



Welcome to the Chapter 770 newsletter. Please share your news and updates from the chapter, upcoming flying events, info and more. If you have flying stories, photos etc to include feel free to send them to etf6911@gmail.com.

UPCOMING EVENTS

Young Eagles Rally : SEP 16, 2023
Chapter Meeting : SEP 21, 2023
Wings And Wheels : SEP 30, 2023

UPCOMING EAA WEBINARS

IAC Aerobatic Center Highlights from Air Venturere 2023	SEP 20	7:00pm
Collision Avoidance in the Traffic Pattern (WINGS)	SEP 27	7:00pm
Fortunate Catch (WINGS)	OCT 4	7:00pm
The Curtiss A-1 Sweetheart	OCT 10	7:00pm
Leaving a Lasting Aviation Legacy	OCT 17	7:00pm
Weather Flying With ForeFlight:Preflight and ADS-B Weather Tips (WINGS)	OCT 18	7:00pm

Register for upcoming webinars at:
www.eaa.org/ea/news-and-publications/ea-webinars

RAY SCHOLAR SOLO!

We have another Chapter 770 Ray Scholar well on his way to his PPL! Here's what Kenny Spaniol had to say about his recent solo...

I am very pleased to announce that I have officially soloed for the first time. The week prior to soloing, I had taken my solo-written exam which cleared me to solo. After passing this exam, it was now a possibility that I would solo some time in the near future. My instructor, who is very knowledgeable and for which I am very grateful for, told me that he wouldn't send me up alone unless it was a clear and calm winded day. It was also important to him that I was feeling alright and I wasn't having an off-day.

On September 8, I pretty much knew that I could very well solo that day. My parents also knew this so they made the drive to Decatur to come see me fly. The nerves were starting to get to me already because I didn't want to mess up especially with my parents there to witness it. When my instructor and I went up he could tell I was nervous because I was forgetting things on checklists. We started to do some touch-and-goes and it didn't start off amazing but once I got settled in I started to do fine on them.

After the touch-and-goes, my instructor said the sentence that I think every pilot in the world remembers which is, "Alright, take me back to the hangar." When I got back my parents were there waiting in the office where

the Decatur Aeroclub does their business. The nerves I felt while watching my instructor fill out the endorsement in my logbook approving me to solo really started to get to me. I could almost compare it to sitting in the locker room before a big football game. You start running every scenario through your head and your heart's beating at a million miles an hour.

My instructor and my parents assured me everything was going to be okay and so with that I hopped back in the Piper Archer and set off. When I got on the runway and applied full power, I think that is when the nerves started to go away. It was just like I had done a bunch of times before and I proceeded flying the plane in accordance with all of my training. After my first touch and go, which was actually one of my best landings, things got a little more difficult.

There was a Skywest CRJ landing on the runway where I was doing my touch-and-goes. This meant the air traffic controller would have to divert me to another runway. After going to the traffic pattern of a neighboring runway, my pattern was really messed up and I realized that once I got onto my final approach. I just turned way too quickly for my crosswind leg. I proceeded to do a go-around just to be safe and to not try to test my piloting limits.

Once I went around in the traffic pattern, the ATC requested I do some 360 degree turns to create spacing for this CRJ that was landing near me. I proceeded to do the 360s until I was cleared to land on the runway and so I tried to get back on my pattern. When I turned final I realized I did it way too late but I thought I

could at least try to see if I could get back on track. I figured I will fly it down to the runway and if it's not looking good, I can just go around.

I got back on track and I felt good about the approach so I landed safely. I did one more touch and go which meant all I had to do was a full stop landing. I did the full stop landing and exited the runway. When I stopped clear of the hold-short line, I took my hands off the yoke to see my hands literally vibrating uncontrollably. I taxied back to the hangar to be greeted again by my instructor and parents. It was awesome having my parents there especially because they were the ones who inspired me into aviation in the first place. Thank you to everyone who gave me this experience from the EAA Chapter 770.

