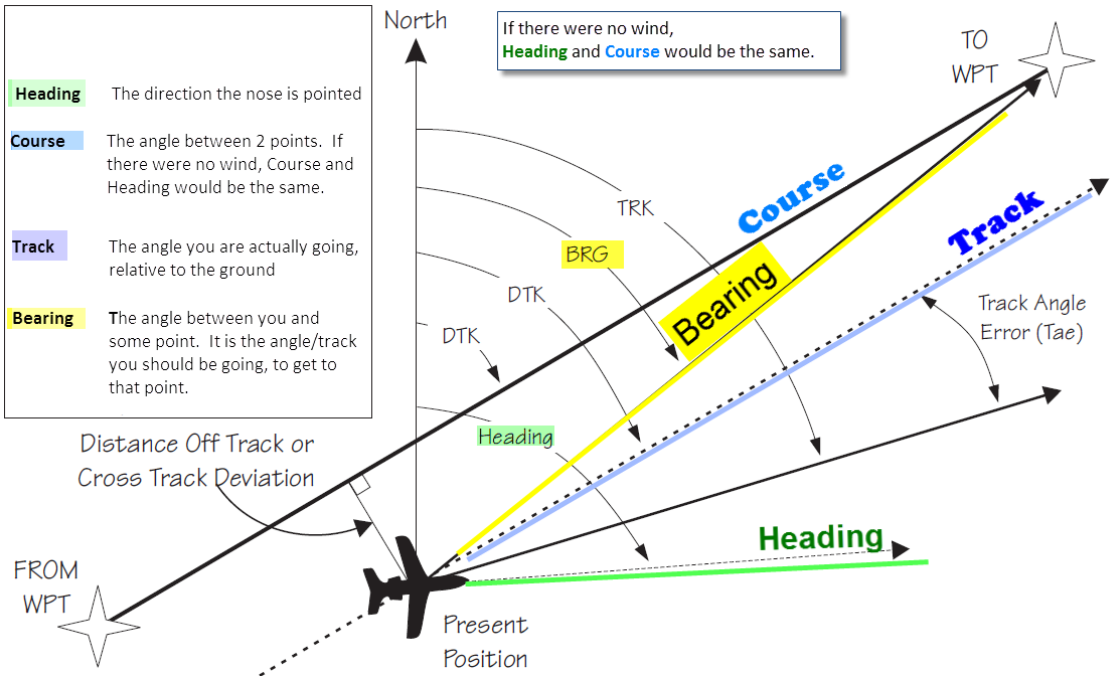
Ground School Notes

Directions:



Heading **The direction the nose is pointed. Usually slightly into the wind, relative to desired Course.**
Course The angle between 2 points. If there were no wind, Course and Heading would be the same.
Track The angle you are actually going, relative to the ground
Bearing **T**he angle between you and some point. It is the angle/track you should be going, to get to that point.

Airspeed

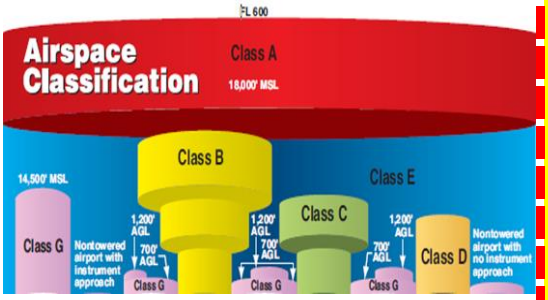
- **Indicated** (IAS) What it says on the airspeed indicator. This is not the True airspeed since altitude, pressure, etc may make the air thinner and not as forceful to the ram induction that is the airspeed indicator. Stall speeds are always at the same IAS because the same factors that affect ram pressure affect the wing aerodynamics
- **True** (TAS) Is Indicated Airspeed corrected for barometric pressure, etc. that represents how fast the airplane is truly moving through the eair. For example, at high altitudes, 100kts IAS is probably more like 105-110Kts
- **Calibrated** (CAS) seldom used; corrected for angle of attack of the pitot tube, etc.

True Airspeed: http://indoavis.co.id/main/tas.html
In round numbers: TAS=IAS at 29.90" and **20F/2000'msl**, **40F/1,000'msl**, **60F/0'msl**
At around **145KIAS**, TAS goes up by **1Kt/10F**, and **3.0Kts/1,000'MSL** (2.5 at 125Kts)
So 145Kts IAS at 8,000'msl with OAT of 70F: Start at 60F/0'msl, and add 10F (worth 1Kt) and 8,000' (worth 8x3.0 = 24Kts) for a TAS of 145+25 = 170

Ground School Notes

Airspace

On the Sectional Maps: Airports with a
Control Tower are shown in **BLUE**, others are in **Magenta**
And Paved airports are in a circle; Services include bars



Before adding airports, ALL OF THE Country is just two simple layers:
all airspace is (uncontrolled) Class G round from 0' to 1,200' AGL,
then it is **(controlled) Class E verything else from 1,200 to 18,000'**
which has Greater visibility & Cloud separation (below)

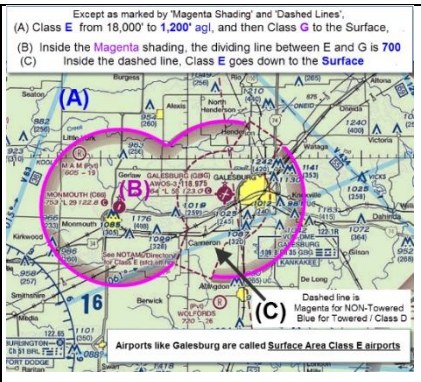
The Magenta shading around airports (KSUE) simply pushes the G/E line down 500', from 1200' to 700'

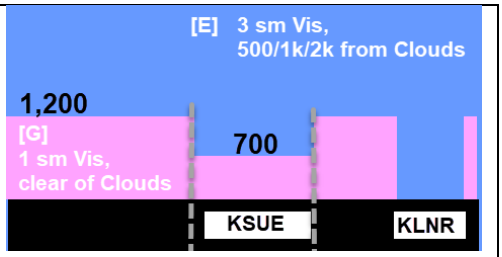
Some airports have a *dotted line around them* (KLNR, Galesburg), which pushes Class E all the way down to the surface, and there is no G.

So from a private Class G strip you can take off w/ 1 sm visibility, and just stay clear of the clouds! – **anywhere *below* *1,200 AGL*** But the moment you hit 1,200 (700 at marked airports), you have the greater visibility and cloud separate requirements. So taking off from KSUE, any clown can be flying 1' from clouds with 1 sm visibility – below 700' AGL.

`		Example	Height	Visibility	Cloud Dist	Entry Req		Notes
A			FL 18 +	n/a	n/a	IFR		
B		ORD	Inv 3Tier 0 - ~10,000' agl	3 sm	Clear	Clearance	Mode C Even to fly over	Tower
C		MDW	Inv 2Tier 0 - ~5,000' agl		500 below 2,000 side 1,000 above	Radio Contact		Tower
D		PWK	Cylinder 0 - ~3500 agl'					Tower
E	*A*	Everyplace else you *fly*	**1,200'** +		1,000' ceilings for VFR			**[C]** is *to keep VFR at bay.* Blue lines if Towered, Magenta if Non-Tower. These are called **Surface Area Class E Airports**
G	B	in shaded area IF IFR Approach!	**700'** +					
	C	in dotted Line	**0'** +					
G Day		KSUE Poplar Grove Lk In Hills	**0' – 1200'**	1 sm	Clear of Clouds (no ceiling req)	Class G is **UN–CONTROLLED** AIRSPACE		
Night			**0' - 700'** in shaded area	3 sm	500 below 2,000 side 1,000 above			
E 2			10k+	5 sm	1k/ 1sM / 1k			

Ex: To take off at Monmouth (B), in G Airspace you need only 1sm and clear of clouds. Once you climb to 700' AGL there, you're in E and need 3sm and the 500/2k/1k cloud separation.
But taking off from Galesburg (C), you are immediately in Class E from 0' and need 3sm and 500/2k/1k cloud clearance as well as 1,000 ceilings.
No SVFR from a non-towered airport.





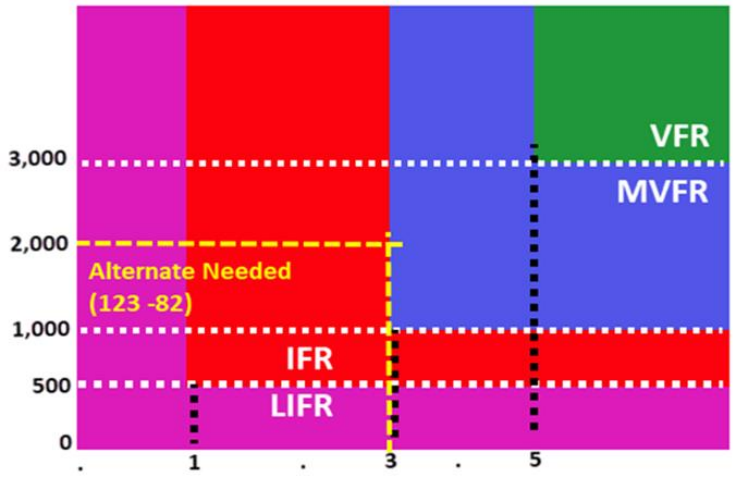
KLNR (or Galesburg left) are "Surface Area Class E Airports"

Ground School Notes

VFRi/IFR

	Ceiling	Visibility
VFR	>3,000’	5+
MVFR	1-3,000	3-5
SVFR	Clear of	1+
IFR	500-1k	1-3
LIFR	<500	0-1

Alternate: if Primary TAF is
± 1 Hr, < 2k’ AGL ceilings or < 3sm vis
Alternate TAF must have :
600’ ceilings for ILS, 800 otherwise



A “**Special VFR Clearance**” allows the pilot to operate with 1 mi visibility and Clear of Clouds (eg, if you can see the runway, but technically the airport is IFR.

