# 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-smeared 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
        - Duepoint 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 Pracitces
    - Consider options 36-48 hours out
        - Weather
        - Route
        - Stops
        - Fuel
        - Load
        - Intended altitude
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