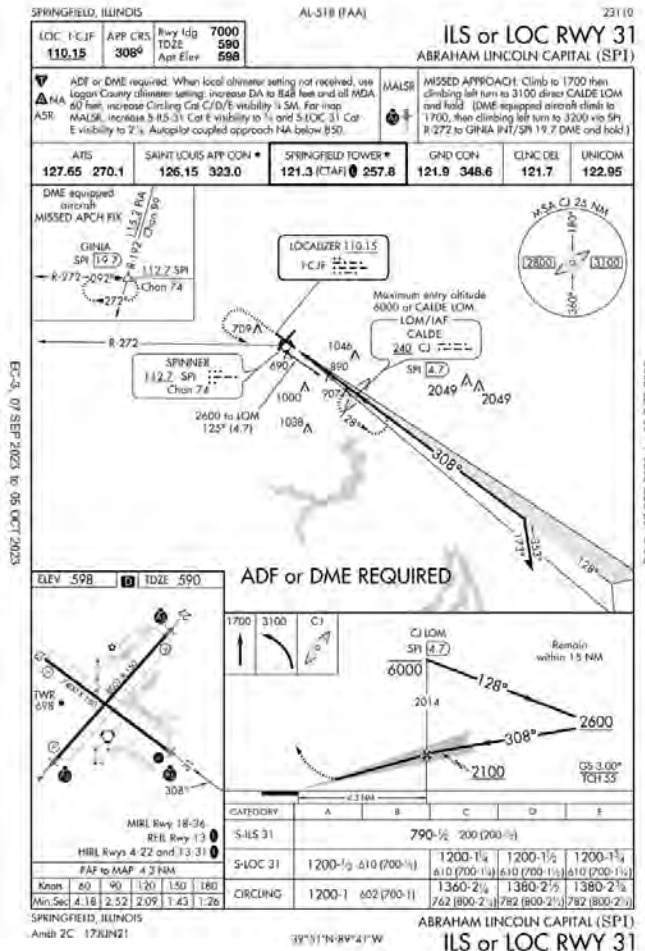


APPROACH PLATES (THE ILS)

by Eric Fromm

The most rewarding aspects of instrument flight, to me, is the approach. You pop out of the soup at minimums, (or your instructor says "ok take the foggles off" and there's a runway perfectly aligned on your nose, the PAPI is bright red over white confirming you're looking good on altitude... but how do you get to that point? You tune in some frequencies and just follow needles?


The FAA, and Jeppesen both publish approach charts that display all of the info required to successfully fly an approach. I'm writing this more from the viewpoint of discussing the chart itself, although we'll talk about what happens during the different phases of the approach and some of the things that will be happening as we fly the approach. This is specifically about an ILS approach. Approach plates for other types of approaches are similar but have their own nuances that we'll discuss in the months to come.



An ILS (Instrument Landing System) approach gives you both lateral and vertical guidance as it uses the localizer (aligned with the runway) and a glideslope (a constant 3ish* path down to the runway).

A localizer approach only gives lateral guidance from the runway centerline and is considered a non precision approach and the descent is handled a little differently as discussed later.

BREIFING AND NOTES

LOC I-C/F 110.15	APP CRS 308°	Rwy Idg 7000 TDZE 590 Apt Elev 598	ILS or LOC RWY 31 ABRAHAM LINCOLN CAPITAL (SPI)			
ADF or DME required. When local altimeter setting not received, use Logan County altimeter setting: increase DA to 848 feet and all MDA 60 feet, increase Circling Cat C/D/E-visibility 1/4 SM. For inop MALS, increase S-ILS-31 Cat E-visibility to 1/4 and S-LOC-31 Cat E-visibility to 2 1/4. Autopilot coupled approach NA below 850.		MALS 	MISSED APPROACH: Climb to 1700 then climbing left turn to 3100 direct CALDE LOM and hold. (DME equipped aircraft climb to 1700, then climbing left turn to 3200 via SPI R-272 to GINIA INT/SPI 19.7 DME end hold.)			
ATIS 127.65 270.1	SAINT LOUIS APP CON * 126.15 323.0	SPRINGFIELD TOWER * 121.3 (CTAF) 257.8	GND CON 121.9 348.6	CINC DEL 121.7	UNICOM 122.95	

The briefing section gives you information related to that approach. The localizer frequency, the actual magnetic approach course the runway is aligned to. As you see here, Runway 31 isn't exactly 310* magnetic, it is actually 308*. Remember runways are usually numbered to the nearest 10*. In some cases at large airports, if there are more than 3 parallels they will be off by at least 10*. O'Hare for instance has 6 parallels. 3 on the north side of the field are 9L/27R, 9C/27C, and 9R/27L, while the parallels to the south are 10L/28R, 10C/28C, and 10R/28L. The actual approach course on 27L is 273* which is the same as for 28C, and all of the other westbound runways.

