



Using TAF Verification to Improve Forecasts and Decision Support Services

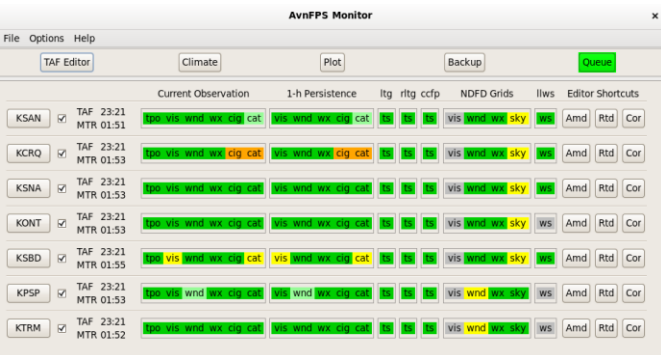
Brandt Maxwell

Meteorologist

NOAA/NWS San Diego

Brandt.Maxwell@noaa.gov

14 Dec 2022



OBS \ FORECASTS	1	2	3	4	5	6	TOTAL
<200 (1)	0	0	0	0	0	0	0
200-400 (2)	0	0	27	0	0	17	44
500-900 (3)	0	0	3	49	0	50	102
1000-1900 (4)	0	0	95	227	96	206	624
2000-3000 (5)	0	0	25	214	205	124	568
>3000 (6)	0	0	48	205	408	4,079	4,740
TOTAL	0	0	198	695	709	4,476	6,078
BIAS	0.000	0.000	1.941	1.114	1.248	0.944	----

TAF Verification – Available for all NOAA Personnel

- <https://verification.nws.noaa.gov/content/pm/verif/aviation/index.aspx>
- A part of the greater Performance Management website
- Available from 2005-present
- Need username and password (not the same as Google mail; you must register)



NATIONAL WEATHER SERVICE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
Performance Management Web Portal



Home

Search

Login

The content of this website is intended for NOAA employees only. You must be logged into the Performance Management website before you are able to see the content of this page. Please log in using the form below.

Username:

Password:

By logging into this system, you accept and agree to follow the [N-PMS Access Agreement](#)

Please remember, your account will be disabled after multiple unsuccessful attempts.

If you have forgotten your username or password, please [click here](#).

If you are a NOAA employee and do not have an account, please [click here](#), to register for one.

Numerous Options – “Aviation Weather” is the Best One!

verification.nws.noaa.gov/services/public/index.aspx



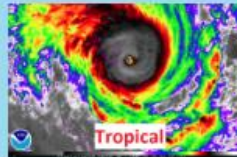
NATIONAL WEATHER SERVICE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
Performance Management Web Portal

Search

- Verification
- StormDat
- StormGen
- NOES
- Customer Satisfaction
- Service Assessments
- GPRA
- Data Tools
- Resources
- About

IMPORTANT
Update! NWS Releases the National Service Assessment on 2018 Hurricane Florence and Hurricane Michael
Verification



Then Select “Stats on Demand Interface”

- After this, the fun begins...I promise!.




NATIONAL WEATHER SERVICE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Performance Management Web Portal




Search brandt.maxwell 

[Home](#) >> [Verification](#)

Aviation Verification Home

Welcome to the National Weather Service aviation verification section of the website. Below are the different programs we have to assist you in monitoring aviation forecast performance.

Terminal Aerodrome Forecast (TAF) Verification

- [Stats on Demand Interface](#) 
 - Data available: October 2005 – present
- Stats on Demand Training
 - [Introduction to TAF Verification](#)
 - [Interpreting TAF Verification Statistics: Impact of TEMPO Forecasts](#)
 - [Interview with: Chuck Kluepfel on TAF Verification – Past and Future](#)
- Quality Control Documents
 - [METAR](#)

TAF Stats Request

- The menu



TAF Stats Request

Click [here](#) to download customized report data in CSV format for Flight Category and Sig Wx element types. Data is available from 09/01/2005 to 06/07/2022. Prior to 12/01/2020 only monthly-sorted **archive data** data is available.

From Date

To End Date

Months to report JAN FEB MAR APR MAY JUN

JUL AUG SEP OCT NOV DEC Select All

[National](#) [Region](#) [WFO](#) [State](#) [Terminal](#) [Experimental Forecast](#) [My Verification](#)

Selection area set to Terminal.

