Aircrew Quick Reference to the METAR and TAF Codes

The Aircrew Quick Reference Guide to the METAR and TAF Codes is designed to help aircrews quickly and clearly translate METAR and TAF codes into plain language. See references in <u>Attachment 1</u> for a listing of source documents.

METAR codes report observed weather conditions by airfield; TAF codes report forecasted weather conditions by airfield. Both codes are lines of text made up of data groups (or just "groups") separated by spaces. Some data groups are not discussed because they are intended for use by the weather community and are not useful for flight planning. Differences between military and civilian renderings of the code are discussed where appropriate.

Aircrews should check METAR/TAF codes thoroughly for all hazards to flying safety, including thunderstorms, icing, turbulence, wind shear, and other elements that may significantly affect their aircraft. When users have additional weather-related questions, they should contact a certified US military forecaster or MAJCOM-approved weather source for clarification. Weather briefing requirements for USAF Aircrews are spelled out in AFI 11-202, Volume 3, *General Flight Rules*.

SUMMARY OF REVISIONS
Corrections to decode tables for icing and turbulence intensity in Figures 3 and 4 made this revision necessary. Figures 1 and 2 are now presented in portrait format for user convenience. Additional edits, identified by vertical bars in the left margin, ease the interpretation of METAR and TAF codes.

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What kind of report is this?

```
METAR KBLV 011657Z AUTO 25015G30KT
210V290 3/8SM R32L/1000FT FG BKN005
01/M01 A2984 RMK A02 SLP034

SPECI KBLV 011715Z 25015G30KT 210V290 3SM
BR BKN015 01/M01 A2984 RMK SLP034
```

METAR (Aviation Routine Weather Report) refers to a scheduled observation taken between 55-59 minutes past the hour (also referred to as a routine *hourly* observation).

SPECI (Special Report) refers to an unscheduled observation that met a predefined criteria (such as a change from VFR to IFR) and may be taken at 00-54 minutes past the hour. When SPECI criteria are met during the hourly observation time window (55-59 minutes past the hour), no special indication is made. The new weather conditions are encoded in a standard METAR report.

How do I determine the location and the date and time of issuance?

```
METAR KBLV 011657Z AUTO 25015G30KT
210V290 3/8SM R32L/1000FT FG BKN005
01/M01 A2984 RMK A02 SLP034
```

The 4-character ICAO identifier that follows the report type is the location identifier; **KBLV** (Scott AFB) is the location/station in this example.

The 7-character group following the ICAO identifier is the date and time of issuance. The first two digits are the date; the last four digits are the coordinated universal time (UTC), sometimes called "zulu time."

In this example, **01** is the first day of the month, and **1657Z** is 1657 UTC.

What does AUTO and/or COR mean, if included?

Let's look at the meanings of AUTO and COR separately.

```
METAR KBLV 011657Z AUTO 25015G30KT 210V290
3/8SM R32L/1000FT FG BKN005 01/M01 A2984 RMK
A02A SLP034
```

AUTO refers to an automated observation with measurements taken by equipment such as the domestic Automated Weather Observing System (AWOS) or Automated Surface Observation System (ASOS), or the Air Force's Automated Meteorological Station (AMS), also known as AN/FMQ-19. AO1 denotes an observation taken by equipment lacking a precipitation type discriminator (rain vs. snow). AO2 denotes an observation taken by standard equipment with a full complement of sensors. **A02A** denotes an automated observation augmented by a human observer.

```
METAR KBLV 011657Z AUTO COR 25015G30KT
210V290 3/8SM R32L/1000FT FG FU BKN005 01/M01
A2984 RMK A02A SLP034 COR 1725
```

COR indicates a corrected observation. Disregard the previous transmission. **COR 1725** means that the correction was transmitted at 1725Z.

How do I determine the wind speed and direction?

```
METAR KBLV 011657Z AUTO 25015G30KT
210V290 3/8SM R32L/1000FT FG BKN005
01/M01 A2984 RMK A02 SLP034
```

The data group followed by KT (knots) is the wind.

The first three digits are the true direction to the nearest 10 degrees from which the wind is blowing. The next two digits are the sustained speed. If gusts are present, the next two or three digits following the "G**"** are the "gust," the maximum wind speed in the last ten minutes.

In this example, the **25015G30KT** group is the wind direction and speed. Here, the wind is blowing from 250 degrees (true) at a sustained speed of 15 knots with 30-knot gusts.

How do I determine if the wind is varying between directions?

```
METAR KBLV 011657Z AUTO 25015G30KT
210V290 3/8SM R32L/1000FT FG BKN005
01/M01 A2984 RMK A02 SLP034
```

A wind variability group will be reported if the wind is variable by 60 degrees or more and the speed is greater than 6 knots. This remark will contain the extremes of the wind directions, separated by "V."

In this example, **210V290** are reads, "wind direction varying between 210 and 290."

How do I determine the prevailing visibility?

```
METAR KBLV 011657Z AUTO 25015G30KT
210V290 3/8SM R32L/1000FT FG BKN005
01/M01 A2984 RMK A02 SLP034
```

In this example, **3/8SM** (3/8 of a statute mile) is the prevailing visibility. Prevailing visibility is the greatest horizontal visibility observed throughout at least half the horizon circle, and is not necessarily continuous.

Sector visibility will be reported in the remarks section if it differs from the prevailing visibility and is less than 3 miles. For sector visibility format, see VIS remarks in Figure 2 on page 17.

```
METAR EDDF 071320Z 22008KT 9999 SCT036
SCT090 BKN280 19/10 Q1011 NOSIG
```

At overseas locations, visibility is reported in meters, and SM is omitted. The largest reportable metric value is **9999**. This value represents a visibility greater than 9000 meters (7 SM or more). To convert visibility values from meters to statute miles see Attachment 3 on page 33 or see Flight Information Handbook conversion tables.