At a surface area class E airport like Galesburg or Rhinelander, those airports require a 1,000 foot ceiling and 3 miles visibility to take off or land VFR. Except, if the pilot wants to take off or land with the WX less than that, the pilot can request a Special VFR from the closest FAA facility. That may be a FSS or a nearby ATC facility. Upon that request, that FAA facility checks to see if there are any IFR flights inbound or outbound and if there are none, issues a Special VFR allowing the pilot to operate only within the lateral limits of the surface area class E airspace with Special VFR minimums of 1 mile visibility and clear of clouds. As was the takeoff from the class G airport with such WX, the pilot climbs and can then enter the enroute class E airspace if the in flight visibility improves to 3 miles. Special VFR's also apply to aircraft inbound to land if the surface area class E airport visibility is less than 3 miles or the ceiling is less than 1,000 feet. Pilots planning to fly a short distance scud running flight might likely use SVFR clearances, or another situation is a takeoff in the early morning when the sky is clear, the sun is visible but ground haze causes the visibility to be reduced to 2 miles. In that case, climbing just a few hundred feet will probably put the pilot on top of the haze and in the clear.

CLOUDS - **defined**

Abbrev	Meaning	
SKC	"No cloud/Sky clear" used worldwide but in North America is used to indicate a human generated repor	
CLR	"No clouds below 12,000 ft (U.S.) (or 10,000 ft Canada)", indicates a station that is partly automated	
FEW	"Few" = 1–2 oktas (eigths)	Mostly Sunny (‘Clear’ at night)
SCT	"Scattered" = 3–4 oktas	Partly Sunny (‘Clear’ at night) is 3/8 to 5/8; same values (3/8-5/8) as Partly ‘Cloudy’
BKN	"Broken" = 5–7 oktas	so ‘Partly Sunny’ could be 5/8 which is ‘Broken’ and therefore a ceiling.
OVC	"Overcast" = 8 oktas, i.e., full cloud coverage	
VV	Clouds cannot be seen because of fog or heavy precipitation, so vertical visibility is given instead.	
	FAR 1.1: “Thin” or “Partial” as prefix to cloud coverage does NOT qualify as a ceiling.	

Ground School Notes

ASRI(Aviation Spectrum Resources, Inc.) is the frequency obtained commercially by the FBO Orion Flight Services. This freq is just for that FBO. "Whiskey Base" is what Skill uses at KUGN. The UNICOM frequency is an FCC-assigned frequency given to the airport for all the things a UNICOM is suppsed to do (including the things you'd do on that ASRI freq with Orion).
PCL: On the CTAF freq, click 3,5, or 7 times for low, med, or high lighting
AWOS (at least at LkHIlls): **Click 5 times to trigger the automated AWOS on the CTAF**

Sequence:

- Listen to the **ATIS**.
- Contact **Clearance Delivery** (Bravo/Charlie only) to get you in the system (unless ATIS says "VFR traffic contact Ground").
- Call **Ground** when you're ready to taxi.
- Call **Tower** when ready to takeoff. They will give an initial direction to turn to after departure.
- Switch over to **Departure** control a couple hundred feet after takeoff, when Tower instructs. (Bravo/Charlie only). You will remain with Departure until you are clear of their airspace.
- Switch over to **Center** (map at right) when told, in order to continue receiving flight following between airports. (or mandatory for continued IFR flight)

Clearance Delivery: In Charlie airports. First call Clearance Delivery for your initial instructions. Be ready to give them your desired departure altitude and direction of departure. They will give you a squawk code, initial altitude and any other restrictions.

Ground: Only at Bravo, Charlie and Delta airspace. This is what you are already used to

Tower: The other person in the control tower, who handles traffic on the active runway and within 5nm in the air

TRACON (Terminal Radar Approach CONtrol)

- **Departure**: & **Approach**:

also called approach control or departure control are generally responsible for aircraft below 18,000 - 10,000 feet and within 30-50(?) miles of the airport. They also separate aircraft primarily by RADAR. A TRACON controller follows similar rules as an EnRoute controller, they just do it in a smaller amount of airspace and can decrease the separation of aircraft a little more than a center controller. The TRACON will set up the arrival sequence to all airports in their jurisdiction as well as handle departures.
A TRACON will also handle much more VFR aircraft as VFR aircraft generally will fly below 10,000 feet. They provide advisories, vectors, and altitudes both VFR and IFR aircraft to and from their destinations. They also coordinate closely with the Towers to get an idea of how the towers departures will conflict with their arrivals..

Center: This is separate from TRACON. As shown in the map above/left, they handle airspace between airports. There are multiple Sectors within each Center.
Listen to Live ATC Feed: http://www.liveatc.net/flisten.php?mount=kpwk&icao=kpwk

Bird Strikes

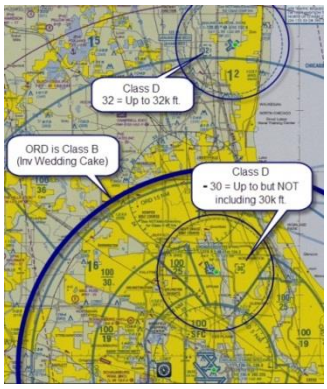
Pilot getaways December 2016

What can you do? Birds tend to dive when they perceive an aircraft nearby, so if you're at cruise, you might want to pitch up. Remember that over 70 percent of collisions between commercial aircraft and birds take place below 500 feet AGL and more than 90 percent take place below 3,500 feet AGL. Those percentages are even higher for general aviation aircraft. So be aware of your

Ground School Notes

When Flying VFR above 3,000 AGL (3,800MSL)**, If Course is**

- 0 - 179 your altitude s/b *3500*, **5500**, 7500, or 9500
- 180 - 359 your altitude s/b **4500**, 6500, 8500 or 10500.



Minimum Altitudes:

- Populated areas: 1,000' of anything within 2,000' horizontally
- Unpopulated areas: 500'
- 2,000' over Mountainous (cf p 5-6-6 of AIM)

Airport Rotating beacon on during the day indicates IFR conditions..

Radio Talk

- Their name + Function (e.g. "**Waukegan Tower**")
  - FSS is '**Radio**', "Milwaukee **Approach**" or EFAS as '**Flight Watch**'
- Your Plane +Tail number (e.g., "**Bonanza 7 8 H F**")
- Location: "**10 miles South**"
- Flight altitude is " at **five thousand, five hundred**"
- Your request (e.g., "**Landing with information Delta**")

CTAF Common Traffic Advisory Frequency (on the map it's a C in a circle ©)

Why does Waukegan have both a CT and a © : Because when it closes, there is no CT, only CTAF.

"Waukegan Tower, …" becomes "Waukegan Traffic..>"

Airport Advisory Area is an area in 10 miles of an airport that has a Flight Service Station on the field.

Ground School Notes

What does the number of white bars in runway's threshold mean?

At the beginning of each runway there are some white bars.

Does number of bars in threshold mean anything?

2 Answers

active oldest votes

21

For runways built, refurbished or repainted after January 2008, the number of bars in the Threshold Markings indicates the width of the runway, as is described in Section 3 of the AIM. Older runways may still use an outdated scheme.

> Runway threshold markings come in two configurations. They either consist of eight longitudinal stripes of uniform dimensions disposed symmetrically about the runway centerline, as shown in FIG 2-3-1, or the number of stripes is related to the runway width as indicated in TBL 2-3-2. A threshold marking helps identify the beginning of the runway that is available for landing. In some instances the landing threshold may be relocated or displaced.

Fig 2-3-1

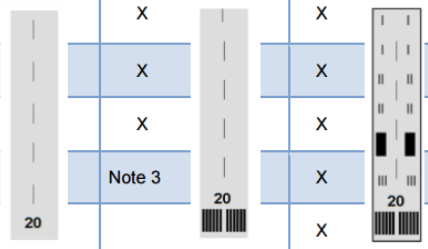
Runway Width	Number of Stripes
60 feet (18 m)	4
75 feet (23 m)	6
100 feet (30 m)	8
150 feet (45 m)	12
200 feet (60 m)	16

autics.com/d × | runway markings and dist × | What does the number of × | Runway - Wikipedia, the f ×

oad/AirfieldStandardsQuickReference2011.pdf

Runway Marking Elements

Runway Surface Marking Scheme	Threshold Approach Category		
	Visual Approach	Non-precision Approach (Approaches with vertical guidance not lower than 0.75 statute mile visibility)	Precision Approach (Approaches with vertical guidance lower than 0.75 statute mile visibility)
Landing Designator	X	X	X
Centerline	X	X	X
Threshold	Note 1	X	X
Aiming Point	Note 2	Note 3	X
Touchdown Zone			X
Side Stripes	Note 4	Note 4	X



Note 1: Required on runways serving approach categories C and D airplanes and for runways used, or intended to be used by international commercial air transport.

Note 2: Required on 4,200 foot or longer runways serving approach categories C and D airplanes.

Note 3: Required on 4,200 foot or longer instrumented runways.

Note 4: Used when the full runway pavement width may not be available for use as a runway.

https://en.wikipedia.org/wiki/Runway

Sections of a runway [edit]

This section **does not cite any references or sources**. Please help improve this section by adding citations to reliable sources. Unsourced material may be challenged and removed. *(July 2009)*

There are runway markings.[10]

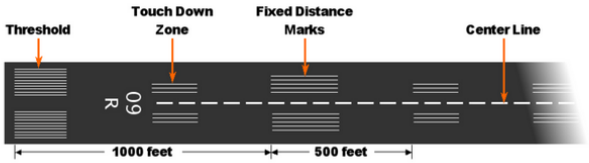
- The **runway thresholds** are markings across the runway that denote the beginning and end of the designated space for landing and takeoff under non-emergency conditions.[11]
- The **runway safety area** is the cleared, smoothed and graded area around the paved runway. It is kept free from any obstacles that might impede flight or ground roll of aircraft.
- The **runway** is the surface from threshold to threshold, which typically features threshold markings, numbers, and centerlines, but not overrun areas at both ends.
- **Blast pads**, also known as overrun areas or stopways, are often constructed just before the start of a runway where jet blast produced by large planes during the takeoff could otherwise erode the ground and eventually damage the runway. **Overrun areas** are also constructed at the end of runways as emergency space to slowly stop plan that overrun the runway on a landing gone wrong, or to slowly stop a plane on a rejected takeoff or a takeoff gone wrong. Blast pads are often not as strong as the main paved surface of the runway and are marked with yellow chevrons. Planes are not allowed to taxi, take off or land on blast pads, except in an emergency.

