Instrument Flight Rule (IFR) Tutorial for flying on VATSIM

The purpose of this document is to provide a basic tutorial for Atlantic Sun Pilots to fly confidently on VATSIM. It will outline air traffic control procedures and phraseology as accepted within the VATSIM community.

Disclaimer: I do not claim to be an authority of any kind, I just want to help my fellow ASA pilots and share what I have learnt. If anything mentioned in this document is incorrect or misleading I accept no liability. Vishan Poonan DEN0179. vishan@xtra.co.nz

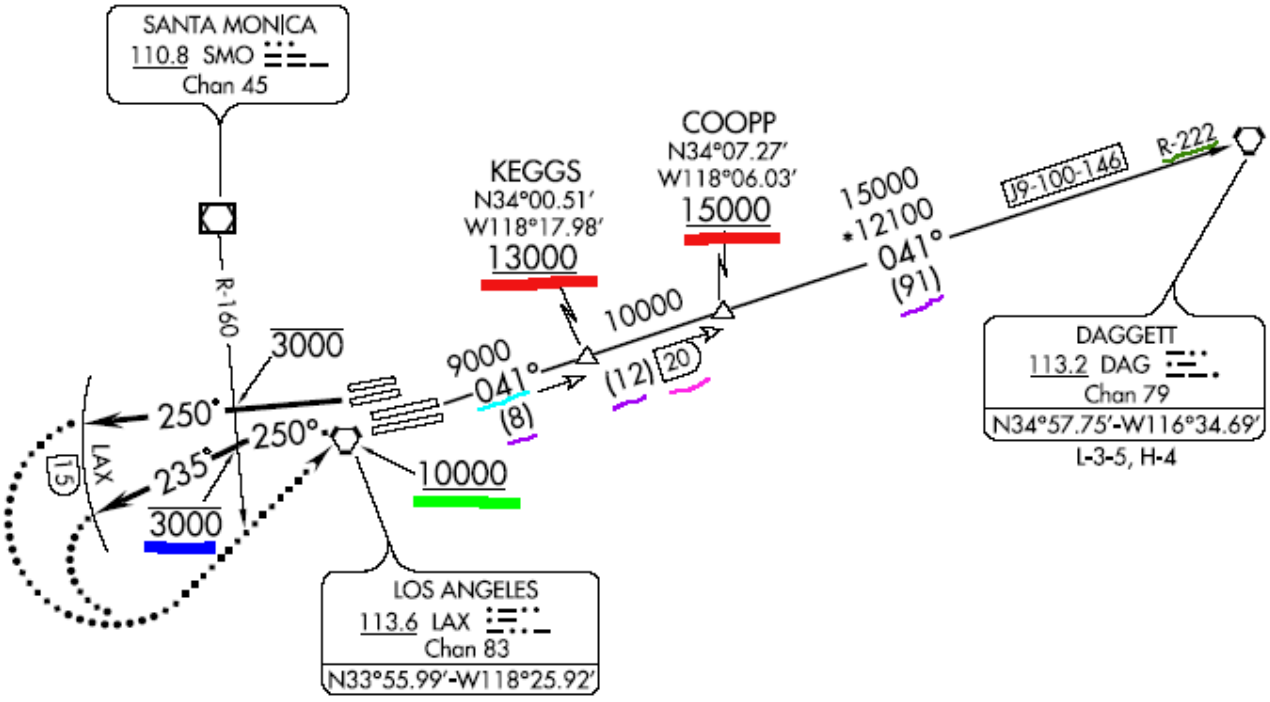
For the purpose of this tutorial we will follow a typical IFR flight from Los Angeles (KLAX) to Las Vegas (KLAS).

Here is the flight plan we will use:

LOOP4.DAG CLARR.CLARR2

The first step is to understand this simple flight plan.