What if there is a group that begins with the letter "R?"

```
METAR KBLV 011657Z AUTO 25015G30KT 210V290
3/8SM R32L/1000FT FG BKN005 01/M01 A2984 RMK
A02 SLP034
```

Runway Visual Range (RVR) follows the visibility and begins with the letter "R." The runway heading will follow the "R," and in this example, "32L" represents runway 32-Left (C-Center, R-Right). The last four digits report the visibility in feet.

In this example, **R32L/1000FT** reads, "runway visual range for runway 32 Left is 1,000 ft."

At overseas locations, visibility is reported in meters, and FT is omitted from the RVR group. The same RVR at an overseas location would appear as R32L/0300 and read, "runway visual range for 32 Left is 300 meters."

How would I decode the formats M0600FT or P6000FT or R06L2000V4000FT (not in example above)?

M0600FT	Reads, "RVR is less than 600 feet." (**M** = less than)
P6000FT	Reads, "RVR is greater than 6,000 feet." (**P** = greater than)
R06L2000V4000FT	Reads, "RVR for 6 Left is variable between 2,000 and 4,000 feet." "**V**" indicates that the RVR is variable between two thresholds.

How do I determine if there is any weather?

```
METAR KBLV 011657Z AUTO 25015G30KT
210V290 3/8SM R32L/1000FT FG BKN005
01/M01 A2984 RMK A02 SLP034
```

If a weather element (precipitation or obstruction to visibility) is observed, it will be found in the data group following the visibility. The absence of a weather element group indicates that no precipitation or obstruction to visibility is occurring at the time of the observation. In this example, "**FG**" represents "Fog."

To methodically decode a weather group, look for six key elements (*depending on the phenomena*, *one or more may be omitted*). In order, these elements are: **Intensity** (symbol preceding the code), **Proximity**, **Descriptor**, **Precipitation Description**, **Obscuration** (other than precipitation), and **Other**.

For a complete table of weather group elements, see .

METAR — Weather/Obscuration Table

Figure 1. Weather/Obscuration Table

Phenomenon Qualifiers		
Element 1: Intensity	**Element 2: Proximity**	**Element 3: Description**
– Light	**VC** In the vicinity	**BC** Patches
none Moderate	*none* On station	**BL** Blowing
+ Heavy		**DR** Low Drifting
Note: **+** *can also mean*		**FZ** Freezing
a well-developed dust storm,		**MI** Shallow
sandstorm, whirl, dust devil,		**PR** Partial (covering
tornado, or waterspout		part of the sky)
		SH Shower(s)
		TS Thunderstorm

Types of Weather Phenomenon		
Element 4: Precipitation	**Element 5: Obscuration**	**Element 6: Other**
DZ Drizzle	**BR** Mist, vis. ≥ 5/8SM	**DS** Dust Storm
GR Hail, diam. ≥ 5mm (.25")	(or ≥ 1000m)	**FC** Funnel cloud(s)
GS Small Hail / Snow Pellets,	**DU** Widespread Dust	e.g., tornado
diam. < 5mm (.25")	**FG** Fog, vis. < 5/8SM	or waterspout
IC Ice Crystals	(or ≥ 1000m)	**PO** Well-developed
PL Ice Pellets	**FU** Smoke	dust/sand whirls
RA Rain	**HZ** Haze	**SQ** Squalls
SG Snow Grains	**PY** Spray	**SS** Sandstorm
SN Snow	**SA** Sand	
UP Unknown Precipitation	**VA** Volcanic Ash	
(Automated only)		

Examples:

+SHRASNPL heavy rain showers, snow, ice pellets
TSRAGS thunderstorm, moderate rain, small hail
BR HZ mist (vis. >= 5/8SM), haze
BCFG patchy fog (vis. < 5/8SM)
PRFG partial fog (sector vis. < 5/8SM)

+DRSN heavy snow, drifting
VCSH showers in vicinity
FZDZ freezing drizzle
BLPY blowing spray
+DS heavy dust storm

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How do I determine the layers of clouds?

```
METAR KBLV 011657Z AUTO 25015G30KT 210V290
3/8SM R32L/1000FT FG BKN005 01/M01 A2984 RMK
A02 SLP034
```

Each observed cloud layer is encoded in a cloud group with sky coverage, altitude of the cloud base above ground level (AGL), and sometimes cloud type. The first three letters of each cloud group denote sky coverage as in the table below. In the example above, **BKN** indicates broken cloud coverage. Then the cloud base of each layer is reported in hundreds of feet AGL. Append two zeros to the value given. In this example, **005** represents the value 500 feet AGL. Finally, codes for convective cloud types are appended. CB stands for cumulonimbus; TCU stands for towering cumulus.

If surface-based clouds or other surface-based obscurations (e.g., smoke, haze) are reported (i.e., cloud base is 000), then vertical visibility, where available, is also reported in hundreds of feet, following the letters, VV. When the lowest broken or overcast cloud base is indefinite, vertical visibility determines the ceiling.

Sky coverage in eighths:

SKC	Sky clear
FEW	Few -- 0-2 eighths
SCT	Scattered -- 3-4 eighths
BKN	* Broken -- 5-7 eighths
OVC	* Overcast -- 8 eighths

* Constitutes a "ceiling"

How do I determine the current temperature and dewpoint?

```
METAR KBLV 011657Z AUTO 25015G30KT
210V290 3/8SM R32L/1000FT FG BKN005
01/M01 A2984 RMK A02 SLP034
```

The group following the sky condition is the temperature and dewpoint information in degrees Celsius. To convert temperatures from Celsius to Fahrenheit see Attachment 2 on page 32 or see Flight Information Handbook conversion tables.