Filter [?](#) Area Type Location

Select [?](#) Terminal Current Selections

KCRQ	<input type="button" value="Add"/>	<input type="button" value="Remove"/> <input type="button" value="Clear"/>
KONT		
KPSP		
KSAN		
KSBD		
KSNA		

KSAN

Element Type

Forecast Type

Guidance Type

Ceilings Below

Visibilities Below

TAF Type Scheduled Amended Scheduled and amended combined

TAF Begin Times 0000-0559 0600-1159 1200-1759 1800-2359 Select All

Forecast Projections >0 - 3 >3 - 6 >6 - 9 >9 - 12 >12 - 18 >18 - 24 >24 - 30 Select All

Email Option [?](#) Email me when the report is finished

Reports may take several minutes to create. Please limit criteria to avoid long waits.

TAF Stats Request



Element Type	CEILING
Forecast Type	CEILING
Guidance Type	VISIBILITY
Ceilings Below	FLIGHT CATEGORY
TAF Type	WIND SPEED
TAF Begin Times	WIND DIRECTION
	WIND GUSTS
	SIGNIFICANT WEATHER TYPE

Forecast Type	OPERATIONAL IMPACT
Guidance Type	OPERATIONAL IMPACT
Ceilings Below	PREVAILING
TAF Type	TEMPO
	PROB

Guidance Type	GFS LAMP
Ceilings Below	NONE
TAF Type	GFS MOS
TAF Begin Times	NAM MOS
	NGM MOS
Forecast Projections	GFS LAMP
	PERSISTENCE



Coming soon by popular demand! NBM MOS

TAF Report Page

- Intro...

TAF Report Page

Element	Flight Category
TAF Type	Operational Impact (Scheduled Only)
Guidance Type	GFS LAMP
Date Range	01/01/2022 TO 06/01/2022
Terminal	KSAN
Cycle Times	0000Z, 0600Z, 1200Z, 1800Z
Projections	>0 - 3, >3 - 6, >6 - 9, >9 - 12, >12 - 18, >18 - 24
Report Format	Hours Minutes Percent Frequency Toggle Legend

Tip: Click on “Percent” and get more meaningful numbers in the output



More of the TAF Report Page

- Contingency Tables (The Matrices)
- Obs are always on left axis/legend; Forecasts are always on top axis/legend:

Hit	1-Category Error	2-Category Error	3-Category Error	4 or More Category Error		
<input checked="" type="checkbox"/> Show All <input type="checkbox"/> Hide All						
<input checked="" type="checkbox"/> MULTICATEGORY CONTINGENCY TABLES WITH ASSOCIATED SCORES						
TAF						
OBS\FORECASTS	VLIFR	LIFR	IFR	MVFR	VFR	TOTAL
VLIFR	0	82	55	10	35	182
LIFR	0	191	313	42	301	847
IFR	0	106	1,492	563	441	2,602
MVFR	0	31	2,222	26,529	7,217	35,999
VFR	0	154	1,753	15,223	100,428	117,558
TOTAL	0	564	5,835	42,367	108,422	157,188
BIAS	0.000	0.666	2.243	1.177	0.922	----
GFS LAMP						
OBS\FORECASTS	VLIFR	LIFR	IFR	MVFR	VFR	TOTAL
VLIFR	15	48	31	16	72	182
LIFR	46	148	111	179	363	847
IFR	25	585	446	838	708	2,602
MVFR	70	1,490	1,996	25,921	6,522	35,999
VFR	108	369	608	14,204	102,269	117,558
TOTAL	264	2,640	3,192	41,158	109,934	157,188
BIAS	1.451	3.117	1.227	1.143	0.935	----

Quick Rewind: Instead of “Frequency” use “Percent”

- Smaller numbers/easier to comprehend
- Good to check for over-forecast vs under-forecast “biases”
 - But official biases are listed too
- And those “bad forecasts” in red...

Hit	1-Category Error	2-Category Error	3-Category Error	4 or More Category Error		
<input checked="" type="checkbox"/> Show All <input type="checkbox"/> Hide All						
MULTICATEGORY CONTINGENCY TABLES WITH ASSOCIATED SCORES						
TAF						
OBS\FORECASTS	VLIFR	LIFR	IFR	MVFR	VFR	TOTAL
VLIFR	0.00	0.05	0.03	0.01	0.02	0.12
LIFR	0.00	0.12	0.20	0.03	0.19	0.54
IFR	0.00	0.07	0.95	0.36	0.28	1.66
MVFR	0.00	0.02	1.41	16.88	4.59	22.90
VFR	0.00	0.10	1.12	9.68	63.89	74.79
TOTAL	0.00	0.36	3.71	26.95	68.98	100.00
BIAS	0.000	0.666	2.243	1.177	0.922	----
GFS LAMP						
OBS\FORECASTS	VLIFR	LIFR	IFR	MVFR	VFR	TOTAL
VLIFR	0.01	0.03	0.02	0.01	0.05	0.12
LIFR	0.03	0.09	0.07	0.11	0.23	0.54
IFR	0.02	0.37	0.28	0.53	0.45	1.66
MVFR	0.04	0.95	1.27	16.49	4.15	22.90
VFR	0.07	0.23	0.39	9.04	65.06	74.79
TOTAL	0.17	1.68	2.03	26.18	69.94	100.00
BIAS	1.451	3.117	1.227	1.143	0.935	----