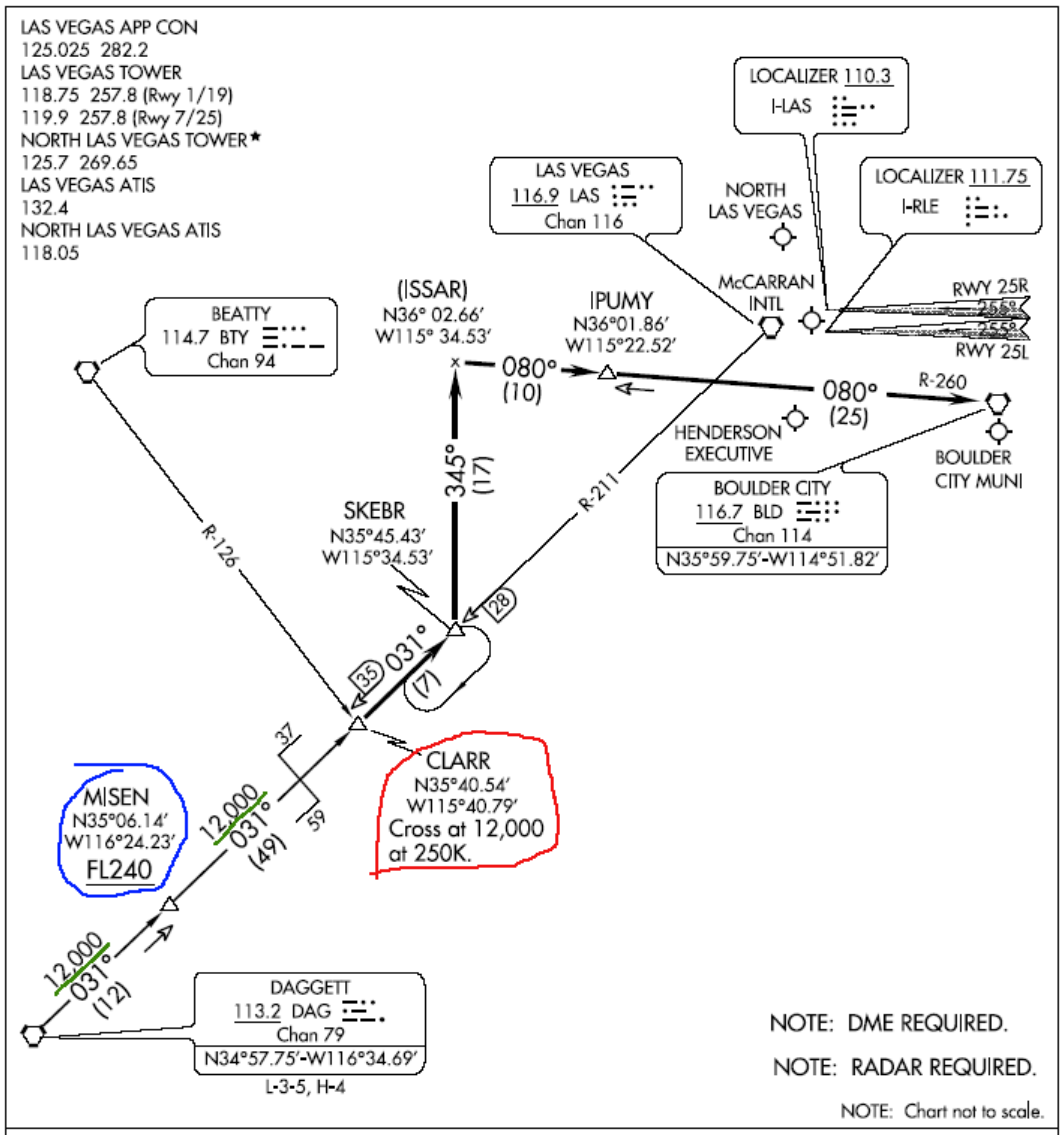
LOOP4 is the Standard Instrument Departure or SID, nowadays known as Departure Procedure or DP. The .DAG means we will be using the DAG transition. This means we will fly the LOOP4 DP for the DAGGETT VORTAC transition. Some DPs have many transitions available but we won't get into that here. Let's have a look at the LOOP4 chart. If you don't have it, go to http://www.myairplane.com/databases/approach/index.php and download it. This site is an excellent place to download charts from. Ok so you have you chart in front of you, there is a lot of information on all charts, but when you break it down, they are quite simple to read. Let's focus on the main graphical section first.



