFE	SPANGDAHLEM AB, GE	52 OSS/WEF	EDAD	GERMAN CONTINENTAL	50	106070	GERMANY
USAFE (USA)	ECHTERDINGEN, GE	OL-B, 7 WS	EDOC	GERMAN CONTINENTAL	80	107381	GERMANY
USAFE (USA)	FULDA AAF, GE	DET 6, 7 WS	EDEX	GERMAN CONTINENTAL	80	105360	GERMANY
USAFE (USA)	GIEBELSTADT, GE	DET 10, 7 WS	EDEU	GERMAN CONTINENTAL	80	106530	GERMANY
USAFE (USA)	GRAFENWOEHR AAF, GE	DET 7, 7 WS	EDIC	GERMAN CONTINENTAL	140	106870	GERMANY
USAFE (USA)	HANAU AAF, GE	DET 2, 7 WS	EDID	GERMAN CONTINENTAL	100	106420	GERMANY
USAFE (USA)	HEIDELBERG AAF, GE	DET 3, 7 WS	EDIE	GERMAN CONTINENTAL	80	107340	GERMANY
USAFE (USA)	HOHENFELS, GE	OL-A, DET 7, 7 WS	EDIH	GERMAN CONTINENTAL	90	107750	GERMANY
USAFE (USA)	ILLESHEIM AAF, GE	DET 13, 7 WS	EDIK	GERMAN CONTINENTAL		107720	GERMANY
USAFE (USA)	KATTERBACH AAF, GE	OL-A, DET 10	EDEB	GERMAN CONTINENTAL	80	107550	GERMANY
USAFE (USA)	SANDHOFEN, GE	OL-A, DET 3, 7 WS	EDOR	GERMAN CONTINENTAL		107280	GERMANY
USAFE (USA)	WIESBADEN AB, GE	DET 26, 7 WS	EDOU	GERMAN CONTINENTAL	80	106330	GERMANY
NA	DOBBINS, GA	AFRES	MGE	GULF COAST MARITIME	110	722270	SOUTHEAST

Appendix C

AIRCRAFT SUPPORTED BY ICAO CALL

Although all the bases included in the TAFVERII program are listed here, many (including most Army airfields) do not have aircraft listed, primarily because of the wide variety of aircraft they support. The aircraft listed here are those for which most weather support at the base listed is specifically tailored and directed.

<u>ICAO</u>	<u>AIRCRAFT</u>	<u>ICAO</u>	<u>AIRCRAFT</u>	<u>ICAO</u>	<u>AIRCRAFT</u>
AYE		FEW	MISSILES	MPHO	C-27
BAB	U-2, KC-135	FFO	F-16	MTC	F-16
BAD	B-52, KC-135, KC-10	FHU		MUI	
		FMH	F-15	MUO	F-15, F-16, B-52, E-3, KC-135
BIF		FRI			C-12, C-21
BIX	C-130	FSI			A-10
BLV	C-9, C-21, C-12	FTK		MXF	
	RF-4C	EGUA	F-15	MYR	
BSM		FWH	B-52	OAR	
BYH		GFA	KC-135	OFF	EC-135, E-4, RC-135, T-38
BYS		GRF			B-52
CBM	T-37, T-38	GRK		OSC	
CEF	C-5	GSB	F-15E, KC-10	OZR	
COF	HH-3, C-130	GTB		PAED	F-15
CVS	F-111, EF-111	GUS	KC-135	PAEI	F-16, OA-10
DAA		HIF	F-16	PAFB	
DLF	T-37, T-38	HMN	F-117, AT-38, F-4	PAFR	
DMA	A-10, OA-10, EC-130			PAM	F-15
	C-5	HOP		PASY	RC-135
DOV	B-1B, KC-135	HRT		PBG	KC-135
DYS	F-15	IAB	B-1B	PDX	F-15
EDAB	F-16, A-10	IGC	C-141, C-17	PEF	C-21, C-130
EDAD	F-16, C-21, C-12, C-9	IKR	HC-130	PGUA	
EDAR		JAX	F-16	PHHI	
		KQDG		POB	A-10, C-130
EDEB		KQSM	F-16	POE	
EDEU		LCK	A-7	RCA	B-1B, A-10
EDEX		LFI	F-15, UH-1	RDR	B-1B
EDIC		LHW		REE	T-1, T-37, T-38
EDID		LIYW			KC-10
EDIE		LIZ	B-52	RIV	C-130, C-9, C-21
EDIH		LMT	F-16	RJTY	F-16
EDIK		LPLA			
EDOC	C-12, C-21	LRF	C-130	RKJK	
EDOR		LSF		RKNC	
EDOU		LSV	F-15, F-16, F-111, A-10	RKSB	
EDW			C-5, C-141, KC-135	RKSG	
EFD	F-16	LTS	F-15E, F-16	RKSO	F-16, OA-10
EGUL	F-15E, F111	LUF	KC-135	RKST	
EGUN	KC-135	MCC	F-16	RKSX	
EGWZ	U-2, C-130	MCF	KC-135	RKSY	
END	T-1, T-37, T-38	MER	F-16	RME	B-52
		MGE	B-52, KC-135	RND	T-1, T-37, T-38, T-43
FAF		MIB			F-15, KC-135, E-3, HC-130
FBG		MMT	B-52H	RODN	
FCS			F-16		

ICAOSAW
SBD

SKA

SKF

SSC

SUU

SVN

AIRCRAFT

B-52

C-141, C-21,
C-12B-52, KC-135,
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ICAO

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TBN

TCM

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TOI

VAD

VBG

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C-141

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UH-1

ICAO

VCV

VPS

W12

WRB

WRI

X68

AIRCRAFT

F-15

T-37, T-38

KC-135

C-141

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 USA TECOM, ATTN: AMSTE-TC-AM(BE), c/o NVESD, Ft Belvoir VA 22080-5677 1
 Director, U.S.A.-CETEC, Attn: GL-AE (Whitmarsh), Fort Belvoir, VA 22080-5546 1
 Technical Library, Dugway Proving Ground, Dugway, UT 84022-5000 1
 HQ NATO Staff Meteorological Officer IMS/OPS APO AE 09734 1
 NOAA/MASG Library MCS, 325 Broadway, Boulder, CO 80303-3328 2
 NOAA Library-EOC4W5C4, Attn: ACQ, 8009 Executive Blvd, Rockville, MD 20852 1
 NOAA/NESDIS (Attn: Nancy Everson, E/RA22), World Weather Bldg, Rm 703, Washington, DC 20233 1
 NIST Pubs Production, Rm A635, Admin Bldg, Gaithersburg, MD 20899 1
 WSO, H & HS Marine Station Woa, MCAS Tucson CA 92710-5000 1
 DTIC-FDAC, Cameron Station, Alexandria, VA 22304-6145 2
 AUL/SE, Maxwell AFB, AL 36112-5564 1
 AWSTL, Scott AFB, IL 62225-6438 35