Replay: Instead of “Frequency” use “Hours”

- Very meaningful data for more anomalous occurrences
- Some numbers can get quite big

Hit	1-Category Error	2-Category Error	3-Category Error	4 or More Category Error
-----	------------------	------------------	------------------	--------------------------

Show All Hide All

MULTICATEGORY CONTINGENCY TABLES WITH ASSOCIATED SCORES

TAF

OBS\FORECASTS	VLIFR	LIFR	IFR	MVFR	VFR	TOTAL
VLIFR	0.00	6.83	4.58	0.83	2.92	15.17
LIFR	0.00	15.92	26.08	3.50	25.08	70.58
IFR	0.00	8.83	124.33	46.92	36.75	216.83
MVFR	0.00	2.58	185.17	2,210.75	601.42	2,999.92
VFR	0.00	12.83	146.08	1,268.58	8,369.00	9,796.50
TOTAL	0.00	47.00	486.25	3,530.58	9,035.17	13,099.00
BIAS	0.000	0.666	2.243	1.177	0.922	----

GFS LAMP

OBS\FORECASTS	VLIFR	LIFR	IFR	MVFR	VFR	TOTAL
VLIFR	1.25	4.00	2.58	1.33	6.00	15.17
LIFR	3.83	12.33	9.25	14.92	30.25	70.58
IFR	2.08	48.75	37.17	69.83	59.00	216.83
MVFR	5.83	124.17	166.33	2,160.08	543.50	2,999.92
VFR	9.00	30.75	50.67	1,183.67	8,522.42	9,796.50
TOTAL	22.00	220.00	266.00	3,429.83	9,161.17	13,099.00
BIAS	1.451	3.117	1.227	1.143	0.935	----


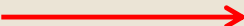
More of the TAF Report Page

- Contingency Tables Scores (Statistics)
- Most of These Are Self-Explanatory

CONTINGENCY TABLES SCORES (TAF / GFS LAMP)	
Percent Hits [?]	81.84 / 81.94
Percent >1 Category Errors [?]	1.80 / 2.57
Peirce Skill Score (PSS) [?]	0.619 / 0.608
5-category Gerrity Skill Score (GSS) [?]	0.376 / 0.340
5-category GSS delta [?]	0.002 / 0.002
3-category GSS [?]	0.621 / 0.524
3-category GSS delta [?]	0.000 / 0.000
TAF Better Than GFS LAMP (TAF > GFS LAMP) [?]	7.80
TAF Worse Than GFS LAMP (TAF < GFS LAMP) [?]	7.42
TAF = GFS LAMP = OBS [?]	75.07
TAF = GFS LAMP <> OBS [?]	9.71

Peirce Skill Score & Garrity Skill Score

- Peirce Skill Score: -1 to 1, with 0 being random based on climatology and 1 being perfect
- Garrity Skill Score: Also -1 to 1, with 0 indicating no skill and 1 being perfect...but...with greater bonus towards forecasting anomalies well

CONTINGENCY TABLES SCORES (TAF / GFS LAMP)	
Percent Hits [?]	81.84 / 81.94
Percent >1 Category Errors [?]	1.80 / 2.57
 Peirce Skill Score (PSS) [?]	0.619 / 0.608
 5-category Gerrity Skill Score (GSS) [?]	0.376 / 0.340
5-category GSS delta [?]	0.002 / 0.002
3-category GSS [?]	0.621 / 0.524
3-category GSS delta [?]	0.000 / 0.000
TAF Better Than GFS LAMP (TAF > GFS LAMP) [?]	7.80
TAF Worse Than GFS LAMP (TAF < GFS LAMP) [?]	7.42
TAF = GFS LAMP = OBS [?]	75.07
TAF = GFS LAMP <> OBS [?]	9.71

Still More on the TAF Report Page

- Finally the last part
- POD/FAR/CSI for each category (slice) plus combinations (“& below”)