Quite self explanatory but let's talk through it. Firstly this DP is used when LAX is departing to the west, you can see this as there are no thick lines with arrows pointing from the eastbound runways. Always good to get the ATIS from the controller so you know the active departure runways. Let's assume you will be departing from one of the 25 runways, one of the southern two runways that is. Ok, after departure fly runway heading until you intercept the SMO VOR 160 radial (I normally tune SMO into my NAV2), then turn left heading 235 until you are 15 DME from LAX VOR. (I normally tune LAX into my NAV1). Now an important note here is what I underlined in blue. Notice the horizontal line ABOVE the 3000? This means you must be at or below 3000 feet MSL during this phase of the DP. OK, once you are 15 DME LAX, at or below 3000MSL make a left turn direct to the LAX VOR. (The departure controller most likely would have turned you before 15 DME LAX). Now move your attention to the LAX VOR, notice the horizontal line UNDER the 10000 which is pointing to the LAX VOR? This means that you must cross LAX at or above 10000MSL. So we now know that the left turn we started at 15 DME LAX (or thereabouts) is a climbing left turn. Now we are to track the LAX VOR outbound on a 041 radial. Notice again two more altitude restrictions at KEGGS and again at COOP. The horizontal line is under the altitude which mean we must cross these intersections at or above, 13000MSL at KEGGS and 15000MSL at COOP. This gives keeps us out of the Los Angeles class BRAVO airspace and as such, gives us plenty of separation from aircraft on approach.

OK before we get ahead of ourselves have a look at the number I have underlined in purple, these numbers indicate the distance between two segments on the chart, the first one, 8 tells us that there is 8NM between LAX VOR and the KEGGS intersection or ISEC. Notice how the small arrow points to and stops at KEGGS? The next segment tells us there is 12NM from KEGGS ISEC to the COOPP ISEC. Pretty straight forward. Now notice the symbol and number underlined in pink. This tells us that there is a VOR somewhere back along this path, so if we follow the path back, we find of course, the LAX VOR. So, COOPP is 20NM from LAX. So, you don't need a GPS or FSAV to know when you are passing COOP as COOP is 20 DME LAX R-041. Ok so now we are passed COOPP and climbing to our cruise altitude, we may as well tune the DAGGETT VOR into our NAV1 and track it inbound on a 222 radial as indicated. That's it, the Los Angeles LOOP4 departure procedure. Now this chart also has a departure route description and many charts do, if you read it, you will notice it is an abbreviated version of what I have said above.

Ok so we have finished the DP. Now we need to plan for our arrival into KLAS, so reach under your left seat and pull out the CLARR2 Arrival.



Ok so quite simple, we fly the DAGGETT VOR outbound on a 031 radial. Notice the MEAs, the Minimum Enroute altitudes underlined in green? Never fly below the MEA, they are there for a reason, mostly to ensure separation from terrain and other enroute aircraft. All STARs have a main ISEC or VOR this is where the name comes from. In this case, the main ISEC is CLARR. Notice the altitude and speed restriction associated with CLARR? I circled it in red. This tells us we must cross CLARR at 12000MSL and 250KIAS. Simple right? OK at this point you probably want to tune your NAV2 radio to 116.9, this is the LAS VOR.

Maintain the 031 heading until you are 28DME LAS then turn left heading 345. While heading 345 tune your NAV1 radio to the BLD VOR 116.70 and set course to 080. Quite straight forward from here, all you have to do now is fly the BLD VOR inbound on a 080 radial and you will get vectors to the final approach from there.

Ok now before we get onto the Instrument Approach Chart let go through some radiotelephony work. For the purpose of this tutorial we will assume that ALL ATC positions are online, DEL, GND, TWR, DEP, APP and CTR. Pilot communications will be in BLUE and controller communication will be in RED. Notes will be in GREEN.

Ok so, you are on the tarmac at Los Angeles, make sure you are squawking standby otherwise you will be a big blip on the CTR controller's radar and he doesn't need to know who and where you are just yet. So the first thing to do is file you flight plan LOOP4.DAG CLARR.CLARR2, and then get clearance to KLAS. So we tune in LAS_DEL (normally 124.10) and request clearance.

Disclaimer: Ok another small disclaimer before I continue. The following section on radiotelephony is my take on how things should be. Many people say different things different ways but they all achieve the same result. You may choose to follow this or not, up to you. Vishan Poonan DEN0179. vishan@xtra.co.nz

Los Angeles Delivery Atlantic Sun seventeen ninety four request clearance to Las Vegas.
Feel free to throw in a good morning, afternoon, evening, but other than that don't get too personal. Air traffic control is serious stuff and keeping it professional is key and most controllers will love you for it.

Atlantic Sun seventeen ninety four Los Angeles Delievery clearance on request standby.
You don't need to acknowledge this, just wait and be ready to copy the clearance.

