<table>
<thead>
<tr>
<th>Turbulence Intensity</th>
<th>Aircraft Reaction to Turbulence</th>
<th>Reaction Inside Aircraft</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIGHT TURBULENCE</td>
<td>Momentarily causes slight, erratic changes in altitude and/or attitude (pitch, roll, yaw).</td>
<td>Occupants may feel a slight strain against seat belts or shoulder straps.</td>
</tr>
<tr>
<td></td>
<td>Slight, rapid and somewhat rhythmic bumpiness, without appreciable changes in altitude or attitude.</td>
<td>Unsecured objects may be displaced slightly</td>
</tr>
<tr>
<td>MODERATE (see below)</td>
<td>Similar to light turbulence, but of greater intensity. Altitude and/or attitude changes occur, but aircraft remains in positive control at all times. It usually causes variations in indicated airspeed.</td>
<td>Occupants feel definite strains against seat belts or shoulder straps.</td>
</tr>
<tr>
<td></td>
<td>Similar to light chop but of greater intensity; causes rapid bumps or jolts without appreciable changes in aircraft altitude or attitude.</td>
<td>Unsecured objects are dislodged.</td>
</tr>
<tr>
<td>SEVERE</td>
<td>Large, abrupt changes in altitude and/or attitude; large variations in indicated airspeed; aircraft may be momentarily out of control.</td>
<td>Occupants are forced violently against seat belts or shoulder straps. Unsecured objects are tossed about.</td>
</tr>
<tr>
<td>EXTREME</td>
<td>Aircraft is violently tossed about and is practically impossible to control; may cause structural damage.</td>
<td></td>
</tr>
</tbody>
</table>

**Thunderstorms imply severe or greater turbulence**

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### ATC Weather Radar Echo Terms & Definitions

<table>
<thead>
<tr>
<th>ATC Weather Radar Terms</th>
<th>dBZ Reflectivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIGHT</td>
<td>18 – 29 dBZ</td>
</tr>
<tr>
<td>MODERATE</td>
<td>30 – 40 dBZ</td>
</tr>
<tr>
<td>HEAVY</td>
<td>&gt;40 – 50 dBZ</td>
</tr>
<tr>
<td>EXTREME</td>
<td>&gt; 50 dBZ</td>
</tr>
</tbody>
</table>

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**ATC describes; the PIC decides!**

- It is not ATC's job to keep you out of severe weather.
  - Do you need to deviate from your route?
  - Do you need to deviate from your altitude?
- Ask for information….never make assumptions.
- Make sure you understand what services ATC is providing.
- Pipe up with PIREPS—report your flight conditions to ATC.
- Thunderstorms always imply severe or greater turbulence.
### Safety Tips for IFR Flight Near Known or Forecast Convective Activity

**Flight in IMC Near Known/Forecast Convective Activity:**
- Tighten seat belts and shoulder harnesses (all occupants).
- Secure all loose items.
- Turn up cockpit lighting to fullest intensity.
- In moderate or greater turbulence, reduce power to establish and maintain $V_a$.
- Listen up for PIREPs.
- Ask ATC if they see any areas of moderate or greater precipitation along your route of flight.

**Avoiding Convective / Thunderstorm Encounters**

**Preflight**
- Ask what kind of weather system you might encounter.
- Are conditions ripe for squall lines, area thunderstorms, embedded thunderstorms?

**Inflight**
- Seek updates from AFSS Flight Watch.
- Listen to chatter on the ATC frequency. Are there PIREPs? Requests to deviate or divert?
- Ask ATC if there are any areas of moderate or greater precipitation along your route of flight.
- Decide early whether to change course, land early, or fly to an alternate. Don’t wait until the last minute!

### Inadvertent Thunderstorm Encounter—What to do?

- Concentrate on keeping the aircraft in a level attitude.
  - Allow the airspeed to fluctuate.
  - Allow the altitude to fluctuate—DO NOT attempt to maintain altitude!
- If equipped with an autopilot, disengage the altitude hold and constant speed modes.
- Fly straight ahead—avoid turning until you have exited the thunderstorm.
- Turn on pitot heat, carb heat, and any anti-icing or deicing equipment on board.

### Radar Limitations

- En Route facilities (centers) cannot display LIGHT precipitation.
- Some approach control facilities cannot provide precipitation intensities. In these cases, ATC will state: “intensity unknown.”
- ATC radar cannot detect clouds.
- ATC can tell you where some areas of precipitation are, but cannot tell you whether they consist of rain or hail.

### Controller Phraseology Examples

**Examples:**
- “Extreme precipitation between eleven o’clock and one o’clock, one zero miles, moving east at two zero knots, tops flight level three niner zero.”
- “Heavy precipitation between ten o’clock and two o’clock, one five miles. Precipitation area is two five miles in diameter.”
- “Moderate precipitation between ten o’clock and two o’clock, one five miles. Precipitation area is two five miles in diameter.”
- “Light to moderate precipitation between ten o’clock and two o’clock, one five miles. Precipitation area is two five miles in diameter.”
- “Precipitation area between one o’clock and three o’clock, one five miles, intensity unknown.”

### Suggested Phraseology for Pilots

**Examples for requesting weather deviation:**
- “Nashville Approach, N123A, request 20 degree deviation right of course.”
- “Detroit Approach, N123A, request left deviation to avoid buildups.”
- “Los Angeles Center, N123A, request approval to deviate around weather for next 10 miles.”