How will weather affect the Indianapolis Air Show?

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As most Indiana residents will attest to, August typically brings in warm and humid weather. Along with that hot weather: thunderstorms, lightning, strong and gusty wind and occasionally, fog and low clouds. All of these weather conditions have an effect on flying.

Thunderstorms

One of the main weather issues in summer time flying comes from thunderstorms. According to the Glossary of Meteorology, a thunderstorm is defined as "a local storm, invariably produced by a cumulonimbus cloud and always accompanied by lightning and thunder, usually with strong gusts of wind, heavy rain, and sometimes with hail" Thunderstorms contain very strong air currents. These air currents are termed "updrafts" and "downdrafts". Updraft/downdraft speeds can exceed well over 100 mph so a pilot is wise to avoid flying into a thunderstorm. Within the thunderstorm, you may also find hail which can severely damage an aircraft. As you can see in Figure 1, a thunderstorm can be dangerous to pilots beginning in the cumulus stage and all the way through to the dissipating stage. You may have experienced flying around a thunderstorm during a commercial flight and even observed the towering cumulus (mature stage) out the window of your airplane. Thunderstorms and cumulonimbus clouds are associated with severe turbulence and very strong wind.

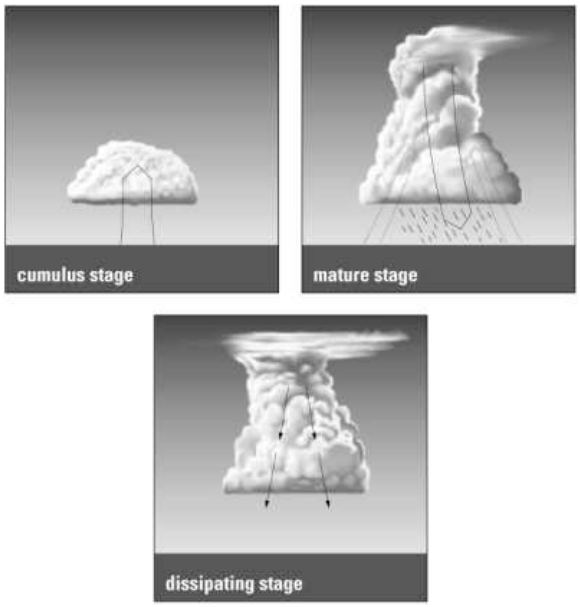

Figure 1

Wind

Wind is a very important element of flying. It can determine what runways an airport will use, whether you will experience turbulence, how your aircraft performs and many other aspects of flying. Meteorologists look at maps that have wind plotted from the surface up past the troposphere in order to determine things such as what type of thunderstorms can be expected that day, how fast is the jet stream moving, whether or not there is enough change in wind direction and speed in the vertical (shear) to produce tornados that day and many other aspects.

The National Weather Service Doppler radar can determine wind speed and direction through the atmosphere. Figure 2 is what the display looks like.