Atlantic Sun seventeen ninety four cleared to Las Vegas airport via the Loop4 departure Daggett transition then as filed, maintain five thousand expect flight level two six zero five minutes after departure, departure frequency one two four point three zero squawk two four six one.
Read this back VERBATIM.

Atlantic Sun seventeen ninety four is cleared to Las Vegas airport via the loop4 departure Daggett transition then as filed, maintain five thousand expect flight level two six zero five minutes after departure, departure frequency one two four point three zero squawk two four six one.

Atlantic Sun seventeen ninety four read back correct contact ground one two six point five zero.

Ground on one two six point five zero Atlantic Sun seventeen ninety four.

Now before we carry on, just a quick pointer on etiquette. As you know pilots are required to read back generally every instruction from controllers, this is so the controller knows that the PIC has received and understand the instruction. So for example, if you hear a controller issue and instruction, wait for about 5 seconds for the PIC to respond. Otherwise you are simply interrupting and may transmit at the same time as the other pilot. And that is a big no no. So wait for the other pilot to read back then say your request. Or if the other pilot has not responded in five seconds, just say your request, the other guy missed out.

Ok back to Ground

Los Angeles Ground Atlantic Sun seventeen ninety four ready for taxi.
Don't ask for clearance to push and start.

Atlantic Sun seventeen ninety four altimeter three zero zero one winds two four zero at one zero taxi to runway two five right via charlie charlie five bravo foxtrot.
Read back except for winds and altimeter.

Runway two five right via charlie charlie five bravo foxtrot Atlantic Sun seventeen ninety four.
When you near the active you will get a handoff to tower

Atlantic Sun seventeen ninety four contact the tower one two zero point niner five.

Tower on one two zero point niner five Atlantic Sun seventeen ninety four.

Los Angeles Tower Atlantic Sun seventeen ninety four holding two five right ready for departure.

Atlantic Sun seventeen ninety four Los Angeles Tower runway two five right position and hold

Runway two five right position and hold Atlantic Sun seventeen ninety four

Atlantic Sun seventeen ninety four winds two four zero at one zero runway two five cleared for takeoff

Cleared for takeoff Atlantic Sun seventeen ninety four
After takeoff you will be handed to the departure controller.

Atlantic Sun seventeen ninety four contact Socal (Southern California) Departure one two four point three zero.

Socal Departure one two four point three zero Atlantic Sun seventeen ninety four.

Socal Departure Atlantic Sun seventeen ninety four with you passing one thousand five hundred for five thousand.

Atlantic Sun seventeen ninety four Socal Departure radar contact one thousand six hundred turn left direct Los Angeles resume the loop four departure comply with restrictions climb and maintain one five thousand.
The “comply with restrictions” is the controllers way to emphasise crossing LAX VOR at 10000MSL etc, as published on the chart.

Left direct Los Angeles climb and maintain one five thousand resume the departure Atlantic Sun seventeen ninety four.
At around 10000MSL you’ll be handed to Los Angeles Centre.

Atlantic Sun seventeen ninety four contact Los Angeles Centre one two five point eight zero.

Twenty five point eight Atlantic Sun seventeen ninety four.

Los Angeles Centre Atlantic Sun seventeen ninety four with you passing one one thousand for one five thousand.

Atlantic Sun seventeen ninety four Los Angeles Centre climb and maintain flight level two six zero.
In the USA, flight levels start at 19000. So 16000 17000 18000 FL190 FL200 FL210 etc. Additionally, for your information, east bound flights are odd altitudes and FLs such as 15000, 17000, FL190, FL210 etc. West bound flights are even altitudes and FLs such as 16000, 18000, FL200 FL220 etc. Be sure to file the correct altitude based on the direction of your flight.

Ok so now you are pretty much enroute and the Centre controller will pretty much leave you alone until you near or around the first transition on your STAR. I our case it’s the DAGGET VOR.

Atlantic Sun seventeen ninety four cross CLARR at and maintain one three thousand two five zero knots. Las Vegas altimeter two niner niner six.
Remember to cross MISEN at or above FL240 as published. Now I know you are thinking, but the chart says 12000 at CLARR, well, you are correct, but the controllers can instruct you otherwise and for reasons you don’t always need to know.

CLARR at and maintain one three thousand two five zero knots roger Atlantic Sun seventeen ninety four.
Just thought I'd throw the "roger" in. ☺

Around CLARR you'll be handed to Las Vegas App.

Atlantic Sun seventeen ninety four contact Las Vegas Approach one two seven point one five.