In this example, **01** is the temperature in degrees Celsius (1ºC), and **M01** is the dewpoint in degrees Celsius (-1ºC). An "M" in the temperature field means "minus" (below zero).

How do I determine the current altimeter setting?

```
METAR KBLV 011657Z AUTO 25015G30KT
210V290 3/8SM R32L/1000FT FG BKN005
01/M01 A2984 RMK A02 SLP034
```

The 5-character group beginning with A, following the temperature/dewpoint group is the altimeter setting in inches and hundredths of an inch of mercury (inches Hg), used in the United States and at US airfields overseas. In this example, **A2984** represents a current altimeter setting of 29.84 inches Hg.

```
METAR EDDF 071320Z 22008KT 9999 SCT036
SCT090 BKN280 19/10 Q1011 NOSIG
```

The 5-character group beginning with Q, following the temperature/dewpoint group is the altimeter setting in hectopascals (hPa), used in some overseas locations. A hectopascal is equivalent to a millibar (mb). In this example, **Q1011** represents a current altimeter setting of 1011 hPa or 1011 mb.

To convert altimeter settings from mb (or hPa) to inches Hg, see Attachment 4 on page 34 or Flight Information Handbook conversion tables.

What is RMK?

```
METAR KBLV 011657Z AUTO 25015G30KT 210V290
3/8SM R32L/1000FT FG BKN005 01/M01 A2984 RMK
A02 SLP034
```

In METAR reports from the United States and from overseas US military airfields, **RMK** indicates the start of the Remarks section, following the altimeter setting. Remarks contain any pertinent information beyond the standard fields provided, and can be either encoded or spelled out in plain language. For a partial listing of possible METAR remarks, see Figure 2 on page 17. Additional abbreviations are constructed in accordance with FAA Order 7340.1, *Contractions*.

In this example, the remark, **SLP034**, is the sea level pressure in millibars (or hectopascals) to the nearest tenth. To decode, place a "10" or "9" before the first digit (use a 9 if the 3-digit value is 500 or more), and place a decimal point before the last digit. The sea level pressure remark in the above example would read "current sea level pressure of 1003.4 millibars."

Caution: Do not confuse the **METAR** remarks "5####" group or "6####" group with the **TAF** "5######" (turbulence) group or the **TAF** "6######" (icing) group. Unlike TAF code usage, METAR "5" and "6" group codes indicate pressure tendency and cumulative precipitation amounts--if you need these values, contact your weather provider for decoding instructions. See pages 27 and 28 for more info on decoding icing and turbulence forecasts.

What is supplemental information?

Overseas (except at US military installations), METAR remarks are called "supplemental information." Supplemental information follows the altimeter setting and uses remark codes like US remarks, as in Figure 2 on page 17, but is not preceded by `RMK`.

Supplemental information can also include:
 - recent weather elements, coded with a leading `RE`,
 - sea surface temperature in ºC and sea state 0-9, coded `W##/S#`,
 - runway state, coded as an 8-digit numerical group determined by regional air navigation agreement, and/or
 - a 2-hour forecast trend as described below.

```
METAR EDDF 071320Z 22008KT 9999 SCT036 SCT090
BKN280 19/10 Q1011 NOSIG
```

Overseas METAR forecast trend groups either start with `BECMG` or `TEMPO`, consistent with TAF coding conventions, or they consist entirely of **`NOSIG`**, which indicates that no significant changes in reportable weather elements are expected during the 2 hours following the reported observation.

METARs issued by North Atlantic Treaty Organisation (NATO) observers have, as the last data group, a color code for ceiling and visibility data:

NATO Airfield Weather Color Code. source: AFMAN 15-111 USAFESUP1

Color Code	Color	* Ceiling at or above:	Visibility at or above:
BLU	blue	2500 feet	8000 meters
WHT	white	1500 feet	5000 meters
GRN	green	700 feet	3700 meters
YLO	yellow	300 feet	1600 meters
AMB	amber	200 feet	0800 meters
RED	red	< 200 feet	< 0800 meters
BLACK	black	*Airfield not useable for reasons other than ceiling or visibility*	

* Belgium, France, Netherlands, and United Kingdom use scattered clouds instead of ceiling

Figure 2. Remarks Decode Table

A01 – Reported by automated observation equipment that **CANNOT** distinguish between rain and snow

A02 – Reported by automated observation equipment that **CAN** distinguish between rain and snow

ACC W – **A**lto**C**umulus **C**astellanus clouds **W**est

ACSL SW-S – **A**lto**C**umulus **S**tanding **L**enticular clouds **S**outh**W**est through **S**outh

CB W MOV E – **C**umulonim**B**us clouds **W**est **MOV**ing **E**ast

CBMAM DSNT S – **C**umulonim**B**us **MAM**matus clouds to the **D**i**S**ta**NT S**outh

CCSL OVR MT E – **C**irro**C**umulus **S**tanding **L**enticular clouds **OV**e**R M**oun**T**ain(s) to the **E**ast

CONS LTGCA – **CON**tinuou**S** (more than 6 flashes per minute) **L**igh**T**nin**G**, **C**loud to **A**ir

FROPA – … due to **FRO**ntal **Pa**ssage

FRQ – **FR**e**Q**uent (1-6 flashes per minute for lightning)