- **Displaced thresholds** may be used for taxiing, takeoff, and landing rollout, but not for touchdown. A displaced threshold often exists because obstacles just before the runway, runway strength, or noise restrictions may make the beginning section of runway unsuitable for landings.[12] It is marked with white paint arrows that lead up to th beginning of the landing portion of the runway.

Runway markings [edit]

This section **does not cite any references or sources**. Please help improve this section by adding citations to reliable sources. Unsourced material may be challenged and removed. *(July 2009)*

There are runway markings and signs on most large runways. Larger runways have a distance remaining sign (black box with white numbers). This sign uses a single number indicate the thousands of feet remaining, so 7 will indicate 7,000 ft (2,134 m) remaining. The runway threshold is marked by a line of green lights.



There are three types of runways:

- Visual runways are used at small airstrips and are usually just a strip of grass, gravel, ice, asphalt, or concrete. Although there are usually no markings on a visual runway they may have threshold markings, designators, and centerlines. Additionally, they do not provide an instrument-based landing procedure; pilots must be able to see the runway to use it. Also, radio communication may not be available and pilots must be self-reliant.
- Non-precision instrument runways are often used at small- to medium-size airports. These runways, depending on the surface, may be marked with threshold markings,

Ground School Notes

Flight Service / Flight Service Station, and Flight Watch

FSS is the 'physical' frequency for Flight Service. Flight Service includes:

- Flight Plan (file/close)
- Preflight weather briefing
- NOTAMS
- IFR Clearances

Flight watch (officially ' Enroute Flight Advisory Service' or EFAS)

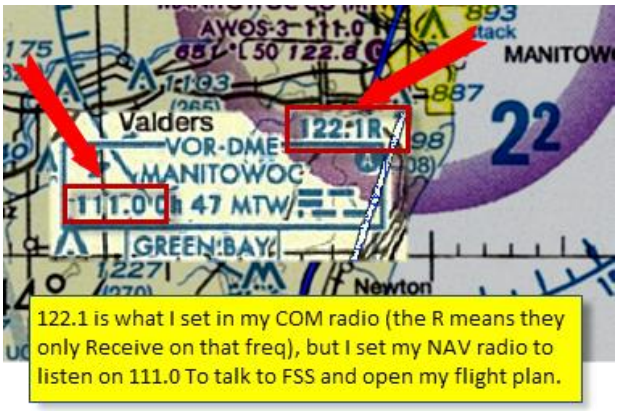
- En route weather updates
- PiReps

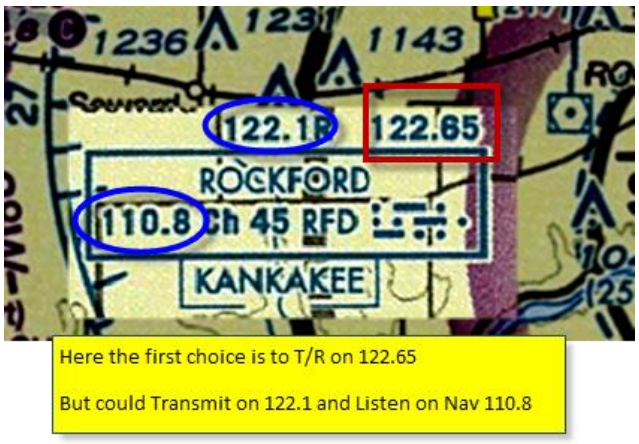
Flight Watch is available on a single common frequency, **122.0 MHz.** Flight Watch may be unavailable below 5,000 feet AGL, depending on terrain and the distance from the nearest station FW is available from 6am-10pm and above 5000 ft. If you can't hear them, see if you need to climb a bit.

Flight FOLLOWING is completely different. It is you getting put on the ATC screen, almost as if you were IFR (but only for traffic advisories)

VORs and FSS

Some VORs allow you to talk to a FSS on frequencies transmitted through the same antennas. This is how you open your





Flight Plan when in the air.

See the words "Green Bay" under the box? That's who you are talking to. So you might say "**Green Bay Radio, N78HF would like to open our Flight Plan**"

When you have to use the vor to listen, don't forget to turn the nav volume up. We always have the comm volume up but many forget that the nav has it's own vol. knob.

Think of flight watch as a dept. w/i the flight service station. You can contact FW for in flight wx updates and to give them pilot reports. Look at the back inside cover of the a/fd for the frequency and you'll also see how the sectors are configured. When calling them, you address them according to the hub/station that is nearest to you. FW is available from 6am-10pm and above 5000 ft. If you can't hear them, see if you need to climb a bit.

Ground School Notes

Transponder

- **7700 is Emergency**
- **7600 Lost Communications**
- 1200 is VFR

Need additional Endorsements to fly either of these:

- Hi Performance (200HP or more)
- Complex (Retractable landing gear, constant-speed propeller)

Fuel Minimums

- **Day** extra 30 minutes **Night** extra 45 minutes

Currency:

- For daytime passengers: 3 takeoffs/landings (e.g., Touch/Gos) w/in 90 days
- For nighttime passengers: 3 takeoffs/landings (full stop) w/in 90 days
  The definition of night as described in FAR 61.57(b), which is the "period beginning **one hour after sunset and ending one hour before sunrise.**" More information is available through AOPA Safety Hot Spot: Flying Night VFR. When you need to turn on your position and anti-collision lights, check out FAR 91.209. According to this definition of night, you will need to turn on those lights "during the period from sunset to sunrise."

	← Rise **Nav & Strobe** Set →	
← -60	**"Day" for Passenger carrying**	+60 →

PILOT – Physical Items:

- Current Pilot's License exp at the end of every 24 months w/o a BFR
- Current Medical exp at the end of every 24 months.
- Photo ID (e.g., Driver's License)

Plane needs 94.403 'sh…

• Annual Inspection	12 months	91.409	
• Transponder Check	24 month	91.413	
• Altimeter Check	24 months	91.411	Part 43 subpart E,
• ELT	12 months	91.207	

Documents on a plane:

- **A**irworthiness **R**egistration ~~**Radio check**~~ **O**peration limit specs **W**eight & balance

Ground School Notes

Oxygen

- Below **12,500** Never
- 12,500 - 14,000 after 30 minutes for Pilot only
- Above 14,000 always for Pilot
- Above 15,000 provided for crew/passengers
  (See my IFR Cliff notes)
  Pulse Oximeter: 95% is minimum;
  Below 90% is a warning (AOPA:Oxygen Use In Aviation)

SkyOx 2 place:$515-$545

Capacity	Construction	Weight	Duration (man hours at 15,0 w/Cannula | w/Mas
6 cu. ft. C	16 3/8"l x 3 1/4" dia.	6 lbs.	5:28 hrs. | 1:49 hrs
9 cu. ft. C	15 1/2"l x 4 3/8" dia.	7 lbs.	8:07 hrs. | 2:45 hrs
15 cu. ft.	21 1/4"l x 4 3/8" dia.	11 lbs.	13:48 hrs. | 4:36 hr
20 cu. ft.	17 3/4"l x 5 1/4" dia.	15 lbs.	17:33 hrs. | 5:51 hr
24 cu. ft.	30 1/4"l x 5 1/4" dia.	14 lbs.	22:42 hrs. | 7:34 hr
40 cu. ft.	21 3/4"l x 6 3/4" dia.	28 lbs.	39:27 hrs. | 13:09 h
50 cu. ft.	26 1/2"l x 7" dia.	36 lbs.	46:21 hrs. | 15:27 h

Weather briefings

For weather specialists to provide an appropriate weather briefing, they need to know which of the three types of briefings is needed—a **standard** briefing, an **abbreviated** briefing, or an **outlook** briefing (planned departure is 6 or more hours away).

Standard *briefing 800 / 992 - 7433*

- *"Hello, I am the pilot of N78HF, a Beech Bonanza.*
- *I would like a Standard Briefing for VFR flight from Chicago Executive PWK to Cherryland WI. SUE*
- *Departure time is about (relative, local or Zulu (Z-5=CST)),*
- *total flight time is about 2.5 hrs.,*
- *with no intermediate stops.*

A standard briefing is the most complete report and provides the overall weather picture. This type of briefing should be obtained prior to the departure of any flight and should be used during flight planning. A standard briefing provides the following information in sequential order if it is applicable to the route of flight.

1. Adverse Conditions—This includes information about adverse conditions that may influence a decision to cancel or alter the route of flight. Adverse conditions includes significant weather, such as thunderstorms or aircraft icing, or other important items such as airport closings.
2. VFR Flight NOT RECOMMENDED—If the weather for the route of flight is below VFR minimums, or if it is doubtful the flight could be made under VFR conditions due to the forecast weather, the briefer may state that VFR is not recommended. It is the pilot's decision whether or not to continue the flight under VFR, but this advisory should be weighed carefully.
3. Synopsis—The synopsis is an overview of the larger weather picture. Fronts and major weather systems that affect the general area are provided.
4. Current Conditions—This portion of the briefing contains the current ceilings, visibility, winds, and temperatures. If the departure time is more than 2 hours away, current conditions will not be included in the briefing.
5. En Route Forecast—The en route forecast is a summary of the weather forecast for the proposed route of flight.
6. Destination Forecast—The destination forecast is a summary of the expected weather for the destination airport at the estimated time of arrival (ETA).

Ground School Notes

7. Winds and Temperatures Aloft—Winds and temperatures aloft is a report of the winds at specific altitudes for the route of flight. However, the temperature information is provided only on request.
8. Notices to Airmen—This portion supplies NOTAM information pertinent to the route of flight which has not been published in the Notice to Airmen publication. Published NOTAM information is provided during the briefing only when requested.
9. ATC Delays—This is an advisory of any known air traffic control (ATC) delays.
10. Other Information—At the end of the standard briefing, the FSS specialist will provide the radio frequencies needed to open a flight plan and to contact en route flight advisory service (EFAS). Any additional information requested is also provided at this time.

Abbreviated briefing

An abbreviated briefing is a shortened version of the standard briefing. It should be requested when a departure has been delayed or when specific weather information is needed to update the previous briefing.