It gives total runway length, touchdown zone elevation and field elevation. Field elevation is determined by the highest point of the usable runways on the field, and even in flat Central Illinois, we can have differences in this. As you see here the TDZE is 590 while field elevation is 8 ft higher.

The next subsection in the briefing gives the "odd" info or some of the

nuances of the specific approach. We see a T and an A in a black triangle. The T indicates that this airport has IFR takeoff minimums or a departure procedure. The A indicates non standard alternate minimums. Oddly enough you use approach charts for this information while in the flight planning stage. This can tell you if you can use this airport as an alternate on a particular flight based on weather conditions.

You'll notice ADF or DME required. You cannot fly this approach without one and/or the other. As you'll see in the planview, one of these two pieces of equipment are needed to help us determine where we're at on the approach. This section also discusses changing minimums if certain conditions exist, say for instance the AWOS is out and there is no current altimeter setting. It advises to use Logan County altimeter setting and then increase your decision height or minimum descent altitude (discussed later) by so many feet, due to the potential inaccuracy of distance and weather condition differences between here and Logan County.

In the center of the section you'll see a familiar shape, it is what kind of approach lighting system to expect at the end of the runway. Imagine you're flying on a barely minimum day. You're have to have at least the "runway environment" in sight to

continue down from the decision height or the minimum descent altitude. You look out and see a ALSF-2 lighting system. As this approach indicates, you're going to see a MALS (Medium-intensity Approach Lighting System with Runway Alignment Indicator Lights) and a visual description of what it looks like. The ALSF-2 mentioned above is much more intricate and used mostly at larger airports, but for the sake of scenario, lets say you accidentally flew the approach to a parallel runway, this can be an indication you're not landing on the correct runway)

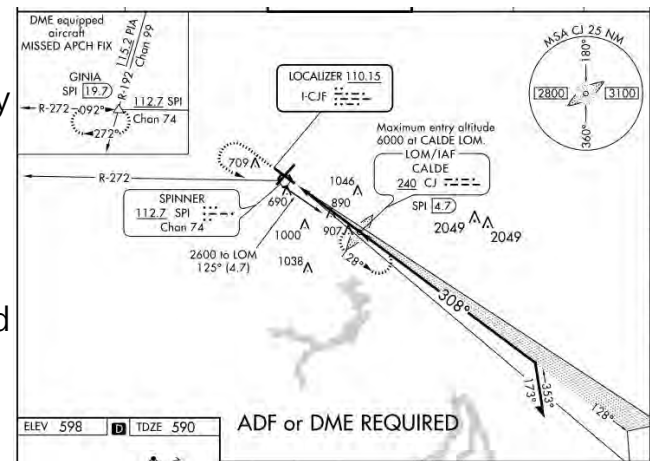
The next section is missed approach procedures. Usually a missed approach will have you climb out and fly to a fix, either an intersection, VOR, or other NAVAID. There are always terrain and obstacle considerations that will dictate how to safely carry this out. Remember you're flying in IMC, there could be a building or radio tower that is 400 ft AGL 2 miles ahead and 10* off the centerline. Without a specific and precise path to the missed approach hold, you could impact the obstacle without seeing it.

As you can see in the ILS/LOC 31 SPI example, this has you flying runway heading until reaching 1700ft and then a climbing left turn to 3100ft to the CALDE LOM. This is the Locating Outer Marker for Runway 31.

(we'll discuss LOMs further along). It is an NDB (non directional beacon) , hence the requirement for ADF (automatic direction finder) equipment. However, it also states if you're DME (distance measuring equipment) equipped, you will fly a different missed approach. You'll fly the same runway heading to 1700 then a climbing turn to 3200ft and outbound on the 272 radial to the GINIA intersection, and hold on the 19.7 DME. (we'll talk about holds someday... they're fun, frustrating, and boring all at the same time, but they're their own topic).

The last row of the briefing section gives all the pertinent frequencies you'll need. ATIS, approach, tower, etc.

PLANVIEW



The planview kind of makes it all make sense. Especially the missed approach instructions. We're looking down on the approach. The long grey and white angled , elongated triangle is the localizer.

The localizer is a set of radio signals

that differ based on left and right of the centerline. Your VOR equipment picks up these signals and the needle on the VOR instrument displays whether you're on course, or left or right of course based on these radio signals. The sensitivity increases as you get closer, and the frequencies are transmitted out at a slight angle as you see on the chart. So if you were to be slightly left of course 15 miles out, you would have a smaller "deflection" than you would at the runway threshold.