POD-FAR-CSI SCORES (TAF / GFS LAMP)				
Category/Scores	Probability of Detection (POD) [?]	False Alarm Ratio (FAR) [?]	Critical Success Index (CSI) [?]	% Improvement TAF CSI over GFS LAMP
VLIFR	0.000 / 0.082	--- / 0.943	0.000 / 0.035	-100.00
LIFR & Below	0.265 / 0.250	0.516 / 0.912	0.207 / 0.070	195.82
IFR & Below	0.617 / 0.401	0.650 / 0.761	0.287 / 0.176	63.38
MVFR & Below	0.798 / 0.807	0.351 / 0.324	0.557 / 0.582	-4.24
LIFR Slice	0.226 / 0.175	0.661 / 0.944	0.157 / 0.044	253.21
IFR Slice	0.573 / 0.171	0.744 / 0.860	0.215 / 0.083	157.60
MVFR Slice	0.737 / 0.720	0.374 / 0.370	0.512 / 0.506	1.16
VFR	0.854 / 0.870	0.074 / 0.070	0.800 / 0.817	-2.06

Profile Of Data Used For This Report	
Scheduled Forecasts Analyzed [?]	553
Total 5-Minute Intervals [?]	157,188 / 159,264 (98.70 %)

Review of POD, FAR, CSI

- $POD = A / (A + B)$: 0 is worst, 1 is best
 - $FAR = C / (A + C)$: 0 is best (no false alarms), 1 is worst
 - $CSI = A / (A + B + C)$: 0 is worst, 1 is best
- Bonus: Bias is $(A + C) / (A + B)$

Obs\Forecast	Forecast says "YES!"	Forecast says "NO!"
Observation says "YES!"	A	B
Observation says "NO!"	C	Not represented in POD, FAR or CSI

Examples of Using Specific Thresholds

- Ceilings Below 2000 Feet (Extra Fuel Requirement):

From Date: 01/01/2022
To End Date: 04/01/2022
Months to report: JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC Select All

National | Region | WFO | State | Terminal | **Experimental Forecast** | My Verification

Selection area set to Terminal.

Filter [?] Area Type: WFO Location: SGX

Select [?] Terminal: KCRQ, KONT, KPSP, **KSAN**, KSBD, KSNA Current Selections: KSAN

Add Remove Clear

Element Type: CEILING
Forecast Type: OPERATIONAL IMPACT
Guidance Type: GFS LAMP
Ceilings Below: 2000 FEET
TAF Type: Scheduled Amended Scheduled and amended combined
TAF Begin Times: 0000-0559 0600-1159 1200-1759 1800-2359 Select All
Forecast Projections: >0 - 3 >3 - 6 >6 - 9 >9 - 12 >12 - 18 >18 - 24 >24 - 30 Select All
Email Option [?]: Email me when the report is finished

Get Scores Reports may take several minutes to create. Please limit criteria to avoid long waits.

Examples of Using Specific Thresholds - Output

- Ceilings Below 2000 Feet (Extra Fuel Requirement):

2x2 CRITICAL THRESHOLD DATA

TAF

OBS\FORECASTS	< 2000	≥ 2000	Total
< 2000	3.88	3.25	7.13
≥ 2000	5.08	87.79	92.87
Total	8.96	91.04	100.00

POD [?] (< 2000)	0.544
FAR [?] (< 2000)	0.567
CSI [?] (< 2000)	0.318
2x2 Heidke Skill Score [?]	0.438

GFS LAMP

OBS\FORECASTS	< 2000	≥ 2000	Total
< 2000	3.35	3.79	7.13
≥ 2000	3.62	89.25	92.87
Total	6.96	93.04	100.00

POD (< 2000)	0.469
FAR (< 2000)	0.519
CSI (< 2000)	0.311
2x2 Heidke Skill Score	0.435

More Critical Threshold – Airport Landing Minimums

- Many airports have landing minimums of 200 feet (can be seen by looking at VLIFR in Stats on Demand)
- Some airports have different landing minimums not corresponding to a threshold associated with VLIFR, LIFR or IFR.
- Example: MSO (Missoula) – 300 foot CAC ceiling (Threshold A – Landing Minimums)

From Date

To End Date

Months to report JAN FEB MAR APR MAY JUN
 JUL AUG SEP OCT NOV DEC Select All

National **Region** **WFO** **State** **Terminal** **Experimental Forecast** **My Verification**

Selection area set to Terminal.

Filter [\[?\]](#) Area Type Location
 »

Select [\[?\]](#) Terminal Current Selections

KBTM	<input type="text" value="KMSO"/>
KFCA	
KGPI	
KMSO	
KSMN	

Element Type

Forecast Type

Guidance Type

Ceilings Below

TAF Type Scheduled Amended Scheduled and amended combined

TAF Begin Times 0000-0559 0600-1159 1200-1759 1800-2359 Select All

Forecast Projections >0 - 3 >3 - 6 >6 - 9 >9 - 12 >12 - 18 >18 - 24 >24 - 30 Select All

Email Option [\[?\]](#) Email me when the report is finished

Reports may take several minutes to create. Please limit criteria to avoid long waits.