IR – **I**ce on **R**unway

LSR – **L**oose **S**now on **R**unway

LTGCA – **L**igh**T**nin**G**, **C**loud to **A**ir

LTGCC – **L**igh**T**nin**G**, **C**loud to **C**loud

LTGCG – **L**igh**T**nin**G**, **C**loud to **G**round

LTGIC – **L**igh**T**nin**G**, **I**n-**C**loud

OCNL – **OC**cassio**N**a**L** (less than 1 flash per minute for lightning)

PK WND 28045/1955 – **P**ea**K W**i**ND 280** at **45** knots occurred at **1955**Z

PK WND 34050/38 – **P**ea**K W**i**ND 340** at **50** knots occurred at **38** minutes past the hour

PRESRR / PRESFR – **PRES**sure **R**ising **R**apidly / **PRES**sure **F**alling **R**apidly

PSR – **P**acked **S**now on **R**unway

RAB20SNB20E55 – **RA**in and **SN**ow **B**egan at **20** minutes past the hour, **E**nded at **55** min past

RCR01 – **R**unway **C**ondition **R**eading – values 00 to 25; higher values better for flight ops

RCRNR – **RCR**-equipped, but **N**o **R**eport; or Base Operations closed

RSC – **R**unway **S**urface **C**ondition as determined by Airfield or Operations Manager

RVRNO – **RVR**-equipped, but **NO** report

SFC VIS 2 1/2 – **S**ur**F**a**C**e **VIS**ibility is **2 ½** statute miles; remarked when (lower) tower visibility is reported in METAR body

SLP015 – **S**ea **L**evel **P**ressure is 10**01**.**5** millibars

TCU OHD – **T**owering **CU**mulus clouds **O**ve**R**ea**D**

TCU W – **T**owering **CU**mulus clouds to the **W**est

TSB05E30 – **T**hunder**S**torm **B**egan at **05** minutes past the hour and **E**nded at **30** min past

TWR VIS 1 – **T**o**W**e**R VIS**ibility is **1** statute mile; remarked when (lower) surface visibility is reported in METAR body

VIRGA – **VIRGA** at the station; precipitation observed but not reaching the ground

VIRGA DSNT NE – **VIRGA** to the **D**i**S**ta**NT N**orth**E**ast

VIRGA SW – **VIRGA** to the **S**outh**W**est

VIS 1V2 – **VIS**ibility is **V**ariable between **1** and **2** miles

VIS 2 RWY 11 – **VIS**ibility is **2** statute miles at **R**un**W**a**Y 11**

VIS N 2 – **VIS**ibility in the **N**orthern sector is **2** statute miles

WR – **W**et **R**unway

WSHFT45 – **W**ind **SH**i**FT** at **45** minutes past the hour

What type of report is this?

```
TAF
KBLV 051212 14005KT 8000 BR FEW030 WS010/18040KT
QNH2960INS
BECMG 1314 16010KT 3200 -SHRA OVC020 QNH2959INS
TEMPO 1416 21015G30KT 1600 TSRA BKN008CB OVC020
BECMG 1617 29008KT 3200 -RA OVC030 620304 QNH2958INS
BECMG 1819 31012G22KT 9999 NSW SCT040 WSCONDS 520004
QNH2952INS
BECMG 2021 30008KT 9999 SKC QNH2950INS T08/18Z M01/11Z
```

TAF (Terminal Aerodrome Forecast) is a weather forecast at an airport or military base for a specific period (usually 24 hours).

```
TAF
KBLV AMD 051812 21015G30KT 0800 TSRA BKN008CB OVC020
BECMG 1819 29008KT 1600 -RA OVC030 620304 QNH2958INS
BECMG 1920 31012G22KT 9999 NSW SCT040 520004 QNH2952INS
BECMG 2021 30008KT 9999 SKC QNH2950INS T08/18Z M01/11Z
AMD 1820
```

AMD (Amended Aerodrome Forecast) is issued because the previous version is no longer representative of the current or expected weather. The amended TAF supersedes the previous TAF. In the above example, **AMD 1820** indicates that the forecast was amended at 1820Z. Always refer to the date/time group at the end of the TAF to determine the most current forecast.

```
TAF
KBLV AMD COR 051812 21015G30KT 0800 TSRA BKN005CB
OVC020
BECMG 1819 29008KT 1600 -RA OVC030 620304 QNH2958INS
BECMG 1920 31012G22KT 9999 NSW SCT040 520004 QNH2952INS
BECMG 2021 30008KT 9999 SKC QNH2950INS T08/18Z M01/11Z
COR 1925
```

COR (Corrected Aerodrome Forecast) is a TAF that has been corrected. When a corrected TAF is issued, disregard previous TAFs. In the above example, **COR 1925** indicates that the amended forecast was corrected at 1925Z. Always refer to the date/time group at the end of the TAF for the most current forecast.

How do I determine the location?

```
TAF
KBLV 051212 14005KT 8000 BR FEW030 WS010/18040KT
QNH2960INS
BECMG 1314 16010KT 3200 -SHRA OVC020 QNH2959INS
TEMPO 1416 21015G30KT 1600 TSRA BKN008CB OVC020
BECMG 1617 29008KT 3200 -RA OVC030 620304
QNH2958INS
BECMG 1819 31012G22KT 9999 NSW SCT040 WSCONDS
520004 QNH2952INS
BECMG 2021 30008KT 9999 SKC QNH2950INS T08/18Z
M01/11Z
```

The 4-character ICAO identifier that follows the report type is the location identifier. **KBLV** (Scott AFB, IL) is the location/station.

