# Table of Contents

How to Read Charts ..................................................................................................... 3

Airport Diagrams .......................................................................................................... 4
  Salt Lake City (KSLC) ............................................................................................... 5
  Provo Municipal (KPVU) ......................................................................................... 6
  Ogden-Hinckley (KOGD) ......................................................................................... 8
  Pocatello (KPIH) ..................................................................................................... 10

Standard Instrument Departure (SID) ...................................................................... 12
  Fairfield Six Departure ........................................................................................... 13

Standard Terminal Arrival Route (STAR) ................................................................... 15
  Spane Four Arrival (STAR) ..................................................................................... 16

Non Precision NDB Approach ..................................................................................... 18
  Tooele/Bolinder Field NDB Rwy 17 Approach ....................................................... 19

Non Precision VOR/DME Approach ......................................................................... 25
  Provo Municipal (KPVU) VOR/DME Rwy 13 Approach ........................................... 26

Instrument Landing System ILS ................................................................................ 32
  Salt Lake City (KSLC) ILS Rwy 34 R Approach ...................................................... 33

RNAV Departure Edeth One ....................................................................................... 41

Acknowledgements and Legal Stuff .......................................................................... 45

---

NOT FOR REAL WORLD AVIATION USE
How to Read Charts

On behalf of Delta Virtual Airlines, we would like to thank you for taking the time to download this manual. We think you will find the information clear and easy to understand.

This is the Delta Virtual Flight Academy “How to Read Charts Manual, 1st edition. It is intended to teach the basics of reading charts that you would use when flying and was written with the flight simulation pilot in mind. This chart manual, the course TASK outline, the FAA “Pilot’s Handbook of Aeronautical Knowledge” and the Aeronautical Information Manual (AIM), make up some of the study materials to help you, the student, learn the basics of aviation and flight simulation flying. We will provide you with an avenue for asking questions and flight instruction to teach you how to fly the flight simulation airplane in a way that resembles the type of flight instruction you could receive in the real world.

This chart manual will cover: Airport Diagrams, Non Precision/Precision Approaches, SIDS/STARS and RNAV. Our instructors will fly with you and teach you the basics – how to use this chart information to fly your airplane, cross country navigation, flight planning and other basics of flying that will help you further your enjoyment and understanding of aviation and flight simulation.

This 1st edition is part of the complete update to our previous course material and manuals. We have updated our aircraft, moved our training location and added more information and training on flying on VATSIM.

If you spot a typo or notice something that doesn’t seem correct, let us know. We sincerely hope you enjoy this course and it helped you to continue your aviation education.

Happy Flying!

Scott Clarke
DVA 2370
Senior Captain
Vice President and Director of Training
training@deltava.org

George Lewis
DVA2253
Senior Captain of the Mighty 722
Vice President of Operations
ops@deltava.org
**Airport Diagrams**

Airport diagrams are relatively easy to understand. They are like a detailed map of a neighborhood with all the houses, roads, sidewalks, lights etc located, details you might need to find your way around a neighborhood you have never been to. These airport diagrams are updated every 56 days and will have a date on the left side of the airport diagram telling you if it is current or not. Check this date range before flying from or to an airport because items such as taxiways, frequencies, etc could have recently changed.

Major airports with control towers will have their own airport diagram on a separate sheet of paper. These airports can have additional airport diagrams for “special taxi to” spots on the airport, deicing location charts and Low Vis taxi charts, etc that use the airport diagram as reference.

Airports that are smaller and may not have a control tower will usually have an airport diagram on one of the approach charts if the airport has one. If there are not any airport diagrams for your favorite airport, you can find airport information at http://skyvector.com/.

So let’s look at the major items on the Salt Lake City Airport Diagram.

**Airport Diagram Salt Lake City (KSLC)**

<table>
<thead>
<tr>
<th>ITEM #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>Communications</strong></td>
<td>This section provides you, the pilot, with communications information. This information may or may not be used when VATSIM Air Traffic Control is online.</td>
</tr>
<tr>
<td>2. <strong>Runway</strong></td>
<td>Length and Width. Runway 34L / 16R provides you with 12,000 feet of useable runway that is 150’ wide.</td>
</tr>
<tr>
<td>3. <strong>Field Elevation</strong></td>
<td>This is depicted with a solid box. There are other elevations noted on the airport diagram, for each runway – but for planning purposes, this elevation is what all airport information is based. For KSLC – the field elevation is 4227’ MSL (Mean Sea Level). The other elevations can tell you if the runway goes up or down.</td>
</tr>
<tr>
<td>4. <strong>Actual Runway Heading</strong></td>
<td>When you are instructed by ATC to taxi to Runway 34L for departure – you would assume that the runway heading is 340 degrees. If you look closely, the actual runway heading is 342 degrees. In a short distance, this may not be a big difference, but over 10 miles that could equal several miles left or right of your actual assigned heading on departure. Use the actual runway heading.</td>
</tr>
</tbody>
</table>
| 5. **Weights** | These numbers depict the Runway Weight Bearing capacity (or PCL – Pavement Classification Numbers) How much weight a runway can take when a plane lands. Example: for Rwy 14-32  

  - S60 – Single wheel weight up to 60,000 lbs  
  - D200 – Double wheel up to 200,000 lbs  
  - DT350 – Double Tandem wheel up to 350,000 lbs  
  - DD850 – Dual Double Tandem wheel up to 850,000 lbs |
| 6. **Taxiway** | Taxiway and apron information is typically depicted in lighter gray lines marked with taxiway alpha-numeric text like A3 (Alpha 3) or Taxiway Echo (E). there can be deice points, ILS hold short points and caution information on the diagram. |
ITEM #

1. **Communications** This section provides you, the pilot, with information. This information may or may not be as it is when VATSIM Air Traffic Control is online.