Ceiling Threshold for Airport Landing Minimum - Output

- Generally under-forecasting cigs < 300 feet
- GFS-LAMP is not included since 300 feet is not one of its category thresholds

2x2 CRITICAL THRESHOLD DATA

TAF

OBS\FORECASTS	< 300	≥ 300	Total
< 300	0.24	4.00	4.23
≥ 300	0.66	95.11	95.77
Total	0.89	99.11	100.00

POD [?] (< 300)	0.056
FAR [?] (< 300)	0.734
CSI [?] (< 300)	0.049
2x2 Heidke Skill Score [?]	0.079

Heidke Skill Score:
-∞ to 1 (1 is best, 0
is no skill, -∞ is evil)

What About Both CIG & VIS Thresholds for Flight Category?

- You can select thresholds for both ceiling and visibility
- Slight limitation in the visibility (no 8th miles)
- Otherwise, same rules apply
- Example: Crescent City, California (CEC) landing minimums are 300 feet and $\frac{3}{4}$ mile:

The screenshot shows a web-based interface for selecting flight categories. At the top, there are date pickers for 'From Date' (04/01/2022) and 'To End Date' (05/01/2022). Below these are checkboxes for 'Months to report' from JAN to DEC, with a 'Select All' option. A navigation bar includes tabs for 'National', 'Region', 'WFO', 'State', 'Terminal', 'Experimental Forecast', and 'My Verification'. The 'Terminal' tab is active, showing a 'Selection area set to Terminal.' section with filters for 'Area Type' (WFO) and 'Location' (EKA). Below this, there are two lists: 'Select' (containing KACV, KCEC, KUKI) and 'Current Selections' (containing KCEC). 'Add', 'Remove', and 'Clear' buttons are present. The bottom section contains various filters: 'Element Type' (FLIGHT CATEGORY), 'Forecast Type' (OPERATIONAL IMPACT), 'Guidance Type' (GFS LAMP), 'Ceilings Below' (300 FEET), 'Visibilities Below' (3/4 MILE), 'TAF Type' (Scheduled, Amended, Scheduled and amended combined), 'TAF Begin Times' (0000-0559, 0600-1159, 1200-1759, 1800-2359, Select All), 'Forecast Projections' (>0 - 3, >3 - 6, >6 - 9, >9 - 12, >12 - 18, >18 - 24, >24 - 30, Select All), and 'Email Option' (Email me when the report is finished). A 'Get Scores' button and a note about report creation time are at the bottom.

Flight Category - Output

TAF			
OBS\FORECASTS	CIG <300 or VIS < $\frac{3}{4}$	CIG \geq 300 and VIS $\geq\frac{3}{4}$	Total
CIG <300 or VIS < $\frac{3}{4}$	0.05	0.16	0.21
CIG \geq 300 and VIS $\geq\frac{3}{4}$	0.35	99.44	99.79
Total	0.40	99.60	100.00

POD [?] (CIG < 300 or VIS < $\frac{3}{4}$)	0.231
FAR [?] (CIG < 300 or VIS < $\frac{3}{4}$)	0.876
CSI [?] (CIG < 300 or VIS < $\frac{3}{4}$)	0.088
2x2 Heidke Skill Score [?]	0.159

Important Nuances of Verification: RAW vs. Compared with Guidance

- RAW scores will almost always be best in fair weather
 - P6SM SKC is *usually* the easiest to forecast
 - Example—PHX (Phoenix!) in April 2022

MULTICATEGORY CONTINGENCY TABLES WITH ASSOCIATED SCORES

TAF

OBS\FORECASTS	VLIFR	LIFR	IFR	MVFR	VFR	TOTAL
VLIFR	0.00	0.00	0.00	0.00	0.00	0.00
LIFR	0.00	0.00	0.00	0.00	0.00	0.00
IFR	0.00	0.00	0.00	0.00	0.00	0.00
MVFR	0.00	0.00	0.00	0.00	0.00	0.00
VFR	0.00	0.00	0.00	0.00	100.00	100.00
TOTAL	0.00	0.00	0.00	0.00	100.00	100.00
BIAS	0.000	0.000	0.000	0.000	1.000	----