When this is the case, the weather specialist needs to know the time and source of the previous briefing so the necessary weather information will not be omitted inadvertently.

Outlook briefing

An outlook briefing should be requested when a planned departure is 6 or more hours away. It provides initial forecast information that is limited in scope due to the timeframe of the planned flight. This type of briefing is a good source of flight planning information that can influence decisions regarding route of flight, altitude, and ultimately the go, no-go decision. A follow-up briefing prior to departure is advisable since an outlook briefing generally only contains information based on weather trends and existing weather in geographical areas at or near the departure airport.

ADDS (part of NOAA), so no TFRs or NOTAMs. Prog (nosis) charts are nice.
http://www.aviationweather.gov/adds/

DUATS – file with Tail# to prove that you did look at weather, in case something goes wrong.

Human Weather Briefing & flight plan filing:: **1-800-WX-BRIEF**

Ground School Notes

Weather

SigMet Significant Meteorological Information (WSs), is a weather advisory that contains meteorological information concerning the safety of all aircraft. There are two types of SIGMETs, convective and non-convective. The criteria for a non-convective SIGMET to be issued are severe or greater turbulence over a 3,000-square-mile (7,800 km2) area, or severe or greater icing over a 3,000-square-mile (7,800 km2) area or IMC conditions over a 3,000-square-mile (7,800 km2) area due to dust, sand, or volcanic ash

This information is usually broadcast on the ATIS at ATC facilities. A SIGMET is a forecast valid for up to four hours. They are assigned an alphabetic designator from N (November) through Y (Yankee), excluding S and T.
A Convective SIGMET is issued for convection over the Continental U.S. Convective SIGMETs are issued for an area of thunderstorms affecting an area of 3,000 square miles (7,800 km2) or greater, a line of thunderstorms at least 60 nm long, and/or severe or embedded thunderstorms affecting any area that are expected to last 30 minutes or longer. A Convective SIGMET is valid for 2 hours and they are issued every hour + 55 min.

Convective SIGMET (WST) is an in-flight weather advisory issued for hazardous convective weather that affects the safety of every flight. Convective SIGMETs are issued for severe thunderstorms with surface winds greater than 50 knots, hail at the surface greater than or equal to 3/4 inch in diameter, or tornadoes.

They are also issued to advise pilots of embedded thunderstorms, lines of thunderstorms, or thunderstorms with heavy or greater precipitation that affect 40 percent or more of a 3,000 square foot or greater region.

Convective SIGMETs are issued for the eastern (E), western (W), and central (C) United States. Each report is issued at 55 minutes past the hour, but special reports can be issued during the interim for any reason. Each forecast is valid for 2 hours. They are numbered sequentially each day from 1-99, beginning at 00 Zulu time. If no hazardous weather exists, the Convective SIGMET will still be issued; however, it will state "CONVECTIVE SIGMET…. NONE."

AirMet Airmen's Meteorological Information (WAs), is a concise description of weather phenomena that are occurring or may occur along an air route that may affect aircraft safety*. Compared to SIGMETs, AIRMETs cover less severe weather: moderate turbulence and icing, surface winds of 30 knots, or widespread restricted visibility.*

AIRMETs are broadcast on the ATIS at ATC facilities, and are referred to as Weather Advisories. AIRMETs are valid for six hours. NOTE: The definition has changed and no longer says "light aircraft"; Airmets are intended for all aircraft.

There are three types of AIRMET, all identified by a phonetic letter: S (Sierra), T (Tango), and Z (Zulu). [1]

AIRMET **SIERRA** (Mountain obscuration or IFR) ceilings less than 1000 feet and/or visibility less than 3 miles affecting over 50% of the area at one time; extensive mountain obscuration

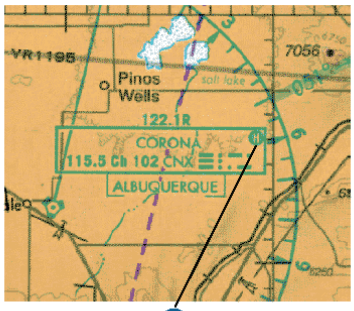
AIRMET **TANGO** (Turbulence) moderate turbulence, sustained surface winds of 30 knots or more

AIRMET **ZULU** (Icing) moderate icing, freezing levels

For an authority to issue an AIRMET, applicable conditions must be widespread. "Widespread" means that the applicable area covers at least 3000 square miles. Because conditions across the forecast period can move across the area, it is possible that only a small portion of the area is affected at any time.

AIRMET's are routinely issued for six hour periods beginning at 0145Z during Central Daylight Time and at 0245Z during Central Standard Time. AIRMETS are also amended as necessary due to changing weather conditions or issuance/cancellation of a SIGMET.

HIWAS *Hazardous In-flight Weather Advisory* HIWAS is a national program for broadcasting hazardous weather information continuously over selected navaids. The broadcasts include advisories such as AIRMETS, SIGMETS, convective SIGMETS, and urgent PIREPs. These broadcasts are only a summary of the information, and pilots should contact an FSS or EFAS for detailed information. Navaids that have HIWAS capability are depicted on sectional charts with an "H" in the upper right corner of the identification box.



Other:

NOTAM- Notice to Air Men. Things like runway closings, VORs down for repairs.

METAR is a format for reporting weather information.

Usually updated every hour, at the top of the hour.

PIREPS – Pilot Reports. Inflight reports from other pilots

TAF *Terminal Aerodrome Forecasts* A terminal aerodrome forecast is a report established for the 5 statute mile radius around an airport. TAF reports are usually given for larger airports. **Each TAF is valid for a 24-hour time period, and is updated four times a day at 0000Z, 0600Z, 1200Z, and 1800Z**. The TAF utilizes the same descriptors and abbreviations as used in the METAR report.

FA The aviation area forecast (FA) gives a picture of clouds, general weather conditions, and visual meteorological conditions (VMC) expected over a large area encompassing several states. There are six areas for which area forecasts are published in the contiguous 48 states. Area forecasts are issued three times a day and are valid for 18 hours. This type of forecast gives information vital to en route operations as well as forecast information for smaller airports that do not have terminal forecasts.Area forecasts are typically disseminated in four sections

Ground School Notes

ICING:

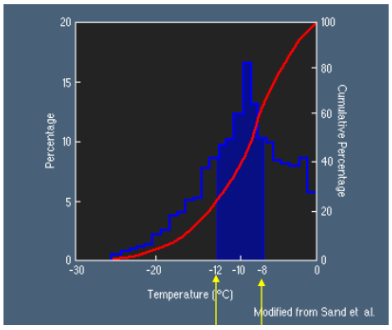
If your airplane is not certified for flight in icing conditions *you exit at the first sign of ice accumulation.*

1/ 4 " Accumulation			
	0 - 5 minutes	Heavy	No one survives Heavy for long. Exit immediately
	5-15 minutes	Moderate	De-icing equipment (boots, weeping) are required to run *continuously* in Moderate icing. 1"-3"/Hr. [1/4" to 3/4" in 15 minutes]
	15-60 minutes	**Light**	¼" to 1" per Hr [1/16 to 1/4" in 15 minutes]
	60+ minutes	Trace	

Typical distance from IAF to RWY is 15nm, at 100Kts = 9-10 minutes.
You can pick up to almost 1/4" in that time, even in LIGHT conditions

If you encounter freezing rain, that indicates warmer air above you (it is freezing as it comes down), so climbing will likely get you into warmer air.

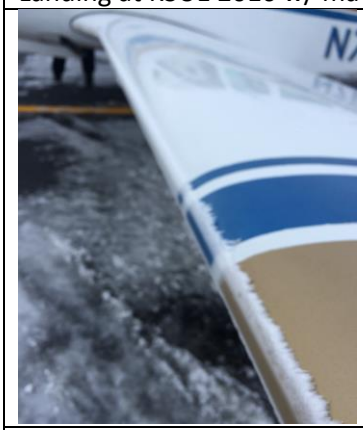
Most icing tends to occur between 0° and -20°C
– More than 50% of those occur between -8 and -12° C



ICING: Most likely between +2C and -20C (36F to -4F)
More than 50% occurs between **18F and 10F**

- Winter clouds are more likely to be Stratus than Cumulus, therefore more likely to find layers of cloud, and clear air in between
- Cloud tops are the most likely / most severe places to encounter icing.
- If landing with possible ice, use little or NO flaps.
- 70% is Rime (shown below), 20% clear (Often "horns" or protrusions are formed and project into the airflow), 10% mixed. SCLD is a form of Clear ice – but bigger and more dangerous.

Landing at KSUE 2016 w/ maybe 10-15 minutes in the clouds, on IFR Approach to Rwy 20.



Though I didn't measure at the time, this seems to be about 1/8 to 1 /4 inch. Hence "LIGHT RIME" (?)

Ground School Notes

3 levels of Pilots

Private

Private Pilot: an individual who may fly for pleasure or personal business, generally without accepting compensation

Recreational

Recreational Pilot: an individual who may fly aircraft of up to **180 horsepower** (130 kW) and **4 seats** in the **daytime** for pleasure only

Sport

Sport Pilot: an individual who is authorized to fly only Light-sport Aircraft

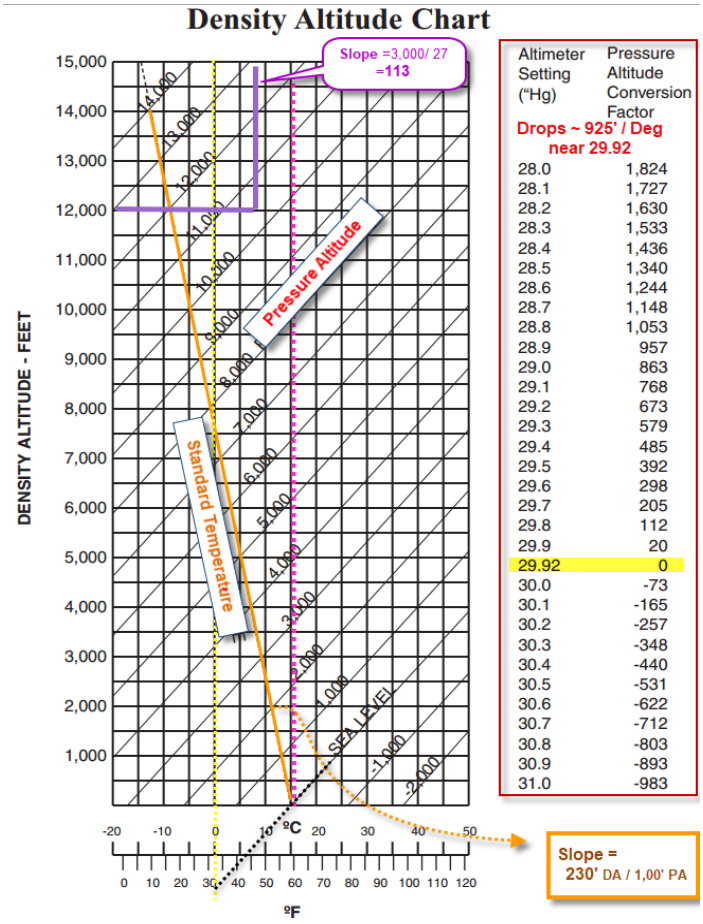
Does not require a medical certificate; a valid vehicle driver's license can be used as proof of medical competence *provided* the prospective pilot was not rejected for their last Airman Medical Certificate

Ground School Notes

Pressure/**Density** Altitude

Density Altitude is the keystone of Takeoff and Landing distances (shown in the POH), as it is the standard condition that the tables are calculated at.