2. **Runway Length and Width**. Provided in terms of feet of useable runway and width. Runway 31 / 13 is 8,599 ft of useable runway with 150 ft width. Runway 36 / 18 is 6,614 ft in length and 150 ft wide.

3. **Field Elevation**. This is depicted with a solid box. There are other elevations noted on the airport diagram, for each runway - but for planning purposes, this elevation is where all airport information is based. The field elevation at KPVU is 4497 ft MSL.

4. **Actual Runway Heading**. This information is very useful. When you are instructed by ATC to taxi to Runway 36 for departure - you would assume that the heading is 360 degrees. If you look closely, the actual runway heading is 359 degrees. In a short distance, this may not be a big difference, but over 10 miles that could equal several miles left or right of your actual assigned heading on departure.

5. These numbers depict the **Runway Weight Bearing capacity** (or PCL - Pavement Classification Numbers) how much weight a runway can take when a plane lands. You will notice that the two runways have different load bearing weights.

6. **Taxiway and airport apron information** is typically depicted in lighter gray lines marked with taxiway alpha-numeric text.

7. Note: Look up the following
   
a. The ILS HOLD SHORT line for RWY 13
b. The run-up areas for each runway.
c. Location of the control tower
d. Read the CAUTION: information
Airport Diagram Ogden-Hinckley (KOGD)

ITEM #

1. **Communications** This section provides you, the pilot, with information. This information may or may not be as it is when VATSIM Air Traffic Control is online.

2. **Runway Length and Width**. Provided in terms of feet of useable runway and width. Runway 34 / 16 is 5,195’ of useable runway and 150’ width. Runway 25 / 07 is 5,600’ in length and 150’ wide.

3. **Field Elevation**. This is depicted with a solid box. There are other elevations noted on the airport diagram, for each runway - but for planning purposes, this elevation is what all airport information is based. The field elevation at KOGD is 4473’ MSL.

4. **Actual Runway Heading**. This information is very useful. When you are instructed by ATC to taxi to Runway 34 for departure - you would assume that the heading is 340 degrees. If you look closely, the actual runway heading is 346 degrees. In a short distance, this may not be a big difference, but over 10 miles that could equal several miles left or right of your actual assigned heading on departure.

5. These numbers depict the **Runway Weight Bearing capacity** (or PCL - Pavement Classification Numbers) how much weight a runway can take when a plane lands. You will notice that the two runways have different load bearing weights.

6. **LAHSO (Land and Hold-Short operations)** Different than the other diagrams - KOGD has markings on all three runways. Discuss LAHSO with your instructor.

7. **Taxiway and airport apron** information is typically depicted in lighter gray lines marked with taxiway alpha-numeric text.

8. **Slope** On some airport diagrams, you will have a number showing that the runway(s) has a slight upward or downward slope. Runway 34 into KOGD has a .4% upward slope, and Runway 3 has a .8% downward slope.

9. **Note:**
   a. Actual runway landing length for runways 3, 21, 25, 16
Airport Diagram Pocatello (KPIH)

ITEM #

1. This section provides you, the pilot, with communications information. This information may or may not be as it is when VATSIM Air Traffic Control is online.

2. **Runway Length and Width.** Provided in terms of feet of useable runway and width. Runway 21 / 03 has 9,060 ft of useable runway and is 150 ft wide. Runway 35 / 17 is 7,150 ft in length and 100 ft wide.

3. **Field Elevation.** This is depicted with a solid box. There are other elevations noted on the airport diagram, for each runway - but for planning purposes, this elevation is what all airport information is based. The field elevation at KOGD is 4452’ MSL.

4. **Actual Runway Heading.** This information is very useful. When you are instructed by ATC to taxi to Runway 35 for departure - you would assume that the heading is 340 degrees. If you look closely, the actual runway heading is 346 degrees. In a short distance, this may not be a big difference, but over 10 miles that could equal several miles left or right of your actual assigned heading on departure.

5. These numbers depict the **Runway Weight Bearing capacity** (or PCL – Pavement Classification Numbers) how much weight a runway can take when a plane lands. You will notice that the two runways have different load bearing weights.

6. **Taxiway and airport apron** information is typically depicted in lighter gray lines marked with taxiway alpha-numeric text.
Standard Instrument Departure-SID

Understanding a Standard Instrument Departure (SID) is easy if you learn a few things about them. When you file your flight plan, you would choose the SID that is best for your departure runway and where (what direction) you are going. These departures are published so both you and ATC will have a graphic picture of what you are expected to do if you were to lose your radio communication with ATC. ATC may clear you to different fixes or waypoints, altitudes, speeds, etc depending on traffic, etc.

1. The SID will have waypoints based on lat/long points (RNAV) or fixes based on VOR or NDB beacons and their radials.
2. It will have a climb that will tell you the altitudes to cross at specific waypoints or fixes along the departure unless advised by ATC to other altitudes.
3. It will always put you on an airway or route and have you on your way to your destination.

The Symbols

You must understand the symbols on the SID (Standard Instrument Departure). On this SID, there are several symbols that you need to recognize.

The box with J107 (and there are several on this departure plate) indicates that this segment follows a (J) JET ROUTE (In this case 107).