Twenty seven point one five Atlantic Sun seventeen ninety four.

Las Vegas Approach Atlantic Sun seventeen ninety four with you one three thousand.

Atlantic Sun seventeen ninety four Las Vegas Approach altimeter two niner niner six expect vectors ILS runway 25L approach.

ILS 25L Atlantic Sun seventeen ninety four.
So you are still flying the STAR somewhere during your inbound to BLD you'll get a descent to 8000.

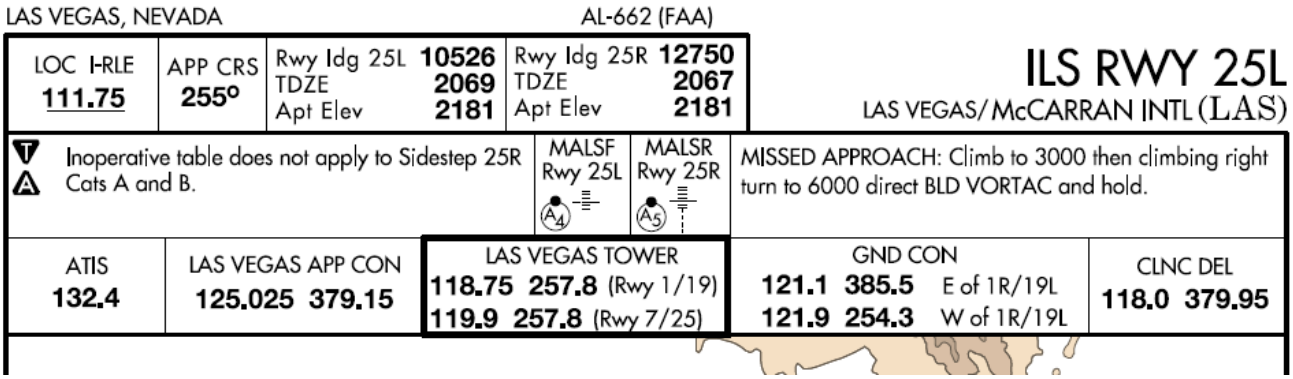
Atlantic Sun seventeen ninety four descend and maintain eight thousand.

Eight thousand Atlantic Sun seventeen ninety four.

Atlantic Sun seventeen ninety four descend and maintain six thousand.

Six thousand Atlantic Sun seventeen ninety four.
OK let's pause for a moment. It's now time to review the IAP (Instrument Approach Plate) for ILS 25L…

Instrument Approach Plates generally consist of three sections, I'm not sure what they are officially called. So I will call them the top section, the main section and the bottom section. ☺



I'm just going to go over the basics of the chart…

LOC = the localiser frequency and the identifier.