Pressure Altitude is a function of only the current Barometric pressure & your field elevation. It is what the Altimeter reads when set to 29.92" Hg. Under 'standard' conditions, 29.22" is Sea Level (0' MSL). The vertical side table inset shows the 'Altitude offset' to 'True Altitude' for each barometer reading



Basically, PA drops 936[1] for every 1" Hg above 29.92

Airport ATIS reports Barometric pressure in "PA" terms; that is they take the scientific/actual Barometric pressure and add about 1" for every 1,000' msl of Field Elevation. So Denver (5,000' above SL) on a 'standard day' would have a Barometric Pressure of (29.92-5.00=) 24.92", you will never hear an ATIS of 24.92", they would describe it as 29.92". Similarly, a reported 'Altimeter setting' of 30.50" is a real Barometric pressure of 25.50", See "Altimeter Setting" vs "Station Pressure" on the next page

PA = Field Elevation + ((29.92 –BarPres) * 925 **(1)**

As a 'rule of thumb', DA drops/rises about 113' for every 1 degree C below/above 15C (60F) = 113/1.8 =~ 62'/F = 620/10F

Density Altitude is Pressure Altitude, adjusted for Temperature (e.g., 'what the plane feels')

The 'upward to the right sloping lines' shown are the Density Altitude line for any given Pressure Altitude (each such line is 1,000' PA greater than the one below it). Now to create a 'simple' formula to tell us what the DA is (vertical, '**Y**-Axis) for any given Temperature (Horizontal '**X**-Axis'). Let's start by assuming a simplified case of always being at 2000' PA. This is a simple linear equation of the form:

Y = m*X + b (called 'slope/intercept' form. 'm' is the slope of the line, 'b' is the Y-intercept (value when X is 0!))

Slope (m) is easy: They're all the same, so pick one that has easy intersections on the graph to read like 9,000' PA. It rises from 7100 to 15,00 over a 70C span, or 7900/70 = **113** (Ft/degree C)

So **DA = 113 * T_c + b** **(2)**

But the **b** value (Y=intercept) changes for each PA line, but at least it does so consistently.

And it too is a linear equation like the above. Look at the pattern:

Y-Intercept (0 C)	2000'	13000'		13,000 – 2,000 = 11,000	11/9 = **1.22**
Press Altitude	3,000	12,000		12,000 - 3,000 = 9,000	
So the Y-Intercept goes up **1.22'** for every 1' of PA					
Extrapolating from 3k' PA, the Y-intercept at a PA of 0' is : 2000 – (3k***1.22**) = 2000 – 3666 = -1,695[2]					

So what is the Y-intercept of the DA line? Well it is obviously a function of PA line, and it is

b = 1.22 * **PA** – 1,695 **(3)**

Combining (2) and (3):

[1] 31.0-28.0 " is a change from 1824 to – 983 which is 2807/3=936, but closer to only 925 near 29.92; it's not consistent.

[2] And not coincidentally, 1695 = 15C x 113, in the following equation

Ground School Notes

Density Altitude = 113 * T_c + 1.22 * **PA** - 1695 **(4)**

Doing the ugly arithmetic and plugging 1 into 4:

Density Altitude = (113 x T_c) + (1.22 x **FE**) - (1159 x **BP**) + 32,982	
This does NOT yet take into account the downward sloping orange line (230'/1,000ft) which is that Standard temperature changes as a function of altitude. Later, not that important, for now…	

Or in simple 'back of the envelope terms':

Density Altitude = **Field Elevation**

\+ **113' for every Degree Celsius** above**15C**; (or **62.7'** for every degree Fahrenheit above **59F**)

\+ **925'** for every inch of Hg **below 29.92** (subtract if above 29.92 for a (better!) lower DA)

And to simplify even more:

Density Altitude = **Field Elevation**

\+ **60'** for every degree above **60F** ← *60x60* Is easy to remember, and not that far off from 62.7 > 59F

\+ **1,000'** for every inch of Hg **below 29.92** (subtract if above 29.92 for a (better!) lower DA)

For example, 1,000 Field Elevation, on a 90F day, at 28.42"Hg is

1,000 + (60x30) + 1,800 = 1,000 + 1,950 + 1,500 = 4,450 = 4,500' DA

Using Altimeter Setting (not Actual Station Pressure)

http://www.pilotfriend.com/pilot_resources/density.htm

Elevation	◉ feet	○ meters	1000		
Air Temperature	◉ deg F	○ deg C	90		
Altimeter Setting	◉ inches Hg	○ mb	28.42		
Dew Point	◉ deg F	○ deg C	0		
Density Altitude	4931	feet	1503	meters	
Absolute Pressure	27.398	inches Hg	927.81	mb	
Relative Density	86.35	%	86.35	%	

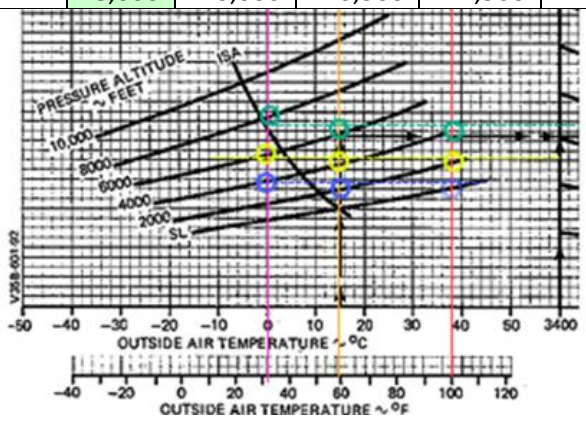
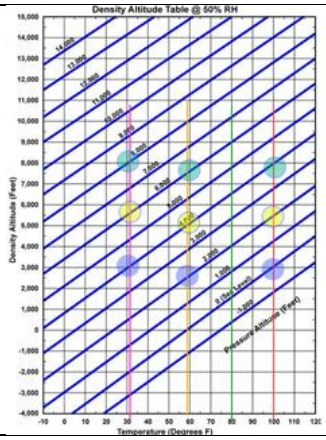
Using Actual Station Pressure, NOT altimeter setting

https://www.weather.gov/epz/wxcalc_densityaltitude

Enter the air temperature and choose a unit:	Density Altitude in feet:
59 ◉ Fahrenheit ○ Celsius ○ Kelvin	ft
Enter the actual station pressure (not the altimeter setting) and choose a unit:	Density Altitude in meters:
◉ in of mercury ○ mm of mercury ○ millibars (hPA)	m
Enter the dewpoint and choose a unit:	
◉ Fahrenheit ○ Celsius ○ Kelvin	
Convert	Clear Values

Technically, moisture affects DA too since moist air is less dense than dry air. But even at extremes, moist air turns out to only add about 500-800' to DA. See http://wahiduddin.net/calc/calc_da.htm for a great 'all variables' calculator.

Ground School Notes

	Temp	0F	32F	58F	80F	100F	
	PA	-18C	**0C**	**15C**	**27C**	**38C**	So, in 'round numbers' we can say that multiple combinations of PRESSURE Altitude/Temps correspond directly with a consistent DENSITY Altitude, so we can work the other way and say for a given DENSITY Altitude, we can find that combination of PA/Temp on the chart and do our calculations from there.
1	0	??	-2,000	0	1,500	2,000	
2	2,000		500	2,500	4,000	5,500	
3	4,000		3000	5,000	6,500	8,000	
4	6,000		5,500	7,500	9,000	9,000	
5	8,000		8,000	10,000	10,500	11,500	
6							
			Ok, so from here on out, we will use (what amounts to) Density Altitude of 0', 3,000, 5,500 and 8,000, and we'll interpolate to 0/1500/3000/4500/6000/9000				
			We will interpolate the wind, which ranges in slope from Lo GTOW of 200'/30Kts (70'/10Kts) to MGTOW700'/30Kts (250'/10Kts)				
			For Obstacle: 0' = +0, obviously, 50' ranges from 300' to 1,500+'				

Ground School Notes

Altimeter

As you increase the Hg dial (e.g., from 29 .9 to 30.0 to 31.0), the altimeter reading goes UP. ~1,000' for every inch of Hg (950, actually)

Henry, as a follow up to our discussion today about errors in the altimeter, here is the official ICAO Cold Temperature Error Table. Keep in mind that the error decreases to zero when you land at the airport that provided the altimeter setting. This error is for pilot consideration and possible correction if temp is way below standard. This correction is never made while at cruise, but only a possible correction while on an approach.

Height Above Airport in Feet Reference: AIM 7-2-3

Reported Temp °C	200	300	400	500	600	700	800	900	1000	1500	2000	3000	4000	5000
+10	10	10	10	10	20	20	20	20	20	30	40	60	80	90
0	20	20	30	30	40	40	50	50	60	90	120	170	230	280
-10	20	30	40	50	60	70	80	90	100	150	200	290	390	490
-20	30	50	60	70	90	100	120	130	140	210	280	420	570	710

EXAMPLE-
Temperature-10 degrees Celsius, and the aircraft altitude is 1,000 feet above the airport elevation. The chart shows that the reported current altimeter setting may place the aircraft as much as 100 feet below the altitude indicated by the altimeter.