This open ended arrow indicate the direction to the fix

Dotted lines in this SID indicate lost communications routes. They are explained on page 2 of the SID instructions. Read them.
FAIRFIELD SIX DEPARTURE

ATIS 124.75 127.625
CLNC DEL
127.3 387.1
SALT LAKE CITY DEP CON
124.3 322.3

NOTE: This is a radar vector departure to assigned route or fix.

NOTE: Radar required.

NOTE: Chart not to scale.

TAKING OFF MINIMUMS
Rwys 14, 32, 34L/R, 35: NA- Operational.
Rwys 16R: Aircraft assigned heading 160°, standard; assigned heading 280° CW through 340°, standard with a minimum climb of 410’ per NM to 10,000’.
Rwys 16L and 17: Aircraft assigned heading 160°, standard; assigned heading 280° CW through 340°, standard with a minimum climb of 400’ per NM to 10,000’.

[NARRATIVE ON FOLLOWING PAGE]

NOT FOR REAL WORLD AVIATION USE
Flying the FAIRFIELD SIX Departure (SID)

You are going to depart KSLC from Runway 16R. This departure is only used when Salt Lake City airport is on SOUTH operations. First, read the Take-Off Minimums on page one:

**TAKE-OFF MINIMUMS**

Rwy 16R: Aircraft assigned heading 160°, standard; assigned heading 280° CW through 340°, standard with a minimum climb of 410’ per NM to 10,000’.

Then look at page two and figure out two things. First, read the Runway 16R departure route information:

**TAKE-OFF RUNWAYS 16L/R and 17:** Fly heading 160° or as assigned, maintain 10,000’ or assigned lower altitude. Expect radar vectors to FFU VORTAC then via filed/assigned transition. Expect clearance to filed altitude 10 minutes after departure.

And what the lost communications procedures are just in case:

**LOST COMMUNICATIONS:** If not in contact with Departure Control 1 minute after take-off:

Aircraft assigned heading 160°:
Runways 16L and 17 turn right, thence... Runway 16R turn left, thence...
. . . . climb to 11,000’ via TCH R-161 to FFU VORTAC and continue climb via assigned/ filed transition.

Then, determine what NAVAID transition you will use for your flight plan:

**BRYCE CANYON TRANSITION (FFU6.BCE):** From over FFU VORTAC via FFU R-170 and BCE R-351 to BCE VORTAC.
**DELTA TRANSITION (FFU6.DTA):** From over FFU VORTAC via FFU R-170 and DTA R-048 to DTA VORTAC.
**HANKSVILLE TRANSITION (FFU6.HVE):** From over FFU VORTAC via FFU R-145 and HVE R-313 to HVE VORTAC.
**MILFORD TRANSITION (FFU6.MLF):** From over FFU VORTAC via FFU R-170 and MLF R-026 to MLF VORTAC.

You will see that the BRYCE CANYON transition sets you up for routing back to the South DELTA and MILFORD transitions set you up for destinations to the West and Southwest. The HANKSVILLE transition sets you for destinations to the East. After reaching these fixes, you will join the airway and head for your destination you filed for in your flight plan.

Pick the BRYCE CANYON transition. It would be written in your flight plan as: FFU6.BCE
Your flight plan has been filed and you have a copy of the SID. If equipped, your FMC / FMS system is programmed with the SID information or you have your NAV Radios set with the charts needed to fly the departure.

Once you have your clearance, taxi to the active and depart as per the departure instructions given to you by ATC – and confirmed on our SID departure procedures. You will be flying heading 160 with a 1800 fpm climb rate up to 11,000 feet as assigned by ATC. Remember, ATC has final say in how you fly a SID, they may modify your clearance at any time.

Check your position on the GPS or FMC/FMS using the SID chart. ATC may turn you left and clear to “Direct FFU VORTAC”.

When you reach the FFU VORTAC, you will track outbound on the 170 Radial FROM FFU VOR or TO the 351 radial from the BCE VORTAC.

Remember to cross the LODUY Intersection at 16,000 ft on your way up to FL180 by the time you reach URNUW intersection. Usually by this time, ATC has cleared you to climb to your cruise altitude. ATC will hand you off to another center controller and you are on your way.

**Standard Terminal Arrival Route-STAR**

This is the reverse of a SID.  STAR stands for Standard Terminal Arrival Route. A STAR defines a path into an airport from the airway structure. And a STAR can be associated with more than one arrival airport, which can occur when two or more airports are in close proximity.

Remember, the STAR is the beginning approach phase to your destination airport. It may begin at your estimated “top of descent” and continue until you enter the ILS, VOR or Visual approach procedure to your destination airport.

Usually a STAR has a set of starting points, called transition points from the many routes that can begin the STAR. There will be a specific point where all of these come together and then allow you to enter the ILS, VOR or Visual approach to your airport.

Most of the STARs in the United State are not very detailed, but they do provide you with guidance toward your destination. Remember, ATC can also vector you to one of these points or change the directions on the STAR to help with traffic flow. Listen to what they tell you to do.
The Symbols

Like the SID, you must understand the symbols of the STAR Approach.

- **VOR/DME**
  - VOR/DME is a VOR with DME transmitting capability for civilian aircraft.

- **VORTAC**
  - VORTAC is a VOR with TACAN capability (Military equivalent of DME)

- **Joint Civil-Military**
  - This airfield conducts both Civilian and Military operations (Air National Guard for instance)

- **DME Mileage**
  - (when not obvious)

**NOT FOR REAL WORLD AVIATION USE**
This lets you know that along your route (or adjacent to) there is **Special Use Airspace**. This example could also be W-352 or P-352 or A-352.