How do I determine the date and valid times of the forecast?

```
TAF
KBLV 050606 14005KT 8000 BR FEW030 WS010/18040KT
QNH2960INS
BECMG 1314 16010KT 3200 -SHRA OVC020 QNH2959INS
TEMPO 1416 21015G30KT 1600 TSRA BKN008CB OVC020
BECMG 1617 29008KT 3200 -RA OVC030 620304 QNH2958INS
BECMG 1819 31012G22KT 9999 NSW SCT040 WSCONDS 520004
QNH2952INS
BECMG 2021 30008KT 9999 SKC QNH2950INS T08/18Z M01/11Z
```

In a military TAF, the group following the ICAO identifier is the valid time of the forecast. Preparation date and time are not included. In this KBLV example, **050606** indicates that the forecast valid time is from 0600Z on the 5th day of the month to 0600Z on the 6th.

```
TAF
KSTL 051130Z 051212 14008KT 5SM BR BKN030 WS010/18025KT
TEMPO 1316 1 1/2SM BR
FM 1600 16010KT P6SM NSW SKC
BECMG 2224 20013G20KT 4SM SHRA OVC020
PROB40 0006 2SM TSRA OVC008CB
BECMG 0608 21015KT P6SM NSW SCT040
```

Civilian forecasters encode the date/time group differently from military forecasters. In a civilian TAF, two groupings follow the ICAO identifier: the date and time the forecast was prepared, then the date and the beginning/ending hours that the forecast is valid. In the KSTL example, **05** is the day of the month and **1130Z** is the UTC time of issuance. **051212** indicates that the forecast is valid from 1200Z on the 5th day of the month to 1200Z on the 6th.

TAF   Time and Type of Change Expected

How do I determine the time and type of changes that will occur?

```
TAF
KSTL 051130Z 051212 14008KT 5SM BR BKN030
WS010/18025KT
TEMPO 1316 1 1/2SM BR
FM 1600 16010KT P6SM NSW SKC
BECMG 2224 20013G20KT 4SM SHRA OVC020
PROB40 0006 2SM TSRA OVC008CB
BECMG 0608 21015KT P6SM NSW SCT040
```

Civilian and military forecasters alike encode the time and type of change expected with TEMPO, FM, and BECMG groups.

TEMPO represents a temporary condition. In this example, **TEMPO 1316 1 1/2SM BR** reads, "Temporary condition between 1300Z and 1600Z of 1 1/2 statute mile visibility in mist." Only the temporary changing conditions are included in TEMPO groups.

FM means "from" and indicates a rapid weather change where all data groups in the previous line are superseded. In this example, **FM 1600** reads, "From 1600Z … "

BECMG means "becoming" or a "gradual change" in meteorological conditions and becomes the predominant group by the end time listed. In this example, **BECMG 2224** reads "Becoming from 2200Z to 2400Z."

PROB40 (civilian use only) represents a 40% probability or chance of conditions occurring along with associated weather conditions (wind, visibility, sky conditions).

In this example, **PROB40 0006** 2SM TSRA 0VCOO8CB reads, "40% chance between 0000Z and 0600Z of visibility 2 statute miles in moderate thunderstorms, 800 overcast cumulonimbus clouds."

How do I determine the wind speed and direction?

```
TAF
KBLV 051212 14005KT 8000 BR FEW030 WS010/18040KT
QNH2960INS
BECMG 1314 16010KT 3200 -SHRA OVC020 QNH2959INS
TEMPO 1416 21015G30KT 1600 TSRA BKN008CB OVC020
BECMG 1617 29008KT 3200 -RA OVC030 620304 QNH2958INS
BECMG 1819 31012G22KT 9999 NSW SCT040 WSCONDS 520004
QNH2952INS
BECMG 2021 30008KT 9999 SKC QNH2950INS T08/18Z M01/11Z
```

The data group after the valid time and followed by `KT`
(knots) is the forecast wind speed.

The first three digits within a wind group are the true direction
to the nearest 10 degrees from which the wind will blow. The
next two digits are the sustained speed. If gusts are
forecasted, the next two or three digits following the "G" are
the "gust," the maximum wind speed in a ten-minute window.

In this example, **14005KT**, `16010KT`, `21015G30KT`,
`29008KT`, `31012G22KT`, and `30008KT` are the wind
direction and speed groups**.**

In the first wind group, the wind is forecasted to blow from
140 degrees (true) at a sustained speed of 05 knots. No gust is
forecasted.

How do I determine the forecast visibility?

```
TAF
KBLV 051212 14005KT 8000 BR FEW030 WS010/18040KT
QNH2960INS
BECMG 1314 16010KT 3200 -SHRA OVC020 QNH2959INS
TEMPO 1416 21015G30KT 1600 TSRA BKN008CB OVC020
BECMG 1617 29008KT 3200 -RA OVC030 620304 QNH2958INS
BECMG 1819 31012G22KT 9999 NSW SCT040 WSCONDS 520004
QNH2952INS
BECMG 2021 30008KT 9999 SKC QNH2950INS T08/18Z M01/11Z
```

In the military and at overseas locations, visibility is forecasted in meters. The 4-character group following the wind is the forecast visibility. In the KBLV example, **8000**, **3200**, **1600**, **3200**, and **9999** are the forecast visibilities in meters. 9999 is the greatest value forecasted. A value of 9999 indicates a forecast visibility of greater than 9000 meters (7 statute miles or greater). To convert visibility values from meters to statute miles, see Attachment 3 on p. 33 or see Flight Information Handbook conversion tables.