A localizer only approach only gives you the lateral guidance to the runway. This means instead of having an instrument indication of your glidepath down to the runway, you will have to rely on a higher minimum altitude in which to decide whether you can continue the approach or go missed approach. This is called a "minimum descent altitude". You cannot go below this altitude while on the approach. Usually prior to the final approach fix you will have a higher minimum altitude to adhere to. Using time from the final approach fix and the appropriate approach category speed you can determine at what point to fly the missed approach. You want to descend to the MDA as soon as possible after passing the final approach fix (unless another step down is required) to give yourself the best

chance to see the runway environment.

An ILS, also having vertical guidance along with lateral, essentially has a fixed path you descend down. It also has an altitude similar to the minimum descent altitude on a non precision approach where you "decide" to go missed approach. It is appropriately called the "decision height". Upon reaching the decision height, if you see the runway environment (pavement, lights, approach lighting), you can continue descending, if not you must fly the missed approach.

The bold black line in the planview is the final approach course. As you can see it is 308* magnetic. There is a 45* angled barb at the approach end of the course. This indicates the procedure turn you could fly to do what is called a "course reversal". When flying with ATC service, usually you will get vectored to this area to get established on the approach "straight in" meaning they will vector you to a heading that is usually 30* to the final approach course. When operating without ATC services (usually after hours or a airport without approach control service) it is necessary to get established by flying to an IAF (initial approach fix). There can be several, usually on GPS approaches you will find them beyond the end of the approach and they allow you to make a straight in

approach, however many NDB, VOR, and LOC/ILS approaches require you to fly to a Initial approach fix that is usually the final approach fix inbound.

Notice the ellipse with the header for CALDE. This is the CALDE NDB and it is located near and behind the old Kmart on Clear Lake Avenue. This serves as the IAF and what is known as the FAF (which will be discussed in a moment. You'll also notice a dashed racetrack pattern, the dashed patterns are the missed approach procedures. Remember in the briefing section it said if you have ADF equipment you fly the hold at CALDE since it is an NDB. This will be where you hold if you go missed.

To get back to the procedure turn. Lets assume you are flying in from Burlington IA which is northwest of Springfield. Notice it says the maximum entry altitude is 6000. This could be due to the navigation signal reception from CALDE at higher altitudes. You're obviously going the wrong direction to land on Runway 31. You have to perform a course reversal. In the clouds a 45* descending turn to probably wouldn't be the safest way to get turned around into a stable approach. So you would fly to CALDE NDB initially. Upon reaching CALDE you would turn outbound (fly opposite) the final approach course, 128*. The amount of time you fly outbound is your discretion as

long as you can perform the procedure turn (turn around) within , well, take a look at the top right hand corner of the planview. There is a circle there that says MSA CJ 25. These are the minimum sector altitudes for a 25NM radius around CALDE. An MSA guarantees 1000ft over any obstacles.

Sometimes a minimum sector altitude is also in place for radio reception , if there are mountains or other obstacles in the way of the radio signals. If you drew a north south (360-180*) line through CALDE you would have a western and eastern sector. The numbers in the boxes indicate the lowest safe altitude in the area relative to the NDB.

In our case we are flying southeast bound past CALDE so we are going to have to be at, at least 3100ft. We can do our procedure turn anywhere within that 25mi ring around CALDE as long as we are above that altitude. Presumably the higher altitude east of CALDE is because of the TV towers at Mechanicsburg that show as the twin towers at 2049msl on the planview.

The barb indicates a standard 45* turn to the right to begin the procedure turn. The time you fly outbound on the 45* is dependent on your groundspeed. Usually 1 minute is enough then begin a standard rate turn (all instrument flying is in standard and half standard rate turns to maintain stability and ATC expectations of timing).

Since you're performing a standard rate turn looking good.