Each has its own requirements for entry / transition through that will normally be posted in the NOTAMS on VATSIM or provided by ATC.

**Flying the SPANE4 Arrival (STAR)**

You are flying into Salt Lake City from the East. You have your FMC/FMS or GPS (or whatever navigation program you use) already programmed for the SPANE4 arrival. Your flight plan has you using the MEEKR Transition (EKR.SPANE4).

The SPANE 4 chart shows that once you cross over the EKR VOR/DME, turn to follow the 258 Radial **FROM** EKR and the 078 Radial **TO** the MTU VORTAC. Once you cross MTU, you will track outbound on the 255 Radial **FROM** MTU to the SPANE Intersection.

**HELP Transition (HELP.SPANE4):** From over HELP INT via FFU R-100 to SPANE INT. Thence....

**MEEKER Transition (EK.R.SPANE4):** From over EKR VOR/DME via EKR R-258 and MTU R-078 to MTU VORTAC, then via MTU R-255 to SPANE INT Thence....

Looking at arrival chart, you will need to be at 15,000 feet until reaching the SPANE Intersection (or as directed by ATC). You will also notice that at the THISL and SPANE Intersections, there are holding pattern symbols. This is used by ATC if needed for spacing. Also notice the direction of the hold. At THISL it is a **LEFT** hand hold pattern and at SPANE it is a **RIGHT** hand hold pattern.

Around Spane, ATC will provide you with your expected landing direction and/or runway into KSLC. You have been told to expect RWY34R (North Ops). So take a look at your charts and read:

....From over SPANE:

**LANDING NORTH:** via FFU R-100 to BOAGY INT. Expect ILS Rwy 34R approach.

This tells us we are to track direct to the FFU VOR via the 100 Radial **FROM** the VOR to the BOGEY Intersection and then the FFU VOR and expect the ILS RWY 34R approach.

Note: The chart has a crossing altitude of 16,000 ft. You can expect ATC to clear you down to cross SPANE at 16,000 ft. Between the SPANE intersection and Boagiy intersection, ATC will have you descend and maintain 10,000 ft, turn right heading 330 until established, and cleared ILS 34R approach.
At this point in the approach, ATC will wait until you have captured the ILS localizer on your HSI and then they will hand you off to the KSLC tower controller. The tower controller will give you the winds and altimeter settings and clear you to land.

Remember: ATC can and will break you off from an arrival or approach for a number of reasons. Even though the STAR is published, and you may want to fly it, ATC has the final say in what you do.

**Non Precision NDB Approach**

A Non precision approach will only provide you with lateral course information. Types of non precision approaches are Localizer, VOR, GPS and NDB.

These approaches only give you a course direction or heading. They do not give you any vertical (height) above the ground clearance. OUCH!

A non precision NDB approach must be flown “with precision”. Since there is no vertical information, you must focus on leveling off at the (MDA) minimum descent altitude before you or your copilot start looking for the airport.

Once the airport is identified, you can transition to a visual approach to landing. If you reach MDA and do not see the airport, continue to fly the approach at MDA until passing the NDB. Make sure you know where it is in relation to the airport. If it is on the airport will be easier to find the runway. If it is off the airport, you may never see the runway environment and have to go missed approach.

NEVER NEVER NEVER descend below your MDA until you are absolutely positive that you have the runway environment (runway, lights, etc) in sight. Continue to fly to the NDB and then go missed.

Let’s go over the approach plate for Toole/Bolinder Field-Tooele Valley (KTVY) NDB RWY 17.
The heading information is simple to understand. On the top right you will always have an approach title, the type of approach, the runway - NDB RWY 17 and the name of the airport.

Starting from the left you will find the NDB (Non-Directional Beacon) Frequency. In this instance the frequency is 371. Tune your ADF (Automatic Direction Finder) to 371.

To the right is the APP CRS (Approach Course) heading for the approach. In this case, the course is 161 degrees. Write that down.

Next is the Runway Length (6,100 ft), the Touchdown Zone Elevation (TDZE) is 4,294 ft and the Airport elevation (Apt Elev) is 4,318 ft.

The middle section provides any other information that may be useful to the pilot. The inverted Triangle with the "▲" alone would indicate that the take-off Minimums not standard and/or Departure Procedures are published. In this instance the information is provided regarding simultaneous approaches.

The "▲ NA" indicates that alternate minimums (Alternate Minimums) are Not Authorized (NA) due to unmonitored facility or absence of weather reporting services.

This airport has no lighting for nighttime operations.

The next critical element of the heading area is the MISSED APPROACH information. This provides guidance that all pilots are assumed to understand unless specific guidance is provided by ATC. It is critical that you follow this procedure – because everyone else is expecting you to fly this published missed approach.

The bottom section of the heading area contains your frequencies needed, generally in the order that you would normally progress through the different ATC agencies. AWOS-3 (Automated Weather Observing System - 3rd Generation) – 119.725 provides altimeter, visibility and cloud/ceiling data (below 12,000 feet AGL).

Frequencies for APP CON (Approach Control) if on approach, CLNC DEL (Clearance Delivery) if you are departing – and UNICOM (or CTAF - Command Traffic Advisory Frequency).
The Plan View

The Plan View is where, at a glance, you get most of your information about the approach. The first thing to look for is the Base Areas or MSA (Minimum Safe Altitude) when flying the approach. This information shows the TOOELE NDB as the center point and it is locate on the airport.