GFS LAMP

OBS\FORECASTS	VLIFR	LIFR	IFR	MVFR	VFR	TOTAL
VLIFR	0.00	0.00	0.00	0.00	0.00	0.00
LIFR	0.00	0.00	0.00	0.00	0.00	0.00
IFR	0.00	0.00	0.00	0.00	0.00	0.00
MVFR	0.00	0.00	0.00	0.00	0.00	0.00
VFR	0.00	0.00	0.00	0.00	100.00	100.00
TOTAL	0.00	0.00	0.00	0.00	100.00	100.00
BIAS	0.000	0.000	0.000	0.000	1.000	----

Important Nuances of Verification: RAW vs. Compared with Guidance

- RAW scores will almost always be best in fair weather
 - P6SM SKC is *usually* the easiest to forecast
 - Example—PHX (Phoenix!) in April 2022

CONTINGENCY TABLES SCORES (TAF / GFS LAMP)	
Percent Hits [?]	100.00 / 100.00
Percent >1 Category Errors [?]	0.00 / 0.00
Peirce Skill Score (PSS) [?]	--- / ---
5-category Gerrity Skill Score (GSS) [?]	--- / ---
5-category GSS delta [?]	--- / ---
3-category GSS [?]	--- / ---
3-category GSS delta [?]	--- / ---
TAF Better Than GFS LAMP (TAF > GFS LAMP) [?]	0.00
TAF Worse Than GFS LAMP (TAF < GFS LAMP) [?]	0.00
TAF = GFS LAMP = OBS [?]	100.00
TAF = GFS LAMP <> OBS [?]	0.00



With More Clouds and “Weather” It’s Sometimes Easier to Beat GFS LAMP

- PDT (Pendleton, OR) – Jan/Feb/Mar 2022:

CONTINGENCY TABLES SCORES (TAF / GFS LAMP)

Percent Hits [?]	80.47 / 78.46
Percent >1 Category Errors [?]	6.32 / 7.41
Peirce Skill Score (PSS) [?]	0.485 / 0.457
5-category Gerrity Skill Score (GSS) [?]	0.559 / 0.587
5-category GSS delta [?]	0.000 / 0.000
3-category GSS [?]	0.665 / 0.683
3-category GSS delta [?]	0.000 / 0.000
TAF Better Than GFS LAMP (TAF > GFS LAMP) [?]	8,546 (8.77 %)
TAF Worse Than GFS LAMP (TAF < GFS LAMP) [?]	5,977 (6.13 %)
TAF = GFS LAMP = OBS [?]	72,242 (74.12 %)
TAF = GFS LAMP <> OBS [?]	10,697 (10.98 %)

Viewing Your Personal Statistics

- You should have “My Verification” available...
- If you are the aviation program manager or in management (MIC/SOO/WCM), you should be able to view stats for other forecasters
- The website is a little slower here (especially when looking at longer periods of time)

From Date

To End Date

Months to report JAN FEB MAR APR MAY JUN
 JUL AUG SEP OCT NOV DEC Select All

National Region WFO State Terminal **Experimental Forecast** My Verification

Selection area set to Terminal for individual forecaster.

Filter [?] Forecaster

Select [?] Terminal Current Selections

KCRQ
KONT
KPSP
KSAN
KSBD
KSNA

KSAN

Add Remove Clear

Results

TAF

OBS\FORECASTS	1	2	3	4	5	6	TOTAL
<200 (1)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200-400 (2)	0.00	0.80	0.15	0.00	0.00	0.21	1.16
500-900 (3)	0.00	0.49	0.31	0.08	0.00	0.53	1.41
1000-1900 (4)	0.00	0.00	1.76	3.09	3.55	1.52	9.91
2000-3000 (5)	0.00	0.00	0.00	1.85	7.35	1.38	10.58
>3000 (6)	0.00	0.24	0.40	1.07	10.64	64.59	76.93
TOTAL	0.00	1.53	2.62	6.08	21.54	68.23	100.00
BIAS	0.000	1.314	1.861	0.614	2.035	0.887	----

CONTINGENCY TABLES SCORES (TAF / GFS LAMP)

Percent Hits [?]	76.14 / 75.23
Percent >1 Category Errors [?]	3.96 / 7.20
Peirce Skill Score (PSS) [?]	0.535 / 0.464
6-category Gerrity Skill Score (GSS) [?]	0.299 / 0.374
6-category GSS delta [?]	0.004 / 0.004
3-category GSS [?]	0.670 / 0.537
3-category GSS delta [?]	0.002 / 0.002
TAF Better Than GFS LAMP (TAF > GFS LAMP) [?]	12.85
TAF Worse Than GFS LAMP (TAF < GFS LAMP) [?]	9.20
TAF = GFS LAMP = OBS [?]	66.96
TAF = GFS LAMP <> OBS [?]	11.00

