

Weather Wisdom (from Flying Magazine March 2007)

- Synopsis
 - Beginning of area forecast
 - Highs, Lows and Fronts
 - Cloud height in MSL unless says AGL or CIG
 - <http://adds.aviationweather.noaa.gov>
- Lows
 - Wind/weather moves into and up from a low
 - Usually moves with wind at 18,000' or 500-millibar
 - Upper lows
 - Also called cut-off or closed lows aloft
 - Bad wx and real bad if surface low is feeding it
- Fronts
 - Cold
 - Can spawn serious thunderstorms
 - Especially with strong associated low and
 - Temp change on sides of front is great
 - Occluded
 - Cold front overtakes warm front
 - Nasty/bumpy flying
 - Stay away from the driving low
 - Worst when it is forming
 - Stationary
 - When the low peters out
 - Weather might stay bad for days in a stationary frontal zone
 - Might take another strong low to get the stationary front out
- Source Regions (where weather is coming from)
 - Hot, dry, cold, wet etc
- Wind
 - Correct wind forecasts usually mean correct weather forecasts
 - If actual wind is more southerly or easterly than forecast the weather will usually be worse than forecasted
 - If actual wind is stronger than forecast the associated low is probably worse than forecast.
- Temperature and Dewpoints
 - When close, fog likely
 - Big difference ahead/behind a cold front = lots of action in frontal zone
 - Temp aloft > forecast = more moisture
 - Ability of atmosphere to hold moisture doubles with every 11°C rise in temp.
- Convective Sigmets
 - Not a forecast
 - Fact about existing thunderstorms
- Airmets (was called "warnings to light aircraft" – still is, but not called that)
 - Sierra
 - IFR conditions and/or extensive mountain obscuration
 - Tango
 - Moderate turbulence
 - Sustained surface winds of ≥ 30 knots

- And/or nonconvective low-level wind shear (severe turbulence would be covered in a sigmet)
 - Zulu
 - Moderate icing and forecast freezing level heights (severe icing is covered in a Sigmet)
- TAF – Terminal Aerodrome Forecasts
 - 0000z, 0600z, 1200z, 1800z
 - Goes out 24 hours from issue time
 - Good for 5 mile radius around airport
 - Vicinity (VCTS) will go to 10 mile radius
- METARS -- MÉTéorologique ["Weather"] Aviation Régulière ["Routine"]) (damm French)
 - Not a forecast
 - Weather facts
- PIREPS – Pilot Reports
 - Check the age
 - Check the type of aircraft
- Precipitation
 - Combine with
 - Lightning
 - Cloud tops
 - Cell movement
 - Etc.

Pilot Workshops

- Top 10 Weather Myths
 - AIRMET
 - Usually very large
 - Time-smearred over 6 hour period
 - Only a small area at a time effected
 - Thermal Turbulence
 - Mid day
 - Usually not a AIRMET Tango
 - Turbulence is interaction between thermals and winds
 - Snow-producing clouds do pose an icing threat
 - Ice is unlikely between surface and base of clouds
 - At any particular moment, a cloud can be in mixed phase consisting of both ice crystals and supercooled liquid water.
 - Virga can be dangerous
 - Precipitation falling into dry air evaporates causing air to cool. The cool air produces down drafts.
 - Avoid Virga if temps aloft are at or below freezing
 - Avoid if Virga is coming from towering cumulus
 - Avoid if you can't see light filtering through it
 - Avoid if in region of convective activity
 - Radiation Fog
 - Hard to predict
 - Usually several hours after sunset
 - Convective Environment
 - Fly a couple thousand feet above haze layer
- Avoiding Thunderstorms and Severe Turbulence

- Check for any advisories of convective outlooks or convective SIGMETS
- How unstable is the atmosphere?
- How high are the cloud tops
 - High tops = more turbulence (>25,000' tops could be severe turbulence)
 - Lightning observations are good indicator of turbulence
 - NEXRAD is not a forecast, but good to look at
- Surface Analysis
 - Shows why clouds/weather exist
 - Produced every 3 hours
 - Compare fronts with older maps. Dashed cold front means dissipating and therefore less chance of thunderstorms
- Enhanced Thunderstorm Outlook
- Convective Outlook
 - Valid for 6 hour period but may be issued every 1 hour if necessary.
 - Not really a forecast – specific conditions must exist before they are issued
- TAFs
- Lifted Index
 - Positive lifted index indicates stability
 - Negative lifted index indicates instability
- Cloud top heights
 - Current icing product
 - Higher clouds = more instability
- Cloud top temps
 - Colder than -35° = higher clouds and more instability
- Enhanced infrared satellite
 - Green, yellow and red is bad
- Avoiding hazardous weather
 - 500mb constant pressure chart
 - Weather at ~18,000'
 - Draw a vertical line through trough axis
 - East side: Most serious adverse weather or degrading conditions are likely
 - West side: Adverse weather can occur but is much less likely
 - Draw a horz line perpendicular to the vertical line
 - SE sector is most likely region for adverse weather
 - Simulated reflectivity chart
 - ~ NEXRAD forecast
 - Don't let ATC or FSS dictate your route.
- On Top Flying Over a Weather System
 - 48 hour surface forecast
 - Lifted Index
 - 2 day convective outlook
 - Surface Analysis
 - Freezing level
 - Enhanced thunderstorm outlook
 - Convective outlook
 - NEXRAD
 - Current Icing Product (CIP)
 - Forecast Icing Potential (FIP)

- Airmet Zulu
- PIREPs
- Forecast Sounding Skew-T Diagram
 - Temperature is in red
 - Dewpoint is in blue
 - Parcel lapse rate is in purple
 - When the parcel temperature is warmer than the environment, the parcel is unstable.
 - Purple right of red = unstable
 - Where they cross again is top of t-storm
- Flight Planning Best Practices
 - Consider options 36-48 hours out
 - Weather
 - Route
 - Stops
 - Fuel
 - Load
 - Intended altitude
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