

FEDERAL AVIATION ADMINISTRATION AIR TRAFFIC BASICS | Lesson 27: Pilot Weather Reports (PIREPs) ALL LESSONS FRAME: 1

Pilot Weather Reports (PIREPs)

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No observation is timelier than the one made from the cockpit.

LEARN MORE

In fact, aircraft in flight are the only means of directly observing cloud tops, icing, and turbulence. Pilots, as well as controllers, welcome Pilot Weather Reports (PIREPs) because they inform pilots of weather where there are no weather reporting stations.

As a controller, you will be handling PIREPs, whether solicited or volunteered, on a daily basis. PIREPs are a valuable source of information to the Air Traffic Service. You must be able to decode and process them properly and in a timely manner to be of use to the pilot.



Purpose

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This lesson covers the Pilot Weather Report (PIREP) Program operated by the National Weather Service (NWS) and the FAA. You will learn to solicit, record, handle, and decode PIREPs.



Objectives

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In this lesson, you will identify:

1. The purpose, uses, and contents of Pilot Weather Reports (PIREPs)
2. How to record and decode PIREPs given various examples

You will meet the objectives in accordance with the following references:

- FAA Order JO 7110.65, Air Traffic Control
- FAA Order JO 7110.10, Flight Services
- Aeronautical Information Manual (AIM)





Pilot Weather Reports (PIREPs)

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In-Flight Reports

The purpose of a PIREP is to report meteorological conditions in flight.

- Meteorological phenomena may not be observable by any other means.

JO 7110.65, Pilot/Controller Glossary



Pilot Weather Reports (PIREPs)

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PIREP Classifications

There are two classifications for PIREPs:

- **Urgent (UUA):** Weather phenomena reported by a pilot which represent a hazard or a potential hazard to flight operations.
 - The following conditions are classified as urgent PIREPs:
 - Tornadoes, funnel clouds, or waterspouts
 - Severe or extreme turbulence (including clear air turbulence)
 - Severe icing
 - Hail
 - Low-level wind shear
 - Volcanic eruptions and volcanic ash clouds
 - Any other weather phenomena reported which are considered by the controller as being hazardous or potentially hazardous to flight operations
- **Routine (UA):** All received PIREPs are classified as routine, except those just discussed.

JO 7110.10, Chap. 9





Pilot Weather Reports (PIREPs)

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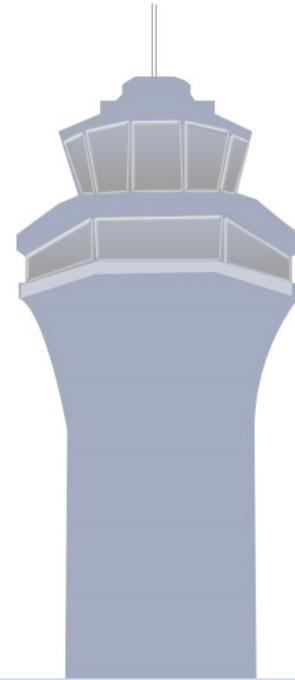
NEXT

Reported Conditions

Reported conditions may include, but not limited to:

- Thunderstorms and related phenomena
- Clouds
 - Bases
 - Tops
 - Layers
- In-flight visibility
- Restrictions to visibility
 - Haze
 - Smoke
 - Dust
- Precipitation
- Wind at altitude
- Temperature aloft
- Airframe icing
- Turbulence
- Wind shear
- Clear air turbulence
- Volcanic ash

AIM, Chap. 7





Pilot Weather Reports (PIREPs)

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PIREP Uses

Towers and TRACONs use PIREPs to expedite traffic flow in the vicinity of the airport and to provide hazardous weather avoidance procedures.

Automated Flight Service Stations (AFSSs) use PIREPs to brief pilots and issue in-flight advisories.

The ARTCC uses the reports to expedite the flow of en route traffic by determining the most favorable altitudes and to issue hazardous weather information within the Air Route Traffic Control Center (ARTCC) area.

The National Weather Service (NWS) uses PIREPs to:

- Verify or amend conditions contained in forecasts and advisories
- Issue advisories based on PIREPs
- Brief pilots
- Study meteorological phenomena

All ATC facilities and the NWS:

- Forward PIREPs into the weather distribution system
- Make PIREP information available to pilots and other interested parties

AIM, Chap. 7





Pilot Weather Reports (PIREPs)

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PIREP Solicitation

Air traffic facilities are required to solicit PIREPs from aircraft when one of the following conditions exist or are forecast:

- Ceilings at or below 5,000 feet
 - Includes cloud bases/tops when feasible
- Visibility 5 miles or less
 - Surface or aloft
- Thunderstorms and related phenomena
- Turbulence
 - Moderate or greater intensity
- Icing
 - Light or greater intensity
- Wind shear
- Volcanic ash clouds are reported or forecast
- When braking action advisories are in effect (Terminal only)