Overseas locations may use the contraction "CAVOK" (ceiling and visibility OK). **CAVOK** is used when there is no significant weather, the visibility is 10 km or greater, and the ceilings are greater than 5,000 ft.

```
TAF
KSTL 051130Z 051212 14008KT 5SM BR BKN030 WS010/18025KT
TEMPO 1316 1 1/2SM BR
FM 1600 16010KT P6SM NSW SKC
BECMG 2224 20013G20KT 4SM SHRA OVC020
PROB40 0006 2SM TSRA OVC008CB
BECOMG 0608 21015KT P6SM NSW SCT040
```

In the CONUS, civilian TAFS forecast visibility in statute miles up to 6 statute miles, beyond which **P6SM** is used to indicate forecast visibility greater than 6 statute miles.

How do I determine if there is any forecast weather?

```
TAF
KBLV 051212 14005KT 8000 BR FEW030 WS010/18040KT
QNH2960INS
BECMG 1314 16010KT 3200 -SHRA OVC020 QNH2959INS
TEMPO 1416 21015G30KT 1600 TSRA BKN008CB OVC020
BECMG 1617 29008KT 3200 -RA OVC030 620304
QNH2958INS
BECMG 1819 31012G22KT 9999 NSW SCT040 WSCONDS
520004 QNH2952INS
BECMG 2021 30008KT 9999 SKC QNH2950INS T08/18Z
M01/11Z
```

The weather data group (forecast precipitation or obstruction to
visibility) follows the visibility data group.

In this example, **BR** means "mist," **-SHRA** means "light rain
showers," **TSRA** means a "thunderstorm with moderate rain," and
-RA means "light rain." **NSW** (no significant weather) is used to
indicate that the weather or obscuration listed in the previous group
is no longer expected to occur. Absence of a weather or
obscuration group means that no weather or obscuration is expected
during the forecast period.

To methodically decode a weather group, look for six key elements
(depending on the phenomena, one or more may be omitted). In
order, these elements are: **Intensity** (symbol preceding the code),
Proximity, **Descriptor**, **Precipitation Description**, **Obscuration**
(other than precipitation) and **Other**.

For a complete table of weather group elements, <u>see Figure 1 on
page 11</u>.

How do I determine the layers of forecast clouds?

```
TAF
KBLV 051212 14005KT 8000 BR FEW030 WS010/18040KT
QNH2960INS
BECMG 1314 16010KT 3200 -SHRA OVC020 QNH2959INS
TEMPO 1416 21015G30KT 1600 TSRA BKN008CB OVC020
BECMG 1617 29008KT 3200 -RA OVC030 620304
QNH2958INS
BECMG 1819 31012G22KT 9999 NSW SCT040 WSCONDS
520004 QNH2952INS
BECMG 2021 30008KT 9999 SKC QNH2950INS T08/18Z
M01/11Z
```

Cloud height is always forecasted in hundreds of feet. Add two zeros to the end of the value given. In this example, **FEW030**, **BKN008CB**, **OVC020**, and **SKC** represent the values 3,000 few, 2,000 overcast, 800 broken cumulonimbus, and sky clear, respectively.

In place of cloud layers, vertical visibility in hundreds of feet will appear in a TAF cloud group when the sky is forecast to be totally obscured. For example, VV002 represents a vertical visibility of 200 feet. Vertical visibility in a TAF represents the forecast ceiling.

Sky coverage (eighths):

SKC	Sky clear
FEW	Few -- 0-2 eighths
SCT	Scattered -- 3-4 eighths
BKN	* Broken -- 5-7 eighths
OVC	* Overcast -- 8 eighths

* Constitutes a "ceiling"

How do I determine if wind shear is in the forecast?

```
TAF
KBLV 051212 14005KT 8000 BR FEW030
WS010/18040KT QNH2960INS
BECMG 1314 16010KT 3200 -SHRA OVC020
QNH2959INS
TEMPO 1416 21015G30KT 1600 TSRA BKN008CB
OVC020
BECMG 1617 29008KT 3200 -RA OVC030 620304
QNH2958INS
BECMG 1819 31012G22KT 9999 NSW SCT040 WSCONDS
520004 QNH2952INS
BECMG 2021 30008KT 9999 SKC QNH2950INS
T08/18Z M01/11Z
```

A wind shear group is included if non-convective low-level winds (up to 2,000 feet) will change in speed and/or direction and result in a shearing action. WS indicates forecast wind shear and is followed by a 3-digit height in hundreds of feet AGL, a slant character, ”/,” and forecast wind at the height indicated. **WS010/18040KT** reads, "forecast wind shear at 1,000 feet above the station; wind at 1,000 feet is from 180 degrees (true) at 40 knots."

The remark **WSCONDS** is used to indicate the potential for wind shear when there is not enough information available to reliably predict the height, direction and speed of the wind shear. WSCONDS is normally used beyond the first 6 hours of the TAF.

For some locations, the wind shear group will follow the minimum altimeter setting group (in the TAF remarks) instead of following the cloud group.

How do I determine forecast icing conditions?

```
TAF
KBLV 051212 14005KT 8000 BR FEW030 QNH2960INS
BECMG 1617 29008KT 3200 –RA OVC030 620304 QNH2958INS
BECMG 2021 30008KT 9999 SKC QNH2950INS T08/18Z M01/11Z
```

If forecasted, the icing group will be prefixed by the number 6, and follows
the cloud group. To decode, follow these instructions:
1. Find the icing designator "6" following the cloud group (**6**20304).
2. The next digit gives icing type and intensity (6**2**0304). See Figure 3.
3. The next three digits give the base of the icing layer in hundreds of feet
(62**030**4).
4. The last digit provides the icing layer depth in thousands of feet
(62030**4**), so add this value to the base height to determine the top limit
of the icing conditions.

In the above example, the icing forecast will read, "light rime icing (in
cloud) from 3,000 to 7,000 feet."