APP CRS = the approach course for the runway

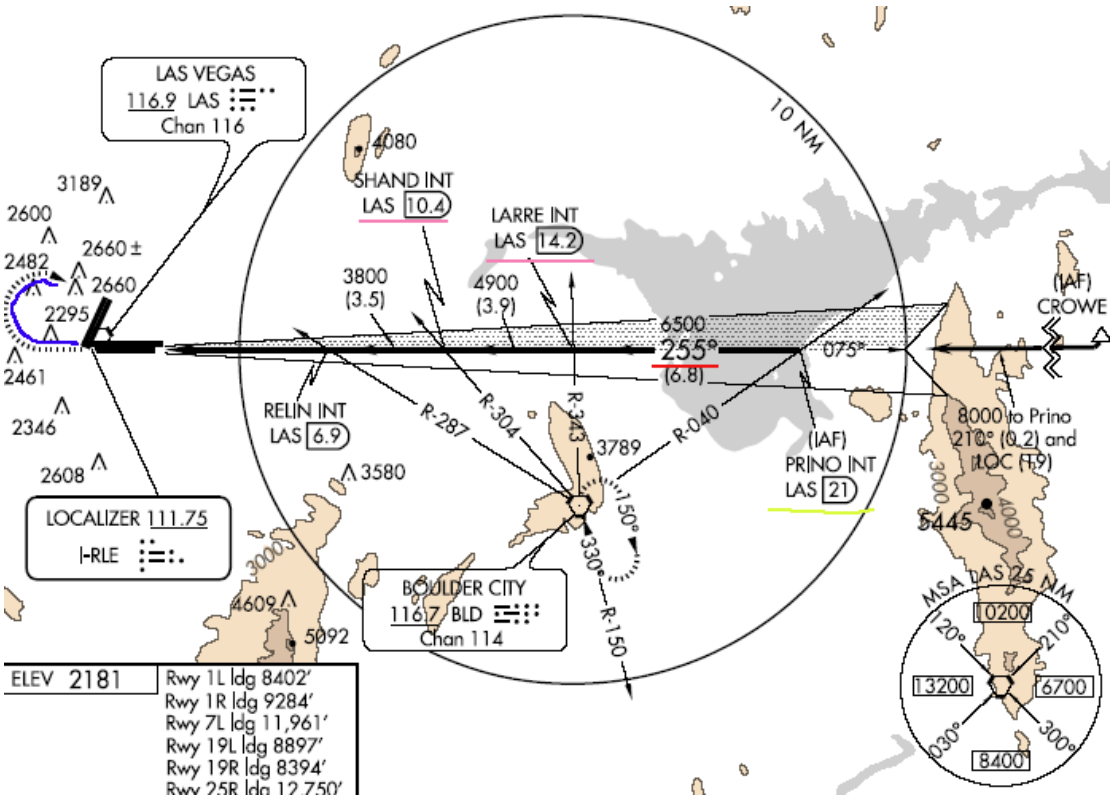
RWY LDG = the runway length

TDZE = Touchdown Zone Elevation – this the height in MSL of the landing threshold

APT ELEV = the general elevation of the airport

There is always missed approach descriptor in this section, in this case the missed approach tells us to fly runway heading climb to 3000 then turn right climbing to 6000 direct to BLD VOR and hold.

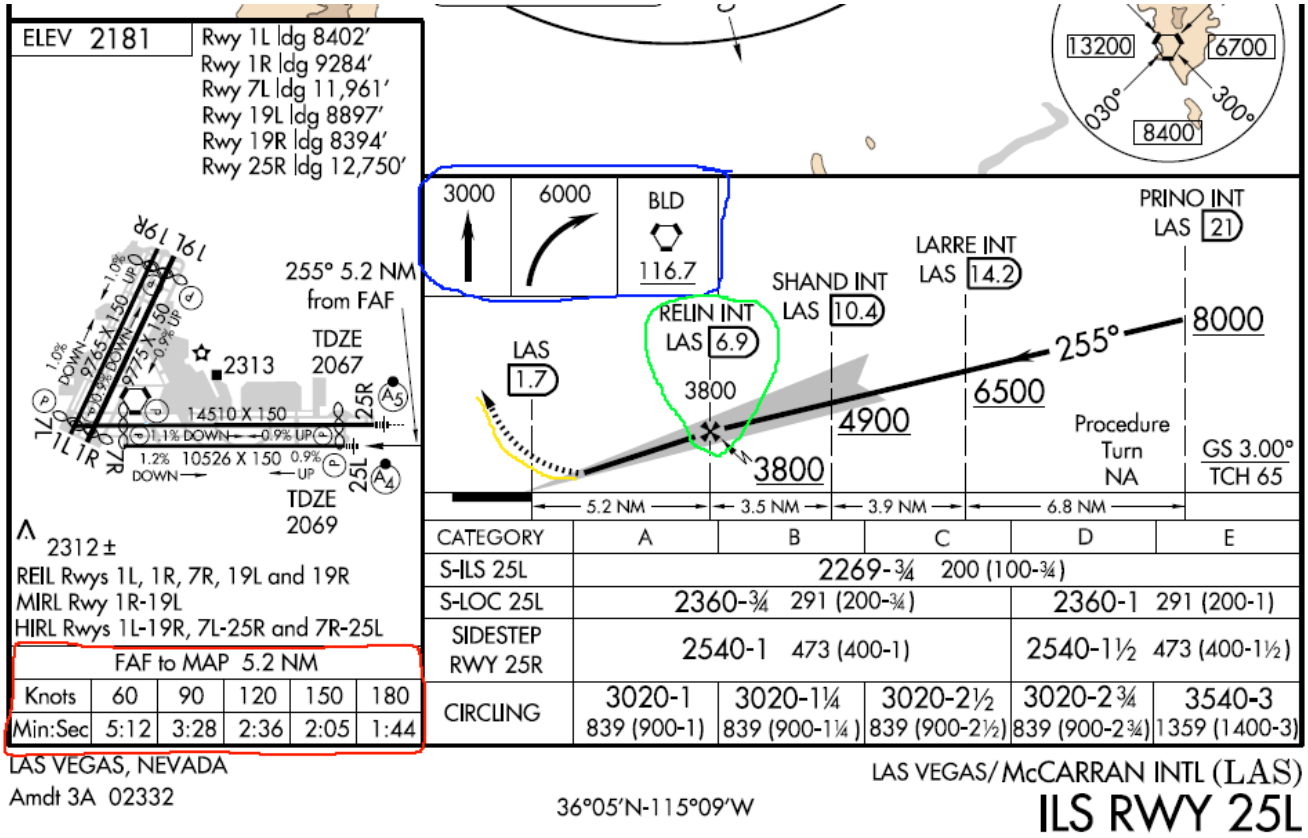
OK now for the main section:



This is essentially a lateral, graphical representation of the approach. It shows you almost everything you need to know.

It gives you and idea of the missed approach procedure, fly runway heading then a right turn.
It also shows you frequencies and distances between the fixes on the approach.
Another interesting piece of information is the MSA (Minimum Safe Altitude) section. Look at the circle in the bottom right corner, this is telling is that the minimum safe altitudes, 25NM around the LAS VOR are:
10,200 feet between radials 120 and 210
6700 feet between radials 210 and 300
8400 feet between radial 300 and 030
and 13,200 feet between radials 030 and 120

It's pretty self explanatory so I'm not going to say any more about this section, let's move on:



The bottom section has some important stuff. The vertical planning section shows you the altitudes you can expect at each fix to intercept the glide slope. 8000 at PRINO 6500 at LARRE 4900 at SHAND etc. It also shows that the glide slope should become active just before you hit SHANND, around 11 DME LAS.

Circled in green is the FAF, the final approach fix. We know it's the FAF due to the little star symbol on the glide path. This is the intersection at which you must already be established on both the localiser and the glide slope. The controller must vector you to intercept the ILS before this fix. The dashed line highlighted in yellow show the MAP (Missed Approach Point) this is the point at which if you do not see the runway or the runway lights, you must execute a missed approach. On this chart the MAP is about 1.2NM.

Circled in blue is again, our missed approach procedure except this time it's graphical. The straight up arrow and 3000, means fly runway heading to 3000 feet. The next symbol shows at arrow curving to the right and 6000 indicating a climbing right turn to 6000 feet. The next symbol is the BLD VOR. So, just as we read from the top section of the chart. Fly runway heading climb to 3000 then turn right climbing to 6000 direct to BLD VOR and hold.

Circled in red is when you can expect to reach the MAP. Let's say we are in a heavy 738 and our approach speed is 150kts. This section tells us that given that speed after the FAF which is RELIN we will hit the MAP in 2 minutes and 5 seconds. If we don't see the runway or runway lights by then, we go missed approach.

Let's get back to our flight. Ok so we are at 6000 feet heading 080. Around 20DME LAS we will get our ILS Approach clearance.

Atlantic Sun seventeen ninety four one five miles from RELIN turn left heading two eight five maintain six thousand until established cleared ILS runway two five left approach.

Turn left heading two eight five maintain six thousand until established cleared ILS runway two five left approach Atlantic Sun seventeen ninety four.

Atlantic Sun seventeen ninety four contact McCarran Tower one one niner point niner

McCarran Tower Atlantic Sun seventeen ninety four.

McCarran Tower Atlantic Sun seventeen ninety four one zero mile final runway two five left.

Atlantic Sun seventeen ninety four McCarran Tower winds calm runway 25 left cleared to land.

Cleared to land Atlantic Sun seventeen ninety four.

Atlantic Sun seventeen ninety four welcome to Las Vegas exit the runway to your right when able, contact ground one two one point one.

Over to ground or Atlantic Sun seventeen ninety four.

McCarran Ground Atlantic Sun seventeen ninety four clear of two five left request taxi.

Atlantic Sun seventeen ninety four McCarran Ground cross two five right taxi to the gate remain this frequency.

To the gate Atlantic Sun seventeen ninety four.

Ok that's it you're parked at the gate, no need to request flight plan closure or permission to shut down.

Well I hope you enjoyed this tutorial and that it helps you improve your online flying experience. Your next task is to fly this flight and others, without using FSNAV or GPS, just use your charts and instruments. You'll love it and remember:

Aviate – Navigate – Communicate – in that order.

Blue Skies,

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