JO 7110.65, Chap. 2



Pilot Weather Reports (PIREPs)

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PIREP Preparation

Ensure each PIREP includes:

- Location
- Time
- Altitude/flight level
- Type aircraft
- At least one other element

When the PIREP involves turbulence, include:

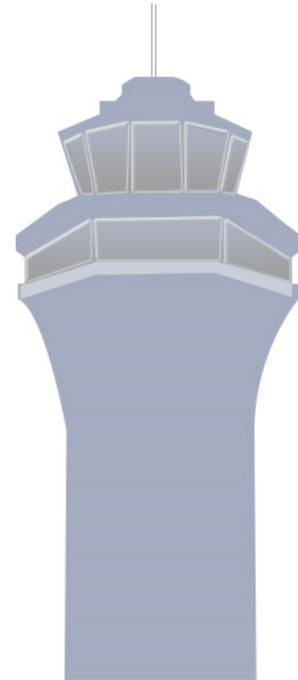
- Whether in clouds or clear air
- Type and intensity of turbulence

When the PIREP involves icing, include:

- Type and intensity of icing
- Air temperature in which icing is occurring

Obtain PIREPs directly from the pilot, or if the PIREP has been requested by another facility, you may instruct the pilot to transmit it directly to that facility.

JO 7110.65, Chap. 2





Pilot Weather Reports (PIREPs)

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Handling PIREPS

Handle PIREPs as follows:

- All ATC specialists shall relay pertinent PIREP information to concerned aircraft in a timely manner.
- En Route ATC Specialists shall relay all operationally significant PIREPs to the facility's Weather Coordinator.
 - The Weather Coordinator is an En Route position that ensures that the sectors in the Center, Towers, and TRACONS are kept up-to-date on significant weather that may affect their areas of responsibility.
- In the Terminal option
 - All operationally significant PIREPs are relayed to:
 - The appropriate intrafacility positions
 - The AFSS serving the area in which the report was obtained
 - Other concerned Terminal or En Route ATC facilities, including non-FAA facilities, such as non-federal Towers and military facilities

JO 7110.65, Chap. 2





Pilot Weather Reports (PIREPs)

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PIREP Form

- The PIREP form is used to aid the controller in collecting all data needed to complete a PIREP.
 - The elements listed on the PIREP form are called Text Element Indicators (TEIs).
- The FAA, NWS, and other organizations that enter PIREPs into the weather reporting system use the format listed in the graphic above.
 - Items 1 through 5 are included in all transmitted PIREPs along with one or more of items 6 through 12.

AIM, Chap. 7; AC 00-45

- LOCATION**
- TIME** Coordinated Universal Time
- ALTITUDE** Essential for turbulence and icing reports
- TYPE AIRCRAFT** Essential for turbulence and icing reports
- SKY COVER** Cloud height and coverage (sky clear, few, scattered, broken, or overcast), and cloud tops.
- VISIBILITY AND WEATHER** Flight visibility, precipitation, restrictions to visibility, etc.
- TEMPERATURE** Degrees Celsius
- WIND** Direction in degrees magnetic north and speed in knots
- TURBULENCE** LGT, MOD, SEV, EXTRM
- ICING** TRACE, LGT, MOD, SEV
- REMARKS** For reporting elements not included or to clarify previously reported items

PIREP FORM

3 or 4-LETTER STATION IDENTIFIER REPORT TYPE

Nearest weather reporting to the reported phenomenon. Routine or urgent PIREP

Pilot Weather Report <small>3-Letter SA Identifier</small>		→ <small>Special Symbol</small>
1	UA →	UUA →
		<small>Routine Report Urgent Report</small>
2	/OV →	Location:
3	/TM →	Time:
4	/FL →	Altitude/Flight Level:
5	/TP →	Aircraft Type:
Items 1 through 5 are mandatory for all PIREPs		
6	/SK →	Sky Cover:
7	/WX →	Flight Visibility and Weather:
8	/TA →	Temperature (Celsius):
9	/WV →	Wind:
10	/TB →	Turbulence:
11	/IC →	Icing:
12	/RM →	Remarks:

FAA Form 7100-2 (11/15) Supersedes Previous Edition



PIREP Recording and Decoding

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Classification

Message type:

- UA - Routine PIREP
- UUA - Urgent PIREP

JO 7110.10, Chap. 9

CLASSIFICATION

```
UA/OV APE230010/TM 1516 /FL085/TP BE20  
/SK BKN-TOP065/WX FV03SM BR/TA 02  
/VV 23538KT/TB LGT/IC TRACE RIME/RM TCU W-NE
```

3-Enter SA Identifier





PIREP Recording and Decoding

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LOCATION

```
UA /OV APE230010 /TM 1516 /FL085 /TP BE20
/SK BKN-TOP065 /WX FV03SM BR/TA 02
/MV 23538KT /TB LGT /IC TRACE RIME /RM TCU W-NE
```

2 /OV →	Location 10 miles SW Appleton VORTAC
---------	---

Location

Location in reference to a Very High Frequency (VHF) NAVAID or an airport.