Figure 3. Icing Intensity Decode Table

CODE	DECODE
0	Trace Icing or None (see note)
1	Light Mixed Icing
2	Light Rime Icing In Cloud
3	Light Clear Icing In Precipitation
4	Moderate Mixed Icing
5	Moderate Rime Icing In Cloud
6	Moderate Clear Icing In Precipitation
7	Severe Mixed Icing
8	Severe Rime Icing In Cloud
9	Severe Clear Icing In Precipitation
Note: Air Force code "0" means a trace of icing, World Meteorological Organization code "0" means no icing	

How do I determine forecast turbulence conditions?

```
TAF
KBLV 051212 14005KT 8000 BR FEW030 QNH2960INS
BECMG 1819 31012G22KT 9999 NSW SCT040 520004 QNH2952INS
BECMG 2021 30008KT 9999 SKC QNH2950INS T08/18Z M01/11Z
```

If forecasted, the turbulence code will be prefixed by the number 5, and will follow the cloud or icing group. To decode, follow these instructions:
1. Look for the turbulence designator "5" that follows the cloud or icing group (**5**20004).
2. The next digit will determine the intensity (5**2**0004). See Figure 4.
3. The next three digits will determine the base limit of the turbulence layer in hundreds of feet AGL (52**000**4).
4. The last digit will determine the turbulence layer depth in thousands of feet (52000**4**), so add this value to the base height to determine the top limit of the turbulence conditions.

In the above example, the turbulence forecast will read, "occasional moderate turbulence in clear air from the surface to 4,000 feet."

Figure 4. Turbulence Intensity Decode Table

CODE	DECODE
0	None
1	Light turbulence
2	Moderate turbulence in clear air, occasional
3	Moderate turbulence in clear air, frequent
4	Moderate turbulence in cloud, occasional
5	Moderate turbulence in cloud, frequent
6	Severe turbulence in clear air, occasional
7	Severe turbulence in clear air, frequent
8	Severe turbulence in cloud, occasional
9	Severe turbulence in cloud, frequent
X	Extreme turbulence
Note:	Occasional is defined as occurring less than 1/3 of the time

How do I determine the forecast lowest altimeter setting?

```
TAF
KBLV 051212 14005KT 8000 BR FEW030
WS010/18040KT QNH2960INS
BECMG 1314 16010KT 3200 -SHRA OVC020
QNH2959INS
TEMPO 1416 21015G30KT 1600 TSRA BKN008CB
OVC020
BECMG 1617 29008KT 3200 -RA OVC030 620304
QNH2958INS
BECMG 1819 31012G22KT 9999 NSW SCT040
WSCONDS 520004 QNH2952INS
BECMG 2021 30008KT 9999 SKC QNH2950INS
T08/18Z M01/11Z
```

Forecast minimum altimeter settings are only found in
military forecasts. These are near the end of the line,
beginning with QNH (minimum) and ending with INS
(inches). To convert altimeter settings from inches Hg to
hectopascals (millibars), use <u>Attachment 4 on page 34</u> or use
Flight Information Handbook conversion tables.

In this example, **QNH2960INS, QNH2959INS,
QNH2958INS, QNH2952INS**, and **QNH2950INS** are read
as minimum altimeter settings of 29.60, 29.59, 29.58, 29.52,
and 29.50 inches of mercury, respectively.

TAF   *Temperatures*

How do I determine the forecast temperatures?

```
TAF
KBLV 051212 14005KT 8000 BR FEW030 WS010/18040KT
QNH2960INS
BECMG 1314 16010KT 3200 -SHRA OVC020 QNH2959INS
TEMPO 1416 21015G30KT 1600 TSRA BKN008CB OVC020
BECMG 1617 29008KT 3200 -RA OVC030 620304
QNH2958INS
BECMG 1819 31012G22KT 9999 NSW SCT040 WSCONDS
520004 QNH2952INS
BECMG 2021 30008KT 9999 SKC QNH2950INS TM08/18Z
01/11Z
```

Forecast temperatures for the forecast period are routinely found only in military TAFs. They are found on the last line, following the minimum altimeter, beginning with the designator "T," maximum temperature first. To convert temperature units from Celsius to Fahrenheit, use Attachment 2 on page 32 or use Flight Information Handbook conversion tables.

In this example, **08/18Z** indicates a forecast maximum temperature of 8°C at 1800Z, and **TM01/11Z** indicates a forecast minimum temperature of -1°C at 1100Z.

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> Acting Deputy Chief of Staff
> Air and Space Operations

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFMAN 15-111, *Surface Weather Observations*

AFMAN 15-124, *Meteorological Codes*

ICAO Document 8896AN/893/4, *Manual of Aeronautical Meteorological Practice,* ISBN 92-9194-345-2

AFMAN 15-111 USAFESUP1, *United States Air Forces in Europe Supplement to Surface Weather Observations*

FAA Order 7340.1, *Contractions*

Abbreviations and Acronyms

AGL—Above Ground Level

FAA—Federal Aviation Administration

ICAO—International Civil Aviation Organization

METAR—Aviation Routine Weather Report

NATO—North Atlantic Treaty Organisation

RVR—Runway Visual Range

TAF—Terminal Aerodrome Forecast

UTC—Coordinated Universal Time, sometimes called "zulu time"