If you are headed towards the NDB from the EAST - your MSA would be 12,600' until you cross the 195 / 105 Radials, then your MSA drops to 8,200 ft.

The ring around the airport (10NM) provides you the MSA radius as well as the confines of the full approach.
Critical to this approach is the statement in the top left of the plan view. It states that: “All aircraft descend to 8,100’ in LAVRY Intersection holding pattern before departing LAVRY Intersection.” This lets you know that this hold pattern (a minimum of one turn) is part of this NDB approach. Why?

The WASATCH VOR (TCH) is outside of the feeder system, but provides you with a bearing to the LAVRY INT (R-249). The remainder of the information in this box is the frequency of the TCH VOR (116.8), the Morse ID signal you should hear when you tune it (to ensure you are tuned to the correct VOR), and the channel if you are equipped to set via channels.

The LAVRY INT holding information is straight-forward. You will enter this holding pattern based on your direction of travel (Teardrop, Parallel, Straight-in) and begin to descend to 8,100 ft while in the hold. Your outbound course will be 341 degrees and your inbound course (toward the NDB) will be 161 degrees. You will set your heading of 161 to the TOOELE NDB, while cross-checking where you are using the WASATCH VOR.

On an arrival, if there is a published hold, the line would be a solid thin line as in this example:

Several other symbols you should be familiar with are:

- VOR
- VOR/DME
- TACAN
- VORTAC
- NDB
- NDB/DME
The Profile View

This section provides the actual instrument procedure, airport quick look, missed approach and minimums.

The information on the bottom right (A), provides times from the FAF (Final Approach Fix) to the MAP (Missed Approach Point). Since this approach is a non precision approach, this information is not provided.

The information in (B) provides information for the missed approach. This one tells you to conduct a climbing right turn after passing the NDB, to 9,000 ft to a heading of 341 degrees, which happens to coincide with the outbound leg of the IAF hold at LAVRY INT. The NDB frequency of 341 is provided (tune into your ADF).

The information in (C) has more detail. This is the approach profile. From left to right (as if on the approach), you start this approach at the LAVRY Intersection (which is 18 NM away from the TCH VOR) with a holding pattern with one minute legs at 8,100 ft.

From LAVRY Int to the next fix, Tolyu Int, you are on the inbound course of 161 degrees and crossing it at 7100 ft or above. It is 3.3 NM distance between the two (yellow shaded area).

From TOLYU you continue your descent to at or above 6,100 ft to the “X” at FIDAG which is the FAF (Final Approach Fix). From the FAF to your MAP is 5.6 NM at an intercept angle of 3 degrees and a TCH (Threshold Crossing Height) of 45.
Remember, this is a non-precision approach and the goal is to get you down out of the soup to where you can see the runway. You have no vertical guidance. You are following the signals from the NDB which sits to the left hand side of the airport as you fly this approach. You should be looking forward and right for the runway.

If an altitude is shown with a solid line underneath it – it means that is the lowest altitude you can descend to at that point along the approach.

Lastly, in part (D), you are given the aircraft category in terms of minimum requirements. To start, aircraft are designated into one of five categories based on 1.3 times their stall speed in their landing configuration at their maximum certificated landing weight. The categories are as follows:

- **Category A**: speed less than 91 knots
- **Category B**: speed 91 knots or more but less than 121 knots
- **Category C**: speed 121 knots or more but less than 141 knots
- **Category D**: speed 141 knots or more but less than 166 knots
- **Category E**: speed 166 knots or more

Look at line **S-17/ 5020-1 / 726 (800-1)**. This is what it tells you:

- **S** = for Straight in Runway 17/ the lowest that the ceiling can be on this approach is 5020 feet with 1 mile visibility/ 726 ft is the Height Above Touchdown (or a minimum of 800 feet and 1 mile visibility)

This means you will be flying toward the NDB and looking for the runway at 726 ft AGL until passing the NDB, then going missed approach.
Non Precision Approach-VOR/ DME

You already know about a non precision approach. It is an approach that gives you lateral (heading) direction but does not supply vertical (clearance from the ground). A VOR/DME approach is a non precision approach. It can also have an arc included in the approach.

This approach is a regular VOR approach with a DME fix along the final approach path to tell you when to begin a descent to a lower altitude. Of course your aircraft must be equipped with DME equipment to fly it.

Add an arc to the regular VOR DME approach and it gets complex. This approach is where you will fly around the VOR at a specific distance from as shown on the DME and then when you arrive at the inbound VOR course for the approach, you turn to this final approach course.

The VOR/DME arc is used when there may be mountains or high terrain near the final approach course, making a long straight in approach too dangerous to fly. You would fly toward the final approach course while maintaining a specific distance from the VOR that is shown on your DME. Once you meet the final approach path, you would turn inbound and fly a regular VOR/DME approach.

You will fly the VOR/DME Rwy 13 approach at Provo, Utah (PVU). Lets take a look at the approach plate for this approach.
Provo Municipal (KPVU) VOR/DME RWY 13

NOT FOR REAL WORLD AVIATION USE
The Heading

On the top right you have the approach title and airport - VOR/DME RWY 13, Provo Muni (PVU).

Starting from the left you will find the VOR/DME (VHF Omni-directional Radio Range) and DME (Distance Measuring Equipment) frequency and channel - 108.4 or channel 21 if equipped.

To the right is the APP CRS (Approach Course) for the approach. In this case, the course heading is 134 degrees.