- A three or four-letter identifier, then three digits to define a radial and three digits to define the distance in nautical miles
- Route segment
 - Two or more fixes to describe a route

Example: /OV SAV-PZD (Savanna, GA to Albany, GA)
or /OV KSAV-KPZD

JO 7110.10, Chap. 9



PIREP Recording and Decoding

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Time

The time that the phenomenon occurred or was encountered is reported in four digits Coordinated Universal Time (UTC).

JO 7110.10, Chap. 9



/TM → Time: 1516 zulu



PIREP Recording and Decoding

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ALTITUDE/FLIGHT LEVEL

```
UA /OV APE230010/TM 1516/FL085/TP BE20  
/SK BKN-TOP065/WX FV03SM BR/TA 02  
/VV 23538KT/TB LGT/IC TRACE RIME/RM TCU W-NE
```

/FL →	Altitude/Flight Level: at 8,500
-------	------------------------------------

Altitude/Flight-Level

Altitude is reported from where the phenomenon was first encountered in hundreds of feet.

- If not known, enter UNKN.
- If the aircraft was climbing or descending:
 - DURC - During climb in remarks
 - DURD - During descent in remarks

Example: /FLUNKN.../RM DURC

- If the condition was encountered within a layer, the altitude range appears within the appropriate TEI describing the condition.

JO 7110.10, Chap. 9



PIREP Recording and Decoding

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Type Aircraft

- If not known, the contraction UNKN is reported.
 - Icing and turbulence reports shall always include the type aircraft.

Example: /TP C172 (Cessna 172)

/TP PAY2 (Piper Cheyenne 2)

JO 7110.10, Chap. 9

TYPE AIRCRAFT

```
UA /OV APE230010/TM 1516 /FL085 TP BE20  
/SK BKN-TOP065/WX FV03SM BR/TA 02  
/VV 23538KT/TB LGT/IC TRACE RIME/RM TCU W-NE
```

s /TP → Aircraft Type: King air 200



PIREP Recording and Decoding

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```

SKY CONDITION
UA /OV APE230010/TM 1516 /FL085/TP BE20
/ISK BKN-TOP065/WX FV03SM BR/TA 02
/WV 23538KT/TB LGT/IC TRACE RIME/RM TCU W-NE

```

/ISK	→	Sky Cover: <i>Tops of the broken layer were 6,500</i>
------	---	--

Sky Condition

Height of cloud bases, tops, and cloud coverage are reported as follows:

- Cloud cover abbreviation (FEW, SCT, etc.)
- Height of cloud bases, using three digits, in hundreds of feet MSL (if unknown, use UNKN or for bases, leave blank)
- Height of tops in hundreds of feet, preceded by the word "-TOP"
- When more than one layer is reported, use a solidus to separate layers

Example: BKN024-TOP050/OVC068-TOPUNKN indicates the base of a broken layer at 2,400 feet MSL, top at 5,000; base of overcast layer 6,800, top unknown.

JO 7110.10, Chap. 9, 7110-2



PIREP Recording and Decoding

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Weather

Weather conditions encountered by the pilot are reported as follows:

- Flight visibility, if reported, will be the first entry in the /WX field.
 - Enter FV followed by a two-digit visibility value rounded down, if necessary, to the nearest whole statute mile and append "SM" (FV03SM).
 - If visibility is reported as unrestricted, it will be entered as FV99SM.

JO 7110.10, Chap. 9

WEATHER

```
UA /OV APE230010/TM 1516 /FL085/TP BE20  
/SK BKN-TOP065/WX FV03SM BR/TA 02  
/WV 23538KT/TB LGT/IC TRACE RIME/RM TCU W-NE
```

`/WX` → Flight Visibility and Weather: *Flight visibility is 3 miles*



PIREP Recording and Decoding

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```
UA /OV APE230010/TM 1516 /FL085/TP BE20  
/SK BKN-TOP065/WX FV03SM BR TA 02  
/MV 23538KT/TB LGT/IC TRACE RIME/RM TCU W-NE
```

AIR TEMPERATURE

TA → Temperature (Celsius): *Air temp is 2 degrees*

Air Temperature

Outside air temperature is reported using two digits in degrees Celsius.