Attachment 2

TEMPERATURE CONVERSION
Degrees Fahrenheit to Degrees Celsius

°F From	°F To	°C	°F From	°F To	°C	°F From	°F To	°C	°F From	°F To	°C
128.3	130.0	54	83.3	85.0	29	38.3	40.0	04	-4.8	-3.1	M20
126.5	128.2	53	81.5	83.2	28	36.3	38.2	03	-6.6	-4.9	M21
124.7	126.4	52	79.7	81.4	27	34.7	36.2	02	-8.4	-6.7	M22
122.9	124.6	51	77.9	79.6	26	32.9	34.6	01	-10.2	-8.5	M23
121.1	122.8	50	76.1	77.8	25	32.0	32.8	00	-12.0	-10.3	M24
119.3	121.0	49	74.3	76.0	24	31.2	31.9	M00	-13.8	-12.1	M25
117.5	119.2	48	72.5	74.2	23	29.4	31.1	M01	-15.6	-13.9	M26
115.7	117.4	47	70.7	72.4	22	27.6	29.3	M02	-17.4	-15.7	M27
113.9	115.6	46	68.9	70.6	21	25.8	27.5	M03	-19.2	-17.5	M28
112.1	113.8	45	67.1	68.8	20	24.0	25.7	M04	-21.0	-19.3	M29
110.3	112.0	44	65.3	67.0	19	22.2	23.9	M05	-22.8	-21.1	M30
108.5	110.2	43	63.5	65.2	18	20.4	22.1	M06	-24.6	-22.9	M31
106.7	108.4	42	61.7	63.4	17	18.6	20.3	M07	-26.4	-24.7	M32
104.9	106.6	41	59.9	61.6	16	16.8	18.5	M08	-28.2	-26.5	M33
103.1	104.8	40	58.1	59.8	15	15.0	16.7	M09	-30.0	-28.3	M34
101.3	103.0	39	56.3	58.0	14	13.2	14.9	M10	-31.8	-30.1	M35
99.5	101.2	38	54.5	56.2	13	11.4	13.1	M11	-33.6	-31.9	M36
97.7	99.4	37	52.7	54.4	12	9.6	11.3	M12	-35.4	-33.7	M37
95.9	97.6	36	50.9	52.6	11	7.8	9.5	M13	-37.2	-35.5	M38
94.1	95.8	35	49.1	50.8	10	6.0	7.7	M14	-39.0	-37.3	M39
92.3	94.0	34	47.3	49.0	09	4.2	5.9	M15	-40.8	-39.1	M40
90.5	92.2	33	45.5	47.2	08	2.4	4.1	M16	-42.6	-40.9	M41
88.7	90.4	32	43.7	45.4	07	0.6	2.3	M17	-44.4	-42.7	M42
86.9	88.6	31	41.9	43.6	06	-1.2	+0.5	M18	-46.2	-44.5	M43
85.1	86.8	30	40.1	41.8	05	-3.0	-1.3	M19	-48.0	-46.5	M44

REPORTABLE VISIBILITY CONVERSION
Statute Miles (SM) to Meters (m)

STATUTE MILES	METERS	STATUTE MILES	METERS	STATUTE MILES	METERS
0	0000	1-1/8	1800	2-3/4	4400
-	0050	-	1900	-	4500
1/16	0100	1-1/4	2000	-	4600
-	0150	-	2100	-	4700
1/8	0200	1-3/8	2200	3	4800
-	0250	-	2300	-	4900
3/16	0300	1-1/2	2400	-	5000
-	0350	-	2500	4	6000
¼	0400	1-5/8	2600	-	7000
-	0450	-	2700	5	8000
5/16	0500	1-3/4	2800	6	9000
-	0550	-	2900	7	9999
3/8	0600	1-7/8	3000	8	9999
-	0650	-	3100	9	9999
-	0700	2	3200	10	9999
-	0750	-	3300	11	9999
½	0800	-	3400	12	9999
-	0900	-	3500	13	9999
5/8	1000	2-1/4	3600	14	9999
-	1100	-	3700	15	9999
¾	1200	-	3800	20	9999
-	1300	-	3900	25	9999
7/8	1400	2-1/2	4000	30	9999
-	1500	-	4100	35	9999
1	1600	-	4200	40	9999
-	1700	-	4300	Etc.	9999

Double underline marks a change in increment

PRESSURE CONVERSION
Millibars (mb)* to Inches of Mercury (inches Hg)

	_ _ _0	_ _ _1	_ _ _2	_ _ _3	_ _ _4	_ _ _5	_ _ _6	_ _ _7	_ _ _8	_ _ _9
094_	27.76	27.79	27.82	27.85	27.88	27.91	27.94	27.96	27.99	28.02
095_	28.05	28.08	28.11	28.14	28.17	28.20	28.23	28.26	28.29	28.32
096_	28.35	28.38	28.41	28.44	28.47	28.50	28.53	28.56	28.59	28.61
097_	28.64	28.67	28.70	28.73	28.76	28.79	28.82	28.85	28.88	28.91
098_	28.94	28.97	29.00	29.03	29.06	29.09	29.12	29.15	29.18	29.21
099_	29.23	29.26	29.29	29.32	29.35	29.38	29.41	29.44	29.47	29.50
100_	29.53	29.56	29.59	29.62	29.65	29.68	29.71	29.74	29.77	29.80
101_	29.83	29.85	29.88	29.91	29.94	29.97	30.00	30.03	30.06	30.09
102_	30.12	30.15	30.18	30.21	30.24	30.27	30.30	30.33	30.36	30.39
103_	30.42	30.45	30.47	30.50	30.53	30.56	30.59	30.62	30.65	30.68
104_	30.71	30.74	30.77	30.80	30.83	30.86	30.89	30.92	30.95	30.98
105_	31.01	31.04	31.07	31.10	31.12	31.15	31.18	31.21	31.24	31.27

* A millibar (mb) is equal to a hectopascal (hPa)