The Runway Landing Length is 8,599 ft. The Touchdown Zone Elevation (TDZE) is 4,497 ft and the Airport (Apt Elev) elevation is 4,497 ft.

The middle section provides other information that is useful to the pilot. The inverted Triangle with the “▽” alone would indicate that the Take-Off Minimums are not standard and/or Departure Procedures are published. It says that “Circling is not authorized west of 18 and 31 or at night to runway 18”.

The MISSED APPROACH information provides instructions that you would follow on a missed approach unless different instructions are provided by ATC. It is critical that you follow this procedure - because everyone else is expecting you to do the published missed approach.

The bottom section of the heading area contains the radio frequencies to use. ATIS (Automatic Terminal Information Service) - is a continuous broadcast of recorded information that contains weather information, which runways are active, available approaches and other information current for this airport.

ATIS information is followed by SALT LAKE CITY APP CON (Approach Control) if on approach, Provo Tower on a UNICOM (or CTAF - Command Traffic Advisory Frequency) frequency, and finally Ground Control.
The Plan View is where you get most of your information about the approach. The first thing to look for is the Base Areas or MSA (Minimum Safe Altitude). This information shows the PVU VOR/DME as the center point and gives MSA within 25 NM. If you are headed towards the VOR from within a heading of 230 to 320 degrees, your MSA will be 12,300 ft. Conversely, if you are headed towards the VOR/DME from within a heading of 140 to 50 degrees, your MSA will be 11,900 ft. The same holds true from a northern or southern approach.
Critical to this approach is the statement in the top left of the plan view. It states that:

“All arrivals over FFU VORTAC descend to 11000 in FFU holding pattern before departing FFU VORTAC.

This lets you know that if you are at FL190 inbound for PVU on this approach, you will execute a holding pattern over the FFU VORTAC, right hand turns, while descending to 11,000.

On an arrival, if there is a published hold, the line would be a solid thin line as in this example (also note that the FFU VORTAC is also part of the Missed Approach procedure:

Several other symbols you should be familiar with are:

This lets you know that along your route (or adjacent to) there is Special Use Airspace. This example could also be W-352 or P-352 or A-352. Each has its own requirements for entry / transit through that will normally be posted in the NOTAMS on VATSIM or provided by ATC.

This provides you with distance between points.

This lets you know that there is a mountain with a 7,138 ft altitude. There are several around this airport and approach.

**PVU DME ARC.** You would enter this ARC on the 313 radial from the FFU VORTAC, at the JETLI Intersection (4 miles). Then turn right, maintain 8, 500 ft and 14 NM from PVU VOR to intercept 314 radial FROM the PVU VOR (inbound course heading 134 degrees) then turn inbound and fly the approach.
The Profile View

This section provides the actual instrument procedure, airport quick look, missed approach and minimums.

The information on the bottom right (A), provides times from the FAF (Final Approach Fix) to the MAP (Missed Approach Point). Since it is not a precision approach, the information is not provided.

Section (B) provides information for the missed approach. You would climb to 9,000 direct to the PVU VOR/DME and continue 5.9 DME beyond on the 130 radial from PVU to the ZIPUT intersection, then turn right to 330 degrees intercepting the 110 radial from the FFU VORTAC and hold.

The information in (C) is more detailed. From left to right (as if on the approach), you start this approach at FAVUR intersection (14 DME from the PVU VOR) at 8,500 ft. Your inbound heading is 134 degrees and you descend at or above 6,200 ft by the SUGIE intersection (6.2 DME from the PVU VOR).

The “X” at SUGIE is the FAF (Final Approach Fix) since this is a non-precision approach. From the FAF to your MAP is 5.2 NM at an intercept angle of 3 degrees and a TCH (Threshold Crossing Height) of 50.

The angle with the slope VDA (Vertical Descent Angle) and TCH represents non-precision vertical guidance to avoid hitting the ground. It is slightly above or below the procedure track based on the fix (in this case SUGIE).
You are heading 134 to the PVU VOR/DME which is on the airport, on the right hand side of runway 13 as you approach. You should be looking forward and slightly left for the runway environment as you get closer to the runway.

Your missed approach point is the OFWIG Intersection which is 1.7 DME from the PUV VOR. This means if you do not have the runway environment at this point – time to execute the missed approach as published.

This symbol (straight down from the PVU 2.6 DME represents the Visual Descent Point. If you have the runway environment in sight you can descend visually to the runway at this point.

If an altitude is shown with a solid line underneath it – that is the lowest altitude you can descend to at that point along the approach.

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-13</td>
<td>5040-1</td>
<td>543 (600-1)</td>
<td>5040-1½</td>
<td>5040-1¾</td>
</tr>
<tr>
<td></td>
<td></td>
<td>543 (600-1½)</td>
<td>543 (600-1¾)</td>
<td></td>
</tr>
<tr>
<td>CIRCLING</td>
<td>5040-1</td>
<td>543 (600-1)</td>
<td>5040-1½</td>
<td>5060-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>543 (600-1½)</td>
<td>563 (600-2)</td>
<td></td>
</tr>
</tbody>
</table>

Lastly, part (D), you are given the aircraft category in terms of minimum requirements. To start, aircraft are designated into one of five categories based on 1.3 times their stall speed in their landing configuration at their maximum certificated landing weight. The categories are as follows:

- **Category A**: speed less than 91 knots
- **Category B**: speed 91 knots or more but less than 121 knots
- **Category C**: speed 121 knots or more but less than 141 knots
- **Category D**: speed 141 knots or more but less than 166 knots
- **Category E**: speed 166 knots or more

Look at this line: **S-13/ 5040-1 / 543 (600-1)** This is what it tells you:

S (For Straight in) Runway 13 the lowest that the ceiling can be on this approach is 5040 with 1 mile visibility. The Height Above Touchdown is 543’ or a minimum of 600 feet and 1 mile visibility.
**Instrument Landing System (ILS)**

The instrument Landing System is based on the ground which gives you precision guidance to the runway. It consists of radio signals and high-intensity lights to help guide you to a safe landing when the ceilings are low and the visibility is low due to fog, rain, or blowing snow.