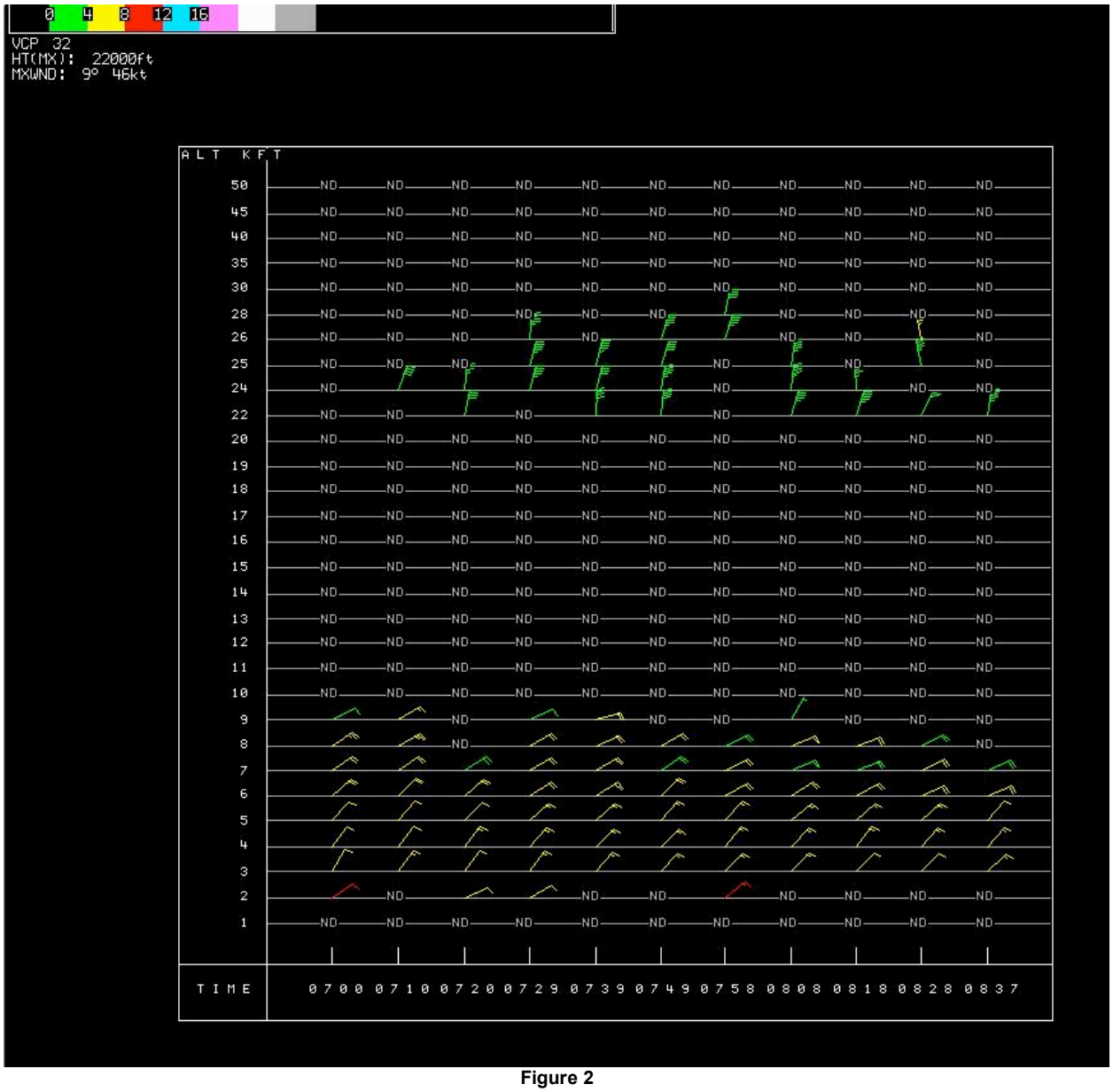

Figure 2

Airplanes always try to take off and land into the wind. This requires a lower ground speed to become airborne, which means the plane can take off or land in the shortest distance traveled along the ground. Since runways have a fixed length, you want to get

airborne as fast as possible on takeoff and stopped as soon as possible on landing. At some airports, you will see a large "wind sock" hanging near the runway. This allows pilots to see which way the wind is blowing to adjust their takeoff and landing directions. At large airports, mechanical or electronic devices provide the information that is radioed to the cockpit. According to Federal Aviation Administration (FAA) standards, a 15 knot (17mph) wind will fully extend the windsock. A 3 knot (3.5mph) breeze will cause the windsock to orient itself according to the wind. Figure 3 shows a fully extended windsock.

Figure 3

Fog and Low Clouds

Although not as frequent in the summer as the winter, low clouds and fog can create problems for pilots. The FAA has established criteria for flying during certain weather conditions. When visibility or ceilings (a ceiling is defined as the lowest broken or overcast cloud layer) become too low, restrictions are placed on pilots so that only aviators with certain flight certificates can navigate in the weather. The two main flight categories include Visual Flight Rules (VFR) and Instrument Flight Rules (IFR). VFR flying is similar to being able to drive; you can see through the sky by just looking out the window. When ceilings or visibility begin to obscure the pilot's vision through the sky, he or she must be able to fly using only instruments since visibility will be limited. Figure 4 is a chart showing the different ceiling and visibility categories that pilots must adhere to (the MVFR category is Marginal Visual Flight Rules).

FLIGHT CATEGORY	CEILING (feet)		VISIBILITY (statute miles)
VFR	GT 3000	and/or	GT 5
MVFR	GTE 1000 to LT 3000	and/or	GTE 3 to LT 5
IFR	GTE 500 to LT 1000	and/or	GTE 1 to LT 3

Figure 4

National Weather Service Role

The National Weather Service provided forecasts specifically for pilots, in the form of a Terminal Aerodrome Forecast (TAF). The Indianapolis National Weather Service office issues TAF's for Lafayette Purdue University Airport (KLAF), Terre Haute Hulman Regional Airport (KHUF), Monroe County Airport (KBMG) and the Indianapolis International Airport (KIND). A TAF is a 24 hour forecast of wind speed and direction, weather and obscurations to visibility (FG, BR, RA, etc.) and ceiling. Here is an example of a TAF for the Indianapolis International Airport.

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KIND 211120Z 211212 02004KT P6SM SCT250
FM1500 04009KT P6SM FEW060CB SCT250
FM1800 05015KT 3SM -TSRA BR OVC025CB
FM2000 07010KT P6SM SCT025
FM0200 06004KT P6SM SCT200=
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For all National Weather Service aviation forecasts, visit our web sites at

http://www.crh.noaa.gov/ind/ind_aviation.php
http://www.aviationweather.gov