Wind Speed

- Example: Great Falls, MT (KGTF) 1 Jan-1 Jun 2022

TAF

OBS\FORECASTS	<8	8-12	13-17	18-22	23-27	28-32	>32	TOTAL
<8	12.26	14.54	2.88	0.26	0.13	0.02	0.00	30.11
8-12	4.41	15.86	6.32	1.21	0.40	0.10	0.01	28.31
13-17	0.85	6.96	9.02	3.38	1.24	0.24	0.03	21.72
18-22	0.10	1.17	4.36	4.09	2.27	0.84	0.14	12.97
23-27	0.01	0.18	0.76	1.80	1.35	0.91	0.09	5.09
28-32	0.00	0.00	0.01	0.32	0.74	0.40	0.03	1.51
>32	0.00	0.01	0.02	0.03	0.13	0.10	0.02	0.30
TOTAL	17.63	38.72	23.38	11.07	6.27	2.61	0.31	100.00
BIAS	0.586	1.368	1.077	0.854	1.232	1.731	1.038	----

GFS LAMP

OBS\FORECASTS	<8	8-12	13-17	18-22	23-27	28-32	>32	TOTAL
<8	19.50	9.81	0.77	0.02	0.00	0.00	0.00	30.11
8-12	6.80	15.30	5.23	0.84	0.11	0.03	0.00	28.31
13-17	0.89	6.12	8.85	4.71	0.89	0.18	0.08	21.72
18-22	0.09	1.19	3.44	5.12	2.41	0.54	0.19	12.97
23-27	0.00	0.07	0.38	2.04	1.86	0.58	0.16	5.09
28-32	0.00	0.00	0.03	0.24	0.79	0.38	0.06	1.51
>32	0.00	0.00	0.02	0.02	0.12	0.11	0.02	0.30
TOTAL	27.29	32.49	18.72	12.99	6.18	1.82	0.51	100.00
BIAS	0.906	1.148	0.862	1.002	1.215	1.209	1.684	----

Wind Speed

- Example: Great Falls, MT (KGTF) 1 Jan-1 Jun 2022

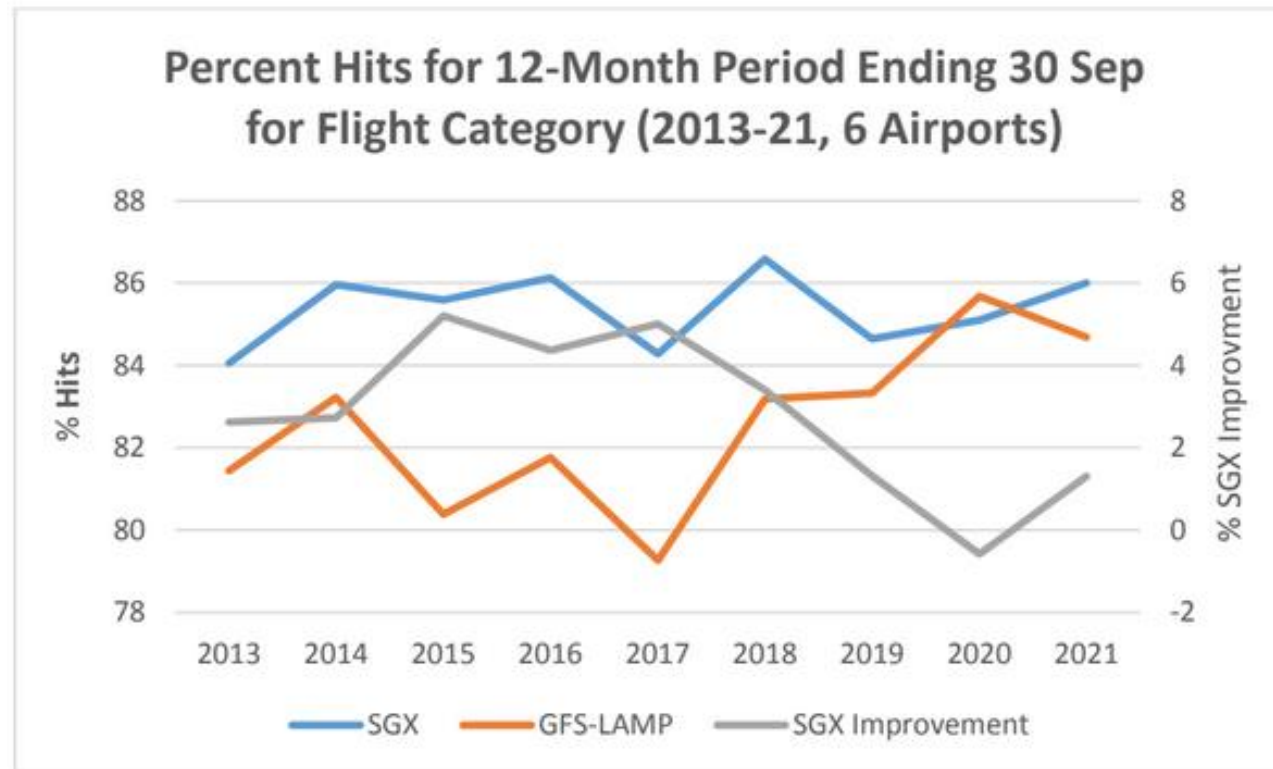
CONTINGENCY TABLES SCORES								
Percent Hits [?]		43.00 / 51.04						
Percent >1 Category Errors [?]		11.18 / 6.86						
Peirce Skill Score (PSS) [?]		0.260 / 0.361						
Gerrity Skill Score (GSS) [?]		0.385 / 0.464						
GSS delta [?]		0.000 / 0.000						
TAF Better Than GFS LAMP (TAF > GFS LAMP) [?]		18.09						
TAF Worse Than GFS LAMP (TAF < GFS LAMP) [?]		28.93						
TAF = GFS LAMP = OBS [?]		28.48						
TAF = GFS LAMP <> OBS [?]		24.50						
POD-FAR-CSI SCORES (TAF / GFS LAMP)								
Scores\Wind Speed		>27 knots			>32 knots			
Probability of Detection (POD) [?]		0.302 / 0.319			0.058 / 0.076			
False Alarm Ratio (FAR) [?]		0.813 / 0.752			0.944 / 0.955			
Critical Success Index (CSI) [?]		0.130 / 0.162			0.029 / 0.029			
% Improvement TAF CSI over GFS LAMP		-19.53			0.76			
MEAN ERROR DATA BY OBSERVED SPEED								
TAF								
CATEGORY	<8	8-12	13-17	18-22	23-27	28-32	>32	OVER-ALL
Mean Algebraic Error [?]	4.1	1.1	-0.2	-0.7	-2.2	-4.4	-8.5	1.2
Mean Absolute Error [?]	4.3	2.9	3.6	4.5	4.7	4.9	8.5	3.8
Root Mean Square Error [?]	5.5	4.1	4.6	5.5	5.8	5.9	9.7	5.0