- Negative temperatures are prefixed with an M

Example: M32

JO 7110.10, Chap. 9



PIREP Recording and Decoding

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Wind

Wind is reported using three digits to indicate wind direction (magnetic) and two to three digits to indicate reported wind speed, and always appended with "KT."

Example: /WV 26580KT (wind two six five at eight zero)

/WV 235110KT (wind two three five at one one zero)

/WV 05008KT (wind zero five zero at eight)

JO 7110.10, Chap. 9

```
UA /OV APE230010/TM 1516 /FL085/TP BE20  
/SK BKN-TOP065/WX FV03SM BR/TA 02  
/WV 23538KT/TB LGT/IC TRACE RIME/RM TCU W-NE
```

WIND

WV → Wind: Winds are two three five at thirty-eight


AIR TRAFFIC BASICS | Lesson 27: Pilot Weather Reports (PIREPs)

ALL LESSONS
FRAME: 21

PIREP Recording and Decoding

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TURBULENCE

UA /OV APE230010/TM 1516 /FL085/TP BE20
 /SK BKN-TOP065/WX FV03SM BR/TA 02
 /WV 23538KT /**TB LGT**/IC TRACE RIME/RM TCU W-NE

/TB → Turbulence: *light turbulence*

Turbulence

Turbulence is reported with duration, intensity, type, and altitude as follows:

- Intensity using contractions LGT, MOD, SEV, or EXTRM
 - Range or variation of intensity will be separated with a hyphen.
 - Example: MOD-SEV
 - If turbulence was forecasted, but not encountered, it will be reported as NEG.
- CAT (Clear Air Turbulence) or CHOP will be included if reported by the pilot.
- Altitude will be reported only if it differs from value reported in /FL.
 - When a layer of turbulence is reported, height values will be separated with a hyphen. If lower or upper limits are not defined, BLO (below) or ABV (above) will be used.

LEARN MORE

Example: /TB MOD (Moderate turbulence)

/TB EXTRM CAT (Extreme Clear Air Turbulence)

/TB LGT-MOD 040-085 (Light to moderate turbulence between four thousand and eight thousand five hundred)

/TB INTMT LGT CHOP (Intermittent light chop)

References:

- JO 7110.10, Chap. 9
- AIM, Chap. 7


AIR TRAFFIC BASICS | Lesson 27: Pilot Weather Reports (PIREPs)

ALL LESSONS
FRAME: 22

PIREP Recording and Decoding

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Icing

Intensity, type, and altitude of icing are reported as follows:

- Intensity is reported first using the word TRACE, or the contractions LGT, MOD, or SEV.
 - Range or variation of intensity reports are separated with a hyphen.
 - Icing forecasted, but not encountered, is reported using NEG.
- Icing type is reported as RIME, CLR, or MX.

Example: /IC LGT RIME (Light rime icing)
/IC MOD MX (Moderate mixed icing)

- Icing/altitude reported only if different from the value reported in the /FL.

ICING

UA /OV APE230010/TM 1516 /FL085/TP BE20
 /SK BKN-TOP065/WX FV03SM BR/TA 02
 /MV 23538KT/TB LGT/IC TRACE RIME/RM TCU W-NE

/IC	→	<div style="font-size: 8px; margin-bottom: 2px;">long:</div> <i>trace of rime icing</i>
-----	---	---

LEARN MORE

Example: /IC SEV CLR 035-062 (Severe clear icing between three thousand five hundred and six thousand two hundred)

- A hyphen is used to separate reported layers of icing.
- ABV or BLO is used when a layer is not defined.

When icing is reported, always report temperature in the /TA Text Element Indicator (TEI).

References:

- JO 7110.10, Chap. 9
- AIM, Chap. 7



PIREP Recording and Decoding

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```

UA /OV APE230010/TM 1516 /FL085/TP BE20
/SK BKN-TOP065/WX FV03SM BR/TA 02
/WV 23538KT/TB LGT/IC TRACE RIME /RM TCU W-NE
  
```

REMARKS

/RM → Remarks:
There's a line of towering cu from the west to the northeast

Remarks

Remarks are used to report phenomena which are considered important, but do not fit in any of the other areas.

- This includes, but is not limited to:
 - Low-Level Wind Shear (LLWS) reports
 - Thunderstorm lines
 - Coverage and movement
 - Hail
 - Lightning
 - Dust storms
 - Sandstorms
 - Clouds observed, but not encountered
 - Contrails
- Hazardous weather is reported first.
- LLWS is described to the extent possible.

Example: /RM LLWS -15 KT 003-SFC DURD RWY 28L PIT
 /RM TCU W-NE (Towering Cumulus West through Northeast)

JO 7110.10, Chap. 9



Conclusion

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Lesson Summary



This lesson covered:

- Pilot Weather Reports (PIREPs)
- PIREP Recording and Decoding