This is another reason you need an extra 1,000' when flying over mountains (e.g., 2,000 v 1,000): As you ascend from your last accurate Hg reading, you may be 10% lower than your altimeter is telling you. *E. Allan Englehardt* Cell: 847-732-1785

Required Obstacle Clearance (ROC) used on procedure segment altitudes.

As a result of the analysis, Cold Temperature Restricted Airports have been designated in the NAS. The list of airports, the segment(s) of the approach requiring cold temperature altitude correction and associated operating procedures may be found at www.faa.gov/air_traffic/publications/notices NTAP, Part 4. Graphic Notices, Section 1. General - Cold Temperature Restricted Airports.

The list of affected airports is also available as a PDF on the bottom of the FAA Digital Products, **"Terminal Procedures Search Results" page**.

An icon will be incrementally added to airport approach plates, beginning Mar 5, 2015. The icon indicates a cold temperature altitude correction will be required on an approach when the reported temperature is, "at or below" the temperature specified for that airport. The one exception to this procedure is Chicago Midway Intl (KMDW). Only operations to 22L and 22R will be affected. Altitude corrections will not be required on any approach to any other landing runway at KMDW.

The affected airports list should be reviewed to determine relevance to each operator's operations (airports), as well as which segment(s) of associated approaches will require an altitude correction. Temperatures for Cold Temperature Restricted Airports are completely separate from the temperatures published on area navigation (RNAV) approaches. Temperature restrictions on RNAV approaches for lateral navigation (LNAV)/vertical navigation (VNAV) minima must be followed, even if it is warmer than the temperature associated with the "snowflake" icon.

Mandatory compliance with these procedures will be in effect Sep 17, 2015.

Traffic Control Phrases

"Cleared to taxi" (Jeppesen Private Pilot 5B; AIM Section 3, Airport Markings)

When told by ground control or tower that you are cleared to taxi, the controller has given you instruction to taxi along taxiway centerlines according to taxiway markings. It is important to repeat all controller instructions and runway crossing instructions. The taxi is the first phase of the flight, so constantly scan for traffic and maintain attention to radio calls. If in doubt or unsure of potential conflict, STOP, and be the courteous pilot.

"Taxi into position and hold" / Line up and Wait (Jeppesen Private Pilot 5B)

The tower expects you to taxi onto runway centerline and maintain a stopped position while the aircraft in front of you gains separation or clears the runway. It is important that, prior to crossing the hold-short lines, you verify your instructions, verify runway of use, and scan extended final for traffic. At Centennial you may be asked to taxi into position and hold with room for aircraft behind you.

"Cleared for takeoff" (Jeppesen Private Pilot 5B)

The tower controller is the only authority to clear you for takeoff at a controlled airfield. Repeat back your takeoff clearance and call sign, as well as scan final for traffic. The tower will expect you to maintain runway centerline on takeoff until reaching 500' AGL. Upon reaching 500' AGL, you may begin your crosswind turn, or on-course turnout. The tower may request other specific instructions, so listen closely to your takeoff clearance.

"Cleared for immediate takeoff"

This means the controller has minimal separation between you and the aircraft on final. If you decide to proceed with the takeoff the aircraft must be fully configured and you should apply full power upon reaching runway centerline. If you feel you are not ready or unable to takeoff, advise the tower that you are unable and remain holding short of the runway.

"Enter closed traffic" (AIM Pilot/Controller Glossary)

The tower has acknowledged the pilot's intention to perform successive operations involving takeoffs and landings or low approaches where the aircraft does not exit the traffic pattern.

"Cleared for the option" (AIM 4-3-22)

When you are cleared for the option you have been given permission to either do a touch-and-go, make a low approach, missed approach, stop and go, or full-stop landing. If requesting this clearance, the pilot should do so upon establishing downwind on a VFR traffic pattern.

"Cleared touch-and-go"

When authorized by the tower, the touch-and-go procedure allows the pilot to land on the runway, reconfigure the airplane and perform a takeoff to re-enter the traffic pattern. If requesting this approach the pilot should do so upon establishing downwind on a VFR traffic pattern.

"Cleared low approach" (AIM 4-3-12)

A low approach clearance allows the pilot to perform a simulated emergency landing or normal landing down to the runway environment (100' AGL) and then perform a go-around to re-enter or depart the pattern. If requesting this approach you should do so upon establishing downwind on a VFR traffic pattern.

"Cleared stop-and-go"

A stop-and-go clearance allows the pilot to land on the runway, come to a full stop, and then takeoff on the remaining length of runway. The pilot must be aware of runway lengths and takeoff distance requirements. This procedure can be beneficial in keeping costs lower when performing night currency. If requesting this clearance the pilot should do so upon establishing downwind on a VFR traffic pattern.

"Cleared to land"

When given clearance to land the tower has authorized you to land on the runway in use. The phrase "cleared to land" gives you immediate use of that runway, unless the tower advises that you are in sequence for landing. After advising approach or tower that you are inbound for landing at your destination you do not have to make any further request for clearance to land.

"Land-and-hold-short" (AIM 4-3-11)

The land-and-hold-short procedure requires the pilot to perform an accurate landing on the runway so that the pilot can stop the aircraft before reaching an intersecting runway, intersecting taxiway, or construction area. If you are unable to comply with land and- hold-short operations, you may request clearance for a different runway.

"Caution: wake turbulence"

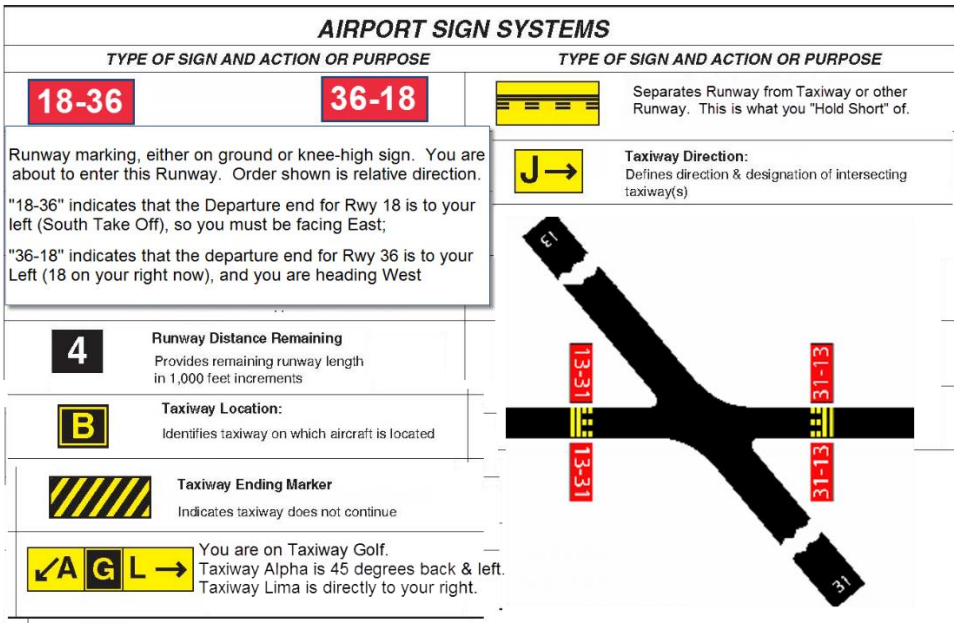
This call from ATC advises the pilot of the potential for encountering wake turbulence from departing or arriving aircraft.

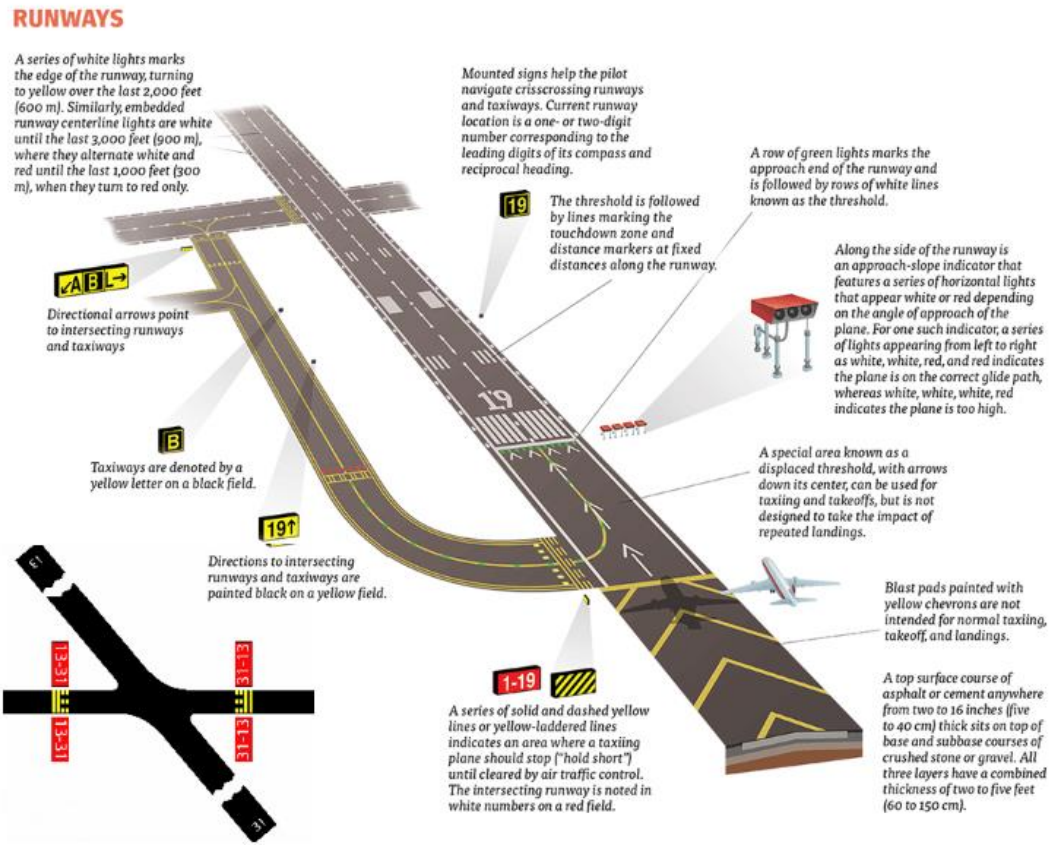
Exiting the runway after landing (AIM 4-3-20)

The AIM advises that you exit the runway at the first available taxiway, stop the aircraft after clearing the runway, and call ground control for instructions if you have not already received them.