Each ILS approach has a published “approach plate”, that gives you all the information you will need to fly the approach. Every ILS has a localizer that gives you the “heading” to fly and a “glideslope” to provide you with vertical guidance to the runway.

There are three types of markers that are part of an ILS system:

- **Outer marker**
  It is usually located 4 to 7 NM from the threshold of the runway. You will hear a tone in the cockpit and a blue indicator light will flash when crossing. Sometimes a NDB is combined with the outer marker beacon called a LOM (Locator Outer Marker).

- **Middle marker**
  The middle marker identifies the missed approach point. You will hear alternating dots and dashes in the cockpit and a amber indicator light will flash when crossing.

- **Inner marker**
  The inner marker is located almost on the runway threshold and appears on Category II approaches. You will hear dots in the cockpit and a white indicator light will flash when crossing.

**Approach lighting**

The ILS will have a variety of approach lighting systems. Some have medium or high intensity approach light systems. These are usually found at larger airports like KSLC, KMCO, KATL. These light systems will help you go from instrument flight on the panel to visual flying looking outside and help you line up with the runway center line.

This is just a little information on the ILS system. Look up ILS Landing System on the internet to gather more information. Let’s take a look at ILS 34R at KSLC.
On the top right you will have the approach title and the airport - ILS or LOC RWY 34R at Salt Lake City Intl (SLC).

Starting from the left you will find the LOC/DME (Localizer and Distance Measuring Equipment) frequency of 109.5 and channel 32.

To the right is the APP CRS (Approach Course) heading of 341 degrees for the approach.

Next is the Runway Length of 12,004 ft, then the Touchdown Zone Elevation (TDZE) is 4,222 ft and the Airport (airfield) elevation is 4,227 ft.

The middle section provides any other information that is useful to the pilot. The inverted Triangle with the “ Vinci” alone would indicate that the take-off minimums are not standard and/or Departure Procedures are published. In this instance the information is provided regarding simultaneous approaches.

To the right you have a block that provides the airport lighting information. ALSF-2 is Approach Lighting System, 2nd Generation which provides High Intensity Sequenced flashing approach lights generally extending 2400’ - 3000’ from the runway approach end.

The next critical element of the heading area is the MISSED APPROACH information. This provides guidance that you must understand unless specific guidance is provided by ATC. It is critical that you follow this procedure - because everyone else is expecting you to do the missed approach as published.

The bottom section of the heading area contains your radio frequencies needed.. ATIS followed by Salt Lake City APP CON (Approach Control), followed by Salt Lake City TWR (Tower) (runway dependant) and finally GND CON (Ground Control) (runway dependant).

On VATSIM, you will want to check on what radio frequencies are being used by ATC.
The Plan View

The Plan View is where you get most of your information about the approach. The first thing to look for is the Base Areas or MSA (Minimum Safe Altitude) when executing your approach.

This information shows the TCH VOR as the center point. It provides us sectored safe altitude information. If you are headed southeast (140 degrees) and to the North of the 140 bearing from the WASATCH VOR, you are at a safe altitude above 11000 ft MSL. If you cross the WASATCH VOR headed to the southeast, your minimum safe altitude is 12,700 ft MSL.
The rings around the airport let you know general distances at a glance. The main focus of this approach is within the 15 NM ring. The FEEDER FACILITY ring typically have radio aids to navigation, fixes and intersections used by the air traffic controller to direct aircraft to intervening facilities/fixes between the enroute structure and the initial approach fix. The ENROUTE FACILITY ring again provides radio aids to navigation, fixes and intersections that are part of the Enroute Low Altitude Airway structure and used in the approach procedure(s).

The Plan View also gives us all of the information you will need to fly the approach. There are three major navigational aids used in flying this approach. They are the FFU (Fairfield) VOR, the LOCALIZER for the approach and the OGD (Ogden) VOR for the missed approach procedure.
The Fairfield VOR (FFU) has a box and the letters IAF listed. IAF stands for Initial Approach Fix and is just what its name suggests. This (as well as the BOAGY Intersection) are the starting point(s) for the actual ILS approach. The remainder of the information in this box is the frequency of the FFU VOR (116.6), the Morse signal you should hear when you tune it to ensure you are tuned to the correct VOR and the channel if you are equipped to set via channels.

Some other key information is obtained from this view. There are some specific symbols with numbers in them such as this one. This is located at the SCOER intersection and lets you know that it is 15.5 DME (Distance Measuring Equipment) from the runway.
This dotted hash represents a missed approach at the OGD VOR. Your outbound course would enter the hold teardrop, straight-in, etc. and begin right hand holding with an outbound course of 281 degrees and inbound of 101 degrees to the VOR.