Note About Wind Speed

- Verification scores are generally poor across the US
- Of the top 15 busiest US airports (Oct 2021-Sep 2022), only 2 had TAFs beating GFS-LAMP!
 - The winners: Las Vegas (LAS) and Denver (DEN)
 - Details: This is % hits for wind speed (5 knot increments, so “8-12 knots”, “13-17 knots”, etc.)

Example Graphic from a TAF Verification Report

- Verification website will give you the data but not the graphic...



Issues with Moving to a New Office

- Forecaster needs to reset their office affiliation
- Click “Account” by your name after you log in, then click “Update your profile information”



NATIONAL WEATHER SERVICE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
Performance Management Web Portal



Search

brandt.ma

[Home](#)

[Account](#)

[Logout](#)

Account

[Home](#)

Account Settings

Please use the links below to view and update your account settings.

- [Update your profile information](#) ←
- [Change your password](#)
- [Update your email subscriptions](#)
- [View your account permissions](#)
- [Create/ Update your Home page profile](#)

Profile Information

- Note that you might need to change your forecaster ID at a new office (contact AWIPS focal point)

[Home](#) >> [Account Settings](#)

Account Update

Please use the form below to update your user profile. All fields are required.

First Name:	<input type="text" value="Brandt"/>	
Last Name:	<input type="text" value="Maxwell"/>	
Username:	<input type="text" value="brandt.maxwell"/>	(6-25 letters, digits, and ".")
Email Address:	<input type="text" value="brandt.maxwell@noaa.gov"/>	(must be NOAA.gov address)
Office / Center:	<input type="text" value="NWS Forecast Office"/>	▼
Location:	<input type="text" value="SGX"/>	▼
Forecaster ID:	<input type="text" value="007"/>	▼
Title:	<input type="text" value="Forecaster"/>	▼
(Optional)	Add Address : Add Phone	
Office Phone:	<input type="text" value="858-675-8700"/>	(format: 321-555-1234)

Logins Every 18 Months

- The verification website will disable your username/password if you don't log in for 18 months



Strategies/Questions

- How often should you do aviation verification for an office?
- What do you do when a certain forecaster is performing less well than others?
- What strategies do you have to improve the TAF verification?
- And how does this affect DSS?

Questions?

- Send them to Brandt.Maxwell@noaa.gov
- Charles.Kluepfel@noaa.gov is the NWSHQ contact (technical assistance)