Ground School Notes

Runway Markings





Owner Maintenance

As an owner operator of your aircraft you are allowed to do the following according to FAR 43 Appendix A(c):

(1) Removal, installation, and repair of landing gear tires.
(2) Replacing elastic shock absorber cords on landing gear.
(3) Servicing landing gear shock struts by adding oil, air, or both.
(4) Servicing landing gear wheel bearings, such as cleaning and greasing.
(5) Replacing defective safety wiring or cotter keys.
(6) Lubrication not requiring disassembly other than removal of nonstructural items such as cover plates, cowlings, and fairings.
(7) Making simple fabric patches not requiring rib stitching or the removal of structural parts or control surfaces. In the case of balloons, the making of small fabric repairs to envelopes (as defined in, and in accordance with, the balloon manufacturers' instructions) not requiring load tape repair or replacement.
(8) Replenishing hydraulic fluid in the hydraulic reservoir.
(9) Refinishing decorative coating of fuselage, balloon baskets, wings tail group surfaces (excluding balanced control surfaces), fairings, cowlings, landing gear, cabin, or cockpit interior when removal or disassembly of any primary structure or operating system is not required.
(10) Applying preservative or protective material to components where no disassembly of any primary structure or operating system is involved and where such coating is not prohibited or is not contrary to good practices.
(11) Repairing upholstery and decorative furnishings of the cabin, cockpit, or balloon basket interior when the repairing does not require disassembly of any primary structure or operating system or interfere with an operating system or affect the primary structure of the aircraft.
(12) Making small simple repairs to fairings, nonstructural cover plates, cowlings, and small patches and reinforcements not changing the contour so as to interfere with proper air flow.
(13) Replacing side windows where that work does not interfere with the structure or any operating system such as controls, electrical equipment, etc.
(14) Replacing safety belts.
(15) Replacing seats or seat parts with replacement parts approved for the aircraft, not involving disassembly of any primary structure or operating system.
(16) Trouble shooting and repairing broken circuits in landing light wiring circuits.
(17) Replacing bulbs, reflectors, and lenses of position and landing lights.
(18) Replacing wheels and skis where no weight and balance computation is involved.
(19) Replacing any cowling not requiring removal of the propeller or disconnection of flight controls.
(20) Replacing or cleaning spark plugs and setting of spark plug gap clearance.
(21) Replacing any hose connection except hydraulic connections.
(22) Replacing prefabricated fuel lines.
(23) Cleaning or replacing fuel and oil strainers or filter elements.
(24) Replacing and servicing batteries.

(25) Cleaning of balloon burner pilot and main nozzles in accordance with the balloon manufacturer's instructions.
(26) Replacement or adjustment of nonstructural standard fasteners incidental to operations.
(27) The interchange of balloon baskets and burners on envelopes when the basket or burner is designated as interchangeable in the balloon type certificate data and the baskets and burners are specifically designed for quick removal and installation.
(28) The installations of anti-misfueling devices to reduce the diameter of fuel tank filler openings provided the specific device has been made a part of the aircraft type certificiate data by the aircraft manufacturer, the aircraft manufacturer has provided FAA-approved instructions for installation of the specific device, and installation does not involve the disassembly of the existing tank filler opening.
(29) Removing, checking, and replacing magnetic chip detectors.
(30) The inspection and maintenance tasks prescribed and specifically identified as preventive maintenance in a primary category aircraft type certificate or supplemental type certificate holder's approved special inspection and preventive maintenance program when accomplished on a primary category aircraft provided:
(i) They are performed by the holder of at least a private pilot certificate issued under part 61 who is the registered owner (including co-owners) of the affected aircraft and who holds a certificate of competency for the affected aircraft (1) issued by a school approved under § 147.21(e) of this chapter; (2) issued by the holder of the production certificate for that primary category aircraft that has a special training program approved under § 21.24 of this subchapter; or (3) issued by another entity that has a course approved by the Administrator; and
(ii) The inspections and maintenance tasks are performed in accordance with instructions contained by the special inspection and preventive maintenance program approved as part of the aircraft's type design or supplemental type design.
(31) Removing and replacing self-contained, front instrument panel-mounted navigation and communication devices that employ tray-mounted connectors that connect the unit when the unit is installed into the instrument panel, (excluding automatic flight control systems, transponders, and microwave frequency distance measuring equipment (DME)). The approved unit must be designed to be readily and repeatedly removed and replaced, and pertinent instructions must be provided. Prior to the unit's intended use, and operational check must be performed in accordance with the applicable sections of part 91 of this chapter.
(32) Updating self-contained, front instrument panel-mounted Air Traffic Control (ATC) navigational software data bases (excluding those of automatic flight control systems, transponders, and microwave frequency distance measuring equipment (DME)) provided no disassembly of the unit is required and pertinent instructions are provided. Prior to the unit's intended use, an operational check must be performed in accordance with applicable sections of part 91 of this chapter.

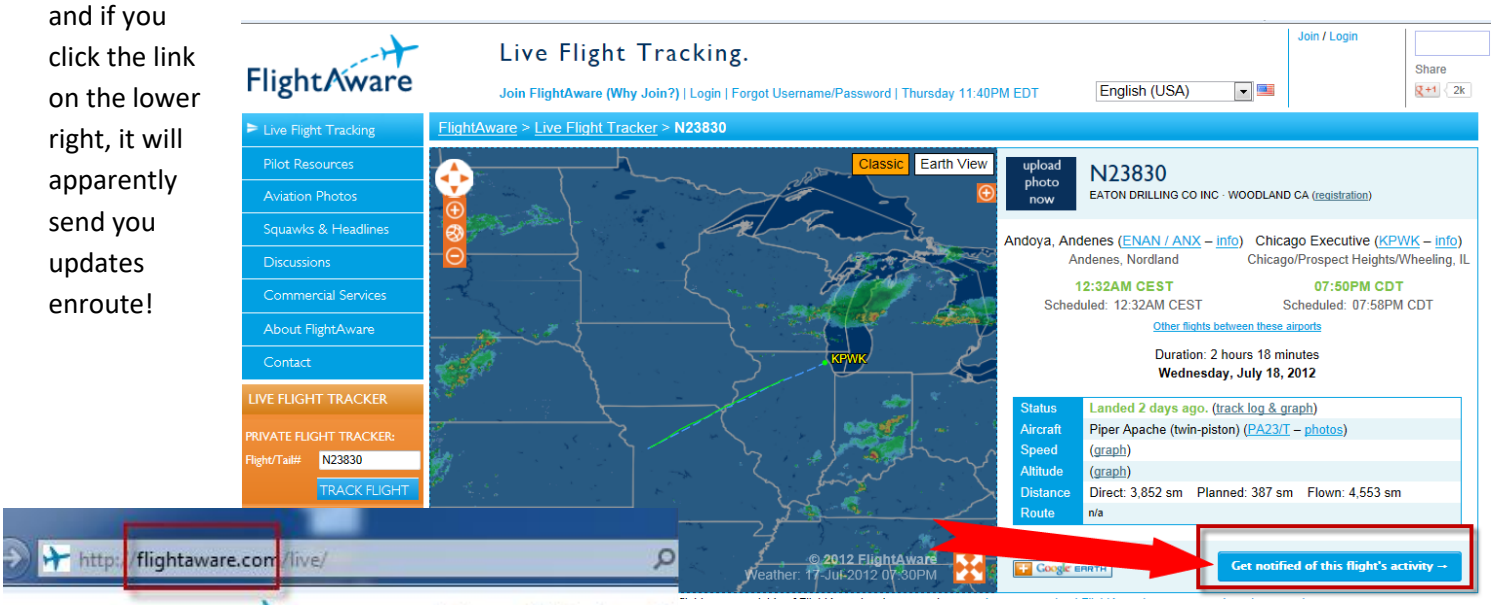
Ground School Notes

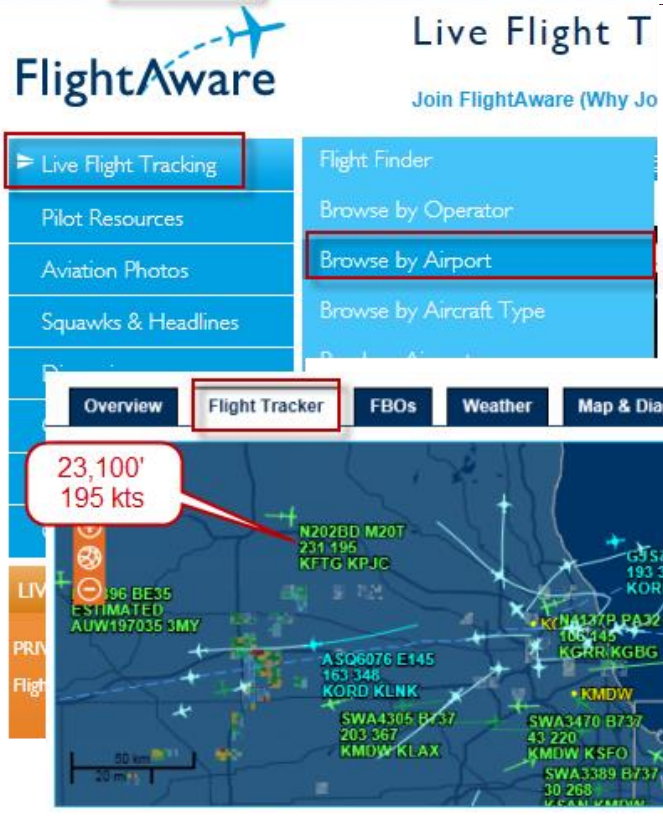
Flight Following on the web

Apparently, when you do Flight Following, your tail number gets tracked and is available online (*most* of the time ....) Here's the link and screen shot of my trip to Topeka!!

http://www.aeroseek.com/webtrax/fboweb.html

(use the 2nd of the two options, and enter: N78HF)
Amazingly, you can Google N78HF and find out at any point in time!
One of the places that seems to be accurate is http://flightaware.com/live/flight/N78HF and if you click the link on the lower right, it will apparently send you updates enroute!