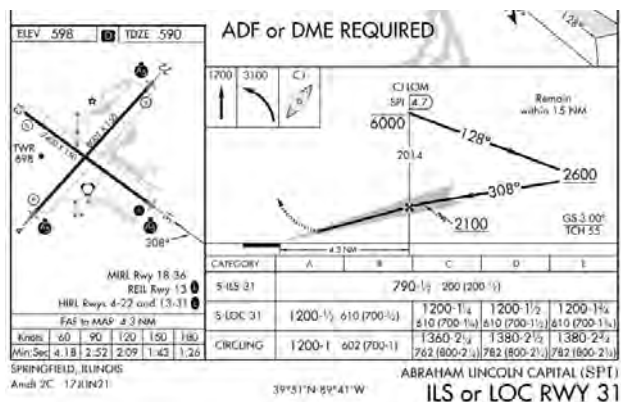
to the left (a 360* standard rate turn is 2 minutes, therefore your turn should take 1 minute. This will have you flying the opposite direction and approximately 30* from the final approach course which allows you to get established in a stable manner and should come pretty close to a minute after wings level from the procedure turn. Keep in mind you'll need to calculate wind correction angles to make the procedure turn work effectively.

The 45* procedure turn is what is published however there are other ways to do it. Some fly a 90*/270* where you initially turn 90* fly outbound for a minute and then a constant turn 270* back inbound. This is acceptable as well as long as you stay within the 25NM ring from CALDE.

So as we're flying inbound from our procedure turn and looking good, the VOR needle (if we're tuned correctly to the 110.15 for the ILS freq, and have identified it via the morse code identifier) should be to our right. As it starts coming in towards center, we are approaching the final approach course. We will begin turning to final approach and if done correctly (and absent any wind) we will level off on a 308* heading as the needle centers. Lets hit pause on this flight really quick, remember we have just intercepted the localizer and are lined up

We're going to need the bottom of the chart here, and in all reality we would've already briefed the approach and had all this information by this point but for explanation sake,

AIRPORT DIAGRAM, PROFILE VIEW AND MINIMUMS



here you have 3 sections. The airport diagram is the same one from the Airport Facilities Directory /AF/D with the exception of that arrow pointing to 31. The arrow indicates how the approach is aligned with the runway. Some VOR and more obscure types of approaches might not be lined up with the runway at all. Consider an airport in a canyon.. you might have to fly to a localizer like device and then turn to the final approach. In our case the ILS brings us right down the centerline.

The graphical depiction to the right is the "profile view" . This shows us the minimum altitudes we can fly in different segments of the approach. Remember as we were inbound to CALDE as an initial

approach fix (heading towards it from Burlington) , the profile view states we can fly to it at or below 6000ft as indicated by the line above "6000" . After passing CALDE it shows we can descend to as low as 2600 as indicated by the line below 2600. Don't forget we have a minimum sector altitude of 3100 east of CALDE however. Depending on aircraft performance you might fly at 3100 until inbound on the procedure turn.

So lets unpause our flight, and we are established on final. We're at 2600 ft at 5 miles from CALDE. On the profile view, we see we can now descend down to 2100. The maltese cross ahead of us indicates the glideslope intercept point. As of now the glideslope is above us. For stability concerns we want to intercept the glideslope from under, meaning it will come down to us. The glideslope intercept is also right at CALDE. By the way, since CALDE is an NDB, we are required to identify it by continuous identification meaning we have to have the audio on for our NAV radio to be able to hear the morse code at all times since the signal can be inaccurate at times. So we have the constant morsecode in our ears telling us the NDB signal is the correct NDB and that we are receiving it. (A VOR LOC/ILS only has to be identified by morse code and then you can turn it off).

We're also going to have our audible marker beacons turned on. As we pass over CALDE we are going to hear a slow "BEEP BEEP BEEP" and our blue outermarker light will flash or illuminate. Since this is where we intercept the glideslope, this will be a good reminder to be ready to start flying the glideslope down. There are also some "checks" to do at this point. The 5 T's is a good way to remember them. Time, Turn, Twist, Throttle Talk.

Time-You immediately want to set the time on the clock/stopwatch first. As you'll see in a moment, timing is very important.

Turn- is there a change in course at all? We want to be perfectly stable on the approach at this point.

Twist -do you need to change a NAVAID setting?

Throttle- we are intercepting the glideslope and going into a descent to ride it down, so we are going to reduce our power setting to give us the proper descent rate and airspeed.

Talk- at a non towered airport this is a good time to get on CTAF and advise you're straight in on final. If at a towered airport, you'll usually report crossing "CALDE and this is usually when you'll get a landing clearance. Of course its not "station passage" until the GPS says you've passed it.

If you're still ADF equipped actual station passage at CALDE is when the needle does a full reversal... the needle should be pointing to the station with the proper wind correction angle, and it will reverse to behind you.