Ground School Notes

FAA PROGRAMS

www.FaaSafety.gov and D:\Users\Personal\Flying\FAA stuff\FAAWingsProgrm.docx

Federal Aviation Administration

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10/20/2012 8:30 AM GL0346650	Understanding TFRs and Airspace **An overview of TFRs and the National Airspace...** This program will look at TFRs and the National Airspace System as it pertains to today's VFR pilot. 1 Credit for Basic Knowledge Topic 3	Free	Schaumburg, IL 33 seats remaining.	15 mi. from 60069
10/26/2012 8:00 AM GL0346649	24 hour ground school in preparation for the Instrument Airman Knowledge Test **Written Test Preparation Course for the...** 24 hour ground school preparation for the Instrument Airman Knowledge Test. There is a cost for this course.... 1 Credit for Basic Knowledge Topic 3	Free	West Chicago, IL 15 seats remaining.	24 mi. from 60069
11/3/2012 9:00 AM GL0346633	iPad and Foreflight Seminar for Beginner, Intermediate and Advanced Users. **iPad and Foreflight for navigation** Use of the iPad and Foreflight for navigation 1 Credit for Advanced Knowledge Topic 2	Free	Lake in the Hills, IL 13 seats remaining.	24 mi. from 60069
11/13/2012 6:30 PM GL1946852	ADS-B Academy **Get the Ins and Outs of ADS-B** The seminar will cover the who, what, when, where and why of ADS-B 1 Credit for Basic Knowledge Topic 3	Free	Chicago, IL 75 seats remaining.	24 mi. from 60069
11/13/2012 7:00 PM GL0346855	Safety Seminar on Advance Preflight **Advance Preflight** Advanced Preflight. Learn how to conducting a preflight that goes beyond the normal	Free	Romeoville, IL	36 mi. from 60069

Chapter 1: Introduction

General aviation[1] (GA) continues to have the highest accident rates within civil aviation. In 2009, GA accident[2] rates per 100,000 flight hours were 4.7 times higher than those for small commuter and air taxi (14 CFR Part 135) operations and over 40 times higher than those for large transport category (14 CFR Part 121) operations.[3] Of the 1,478 GA accidents that occurred in 2009, 465 (31.5 percent) were classified as serious or fatal, resulting in 475 fatally injured and 278 seriously injured occupants.

There are two fundamental ways to reduce the number of injuries and fatalities in GA accidents. The first way is to reduce the number of accidents by making improvements to the aircraft, the flying environment, or pilot performance. The second way is to improve the likelihood that airplane occupants will survive or avoid injury when a crash does occur. As shown in figure 1, rates of both fatal[4] and nonfatal GA accidents per 100,000 flight hours have declined over the past 35 years. Between 1975 and 2009, the fatal accident rate declined by 39.3 percent and the nonfatal accident rate declined by 48.1 percent. In 2009, there were 1.3 fatal and 5.9 nonfatal accidents per 100,000 flight hours.

Although accident rates have decreased, the *proportion* of occupants killed or seriously injured in those GA accidents that occur, shown in figure 2, has changed very little since the early 1980s. In 2009, 18.6 percent of all occupants in GA accidents died, 11.0 percent were seriously injured,[5] 13.4 percent had minor injuries, and 56.9 percent were uninjured.

During the 3-year data collection
(including 88 accidents) involving airbag
of 18 of those events. Ten airbag-equipp
the study criteria and were subjected to
The accidents represented a range of cras
without airbag deployments. There
consequences identified during the st
deployment of the airbag systems did no
deployment may have mitigated the sever

66% - so mild airbag wasn't even needed (Deployed)

22% - so severe that an airbag could not have helped

12% - Window of usefulness.
Have to read the whole report to see how much airbags actually did help in this 12%

Of the 88 accidents involving airbag-equipped airplanes that were identified during the study period, about two-thirds (66 percent) had no airbag deployment and no occupant injuries. An additional 22 percent had reductions in survivable space or crash forces that were not survivable. Therefore, airbags would only have been expected to yield a benefit in a relatively small (12 percent) proportion of accidents. Within that window of accident severity, the NTSB concludes that aviation airbags can mitigate occupant injuries in severe but survivable crashes in which the principal direction of force is longitudinal.

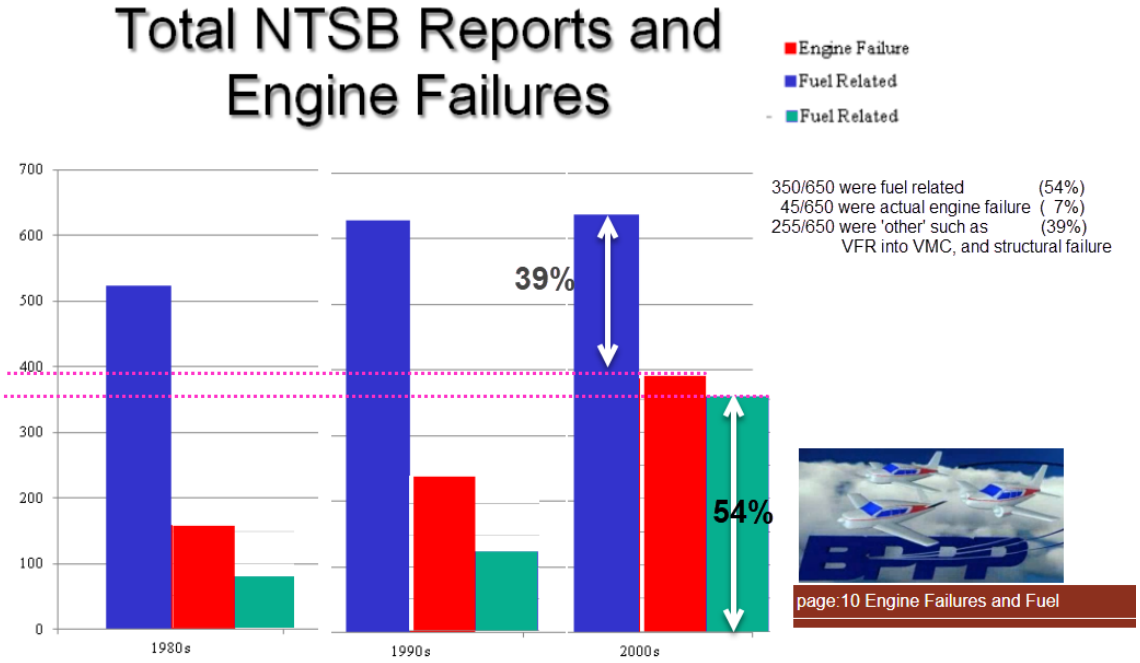
During the course of the study, the study team also discovered several potential issues that may compromise occupant safety associated with the use, adjustment, or design of restraint systems. The report discusses steps that could be taken to address these safety issues and suggests future research directions in the area of GA occupant protection.

Ground School Notes

From Tom Turner
Fatal GA crash causes:

A) Mechanical Failure Overall, 5 – 15% of all crashes.
   a. Engine Historically very few actual mechanical engine failures—most are fuel management related (90% in ABS-type airplanes over the past 15 years). When mechanical engine failures do occur and a crash occurs, it's usually when the pilot stalls trying to stretch a glide or attempting to return to a takeoff runway
   b. Other (e.g., airframe for the most part..) Almost never (except in amateur-built airplanes), and when it does happen, it's the outcome of a loss of control in flight (VFR into IMC, attitude indicator loss in IMC or thunderstorm penetration)—putting it in the "pilot error" column, with the mechanical failure a symptom, not the cause.

B) Pilot Error Overall, 70 – 80% of all crashes
   a. VFR into IMC Not as common as it used to be, but almost universally fatal when it happens. I believe AOPA says VFR into iMC has the greatest likelihood of being fatal, of all accident causes.
   b. Fuel exhaustion Fuel exhaustion and fuel starvation events are split about 50/50 in terms of numbers of mishaps. If a fatality occurs it is usually because the pilot stalls the airplane attempting to reach a landing zone, or in a twin attempts to make a too-rapid return to a runway (in the event one engine starves for fuel).
   c. Fuel Starvation See above



Ground School Notes

December 2017 AOPA

What causes power-loss accidents?

Some surprising stats in FAA study

At the GA Engine Summit, James Gray, an aeronautical engineer in the FAA Engine and Propeller Standards Branch, updated attendees on his study of more than 700 GA power-loss accidents that occurred from 2000 to 2014. There have been 200 to 300 such accidents every year, and roughly one in five have been fatal (about 50 per year). The number of nonfatal power-loss accidents has been slowly declining but the fatal ones have been flat, causing the percentage of fatal accidents to increase in recent years.

As longtime owner of a Cessna 310, I was shocked to learn that the fatal power-loss accident rate for piston twins is more than twice the rate for piston singles. Another shock: The rate of power-loss accidents for Experimentals is six times that of certificated airplanes—but a lot of those accidents have occurred during the initial flight test period, and the Experimental community is working hard to address that problem.

The study shows that most power-loss accidents are caused by fuel problems. During the study period, 128 accidents were caused by fuel starvation, 93 by fuel exhaustion, and 43 by fuel contamination. Another 31 were caused by carburetor problems, mostly carb icing. True mechanical problems were rare: cylinders (23), connecting rods (16), magnetos (16), and fuel pumps (11) topped the list.

While three-quarters of power-loss accidents were caused by pilot misdeeds, maintenance errors also played a nontrivial role. These were classified in the study as overhaul (57), assembly/installation (43), and repair (12). The number of assembly/installation-caused accidents has been decreasing, but the number of overhaul-caused accidents has not. Think about that when you're deciding whether to go past TBO.—*MB*Mike Busch

Mike Busch is an A&P/IA and founder and CEO of Savvy Aircraft Maintenance Management Inc.