Back to the profile view on the chart, there is a line going straight down through the maltese cross. At the top there is an encircled 4.7. That indicates CALDE is 4.7 from the SPINNER VOR. At the bottom of the profile view there is another distance, showing 4.3 to the runway threshold which is indicated by the thick black line it points to.

As we continue down the glideslope (and of course centered on the localizer) it doesn't tell us any more altitudes to descend to. Can we just fly it down to the runway since we have glideslope indication and it will take us all the way down? Actually that's where the next section comes in. The minimums section.

The minimum section is made up into a grid. This indicates minimum altitudes you can descend to based on both the type of approach you're flying as well as your aircraft's speed by category.

The first column is the type of approach you're flying. "S-" means straight in, so the first is the straight in ILS, and it has the lowest minimums because

you're using both localizer and glideslope. The next is a straight in localizer. Since you're not using glideslope your minimums will be higher. The third is "circling". A circling approach is an approach in which you fly a particular approach to another runway. Lets say that 31 is closed. You can still fly the ILS-31 but you'll be circling to another runway to land. You have to remain clear of clouds (obviously) and have to have constant sight of the ground. You're also required to complete your pattern within a certain radius from the runway.

The row on top, A, B, C, D, and E are approach speed categories. The speeds are based on indicated. They include final approach speed, missed approach speeds etc, but for simplicity lets just focus on the final approach speed. A is 91kts or less, so most of us in 172s, Warriors etc would use the minimums in A. B is 91-120, C is 121-140, D is 141-165 and E is 166-210.

Since we're in a good ol' Warrior, we're looking at category A. We're flying a straight in ILS so our minimums are 790MSL and ½mi. The parentheses give it to us in AGL and are standard minimums of 200AGL and 1/2mi.

So as we descend down the glideslope we are looking for the runway environment. Approach lights, runway lights, the actual runway pavement. If we

don't see any of that at 790ft indicated, we have to begin our missed approach. By comparison you can see that not having the glideslope or circling, raises that minimum altitude by a lot, which could be the difference in seeing the runway environment or not.

Back to the profile view, we're at our DH (decision height) and we can't see the runway environment, we have to go missed. Now when we briefed the approach prior to flying it we told ourselves and other crew members (if they're with us) what we're doing in the missed, and it should still be on your mind, however there is a lot going on flying an approach so if you need a refresher, it tells you in the corner of the profile view.

The three boxes tell you to climb, to turn and where to go. The first tells us fly straight ahead and climb to 1700, and the next tells us continue climbing to 3100 in a left turn, and the third tells us to go back to CALDE where we will hold and await further instructions. We'll fly to CALDE with our ADF, and point the needle at CALDE with a wind correction angle and then use the proper hold entry (probably an upcoming newsletter topic) to enter the hold after passing CALDE. Remember we have 2 missed approach options based on equipment on board. This missed approach

in the profile view is if we have ADF equipment and can use the NDB at CALDE to hold. If we have DME we're going to GINIA intersection which was displayed in the planview and briefing sections.

If we're flying the missed with DME and not ADF, we're going to climb to 1300 which is the same, and then a left turn to 3200 and fly to GINIA intersection. We'll use the 272* radial from SPINNER VOR. To identify GINIA though we'll need to use the 192* radial from the PIA VOR as indicated on the planview. Once we get to GINIA, as we had to with CALDE, we're going opposite the hold. As you can see in the hold (the dashed lines in a racetrack shape) it has arrows showing the direction of the hold and the headings on the inbound and outbound legs, 092 inbound and 272 outbound. We're again going to have to do a course reversal to enter the hold and will need to use the proper hold entry to get established in the hold. This entry will be called a "parallel" entry but we'll talk about holds one of these months.

Eventually you'll get clearance to try the approach again. In the real world, typically if you do go missed, ATC will give you vectors to final or an initial approach fix to try the approach again, or you may opt to divert to your alternate if you didn't like the way it looked. I described the "full

published missed” which you'll hear a lot of training flights request when practicing approaches. There are times you'll fly these so you need to be proficient on them.

This probably seemed pretty wordy, but fly some ILS's or other approaches with an instructor and after flying a few they're pretty challenging at first, but they are a lot of fun, and nothing beats pulling those foggles off, or punching out of a cloud and seeing a nice big lit runway just where it should be out the windscreen.

FALL YOUNG EAGLES RALLY

We finally got some decent weather for a Young Eagles Rally at SPI on Saturday September 16th. Thanks to Steve Cook for sharing these photos of some of the Young Eagles he took up that day...