On an arrival, if there is a published hold, the line would be a solid thin line as in this example:

In lieu of Procedure Turn

Missed Approach

Arrival

Several other symbols you should be familiar with are:

- The Marker Beacon
- The Localizer

- VOR
- TACAN
- NDB
- VOR/DME
- VORTAC
- NDB/DME
The Profile View

This section provides the instrument procedure from the side view.

The information on the bottom left (A) provides times from the FAF (Final Approach Fix) to the MAP (Missed Approach Point). For example, if your airspeed is 150 knots, to travel the 5.2 NM will take you 2 minutes and 5 seconds.

The information in (B) provides information for the missed approach. You are to climb straight ahead to 4,800 ft. The next block tells you to intercept the 153 Radial from the ODG VOR and conduct a climbing left turn to 9,000 ft tracking TO the VOR. The OGD VOR frequency is also provided – 115.7.

The information in (C) is more detailed. From right to left (as if on the approach), you start this approach at 11,000 ft at the PLAGE Intersection which is 20.2 NM away with DME (Distance Measuring Equipment) or whatever altitude ATC tells you to descent to. From PLAGE to the next fix, which is ATANE, you can descend to 10,000 ft. There is 3.2 NM between these two intersections (indicated in the yellow shaded area).

If an altitude is shown with a solid line underneath it - it means that is the lowest altitude you can descend to at that point along the approach unless otherwise directed by ATC. For instance, 11,000 ft at PLAGE, 10,000 ft at ATANE, 9,500 ft at SCOER, etc.

In between ATANE and SCOER you will also notice the approach heading (341 degrees) is listed again for easy reference.
The next section depicts the actual Glide Slope (GS) information for the approach. The lightning bolt with 7100 indicates the Glide Slope/Glide Path Intercept Altitude and FAF (Final Approach Fix) for this precision approach. The X indicates the Final Approach Fix (FAF) for Non-Precision Approaches) as well as the altitude. The V indicates the Visual Descent Point - a fancy way of saying if you can see the runway at this point - you can continue visually if desired and requested. The solid line ends at the MAPB (just after the GITBE intersection). The letters IM represent where the Inner Marker is and the dotted line lets you know that is where you initiate your missed approach procedures if you do not see the runway (the missed approach track).

The final bit of information on this view gives us the optimal Glide Slope angle (3 degrees) as well as the TCH (Threshold Crossing Height), which is 53 ft AGL. The GS also signifies that there is an electronic Glide Slope for the ILS and provides precision vertical guidance for LNAV and VNAV.

The grey arrow running from right to left down the approach path just signifies that this is an ILS or LOC approach.

Lastly, part (D), you are given the aircraft category in terms of minimum requirements. To start aircraft are designated into one of 5 categories based on 1.3 times their stall speed in their landing configuration at their maximum certificated landing weight. The categories are as follows:

- **Category A**: speed less than 91 knots
- **Category B**: speed 91 knots or more but less than 121 knots
- **Category C**: speed 121 knots or more but less than 141 knots
- **Category D**: speed 141 knots or more but less than 166 knots
- **Category E**: speed 166 knots or more

Look at this line: **S-ILS 34R // 4422/18 200(200-1/2)**

S (For Straight in) ILS Runway 34R the Decision Height (DH - the lowest that you can descend on this approach) is 4422 ft MSL / 18 feet AGL.

The Height Above Touchdown (HAT) is 200’ and ceiling and visibility must be 200’ and ½ mile visibility.

Lastly the next line for the non-precision (S-LOC) the DH is 200’ higher than for the precision approach.
EDETH ONE – RNAV DEPARTURE

(EDETH1, EDETH) 07354
EDETH ONE DEPARTURE (RNAV)

ATIS 124.75 127.625
CLNC EDEL
127.3 397
GND CON
121.9 348.6 (Rwy’s 14R/32L, 17-35)
133.65 348.6 (Rwy’s 16L-34R, 16R-34L)
SALT LAKE CITY TOWER
119.05 257.8 (Rwy 16R-34L)
118.3 257.8 (Rwy’s 14, 32, 17-35)
132.65 336.4 (Rwy 16R-34L)
SALT LAKE CITY DEP CON
128.1 307.05

BUCCO
10000 230 KIAS

SAFEE
4727

SCANT
10000

HIDUT
11000

TOOLE
13000

MUSAW
FL230 250 KIAS
Resume normal speed after MUSAW

TRILA

EDETH
(38)

TRANT

SEYR

FL220 14400
240 (236)

COALDALE OAL

FL220 14400
1800

MILFORD MLF

BRYCE CANYON BCE

NOTE: Chart not to scale.

SALT LAKE CITY INTL (SLC)
SALT LAKE CITY, UTAH

TAKE-OFF MINIMUMS
Rwy’s 14, 32, 16R/L, 17: NA-ATC.
Rwy 34R: Standard with minimum climb of 420’ per NM to 10900.
ATC climb of 264’ per NM from 11000 to 13000.
Rwy 34L: Standard with minimum climb of 430’ per NM to 10700. ATC climb of
264’ per NM from 11000 to 13000.
Rwy 35: Standard with minimum climb of 425’ per NM to 10800. ATC climb of
264’ per NM from 11000 to 13000.

NOTE: If unable to accept climb rates and crossing restrictions, advise ATC on initial contact.
NOTE: DME/DME/RU or GPS required.
NOTE: Radar required.
NOTE: RNAV 1.
NOTE: Turbojet aircraft only.

NOTE: For Non-GPS equipped aircraft:
FFU and DTA DMEs must be operational for BRYCE CANYON, MILFORD, and BERYL transitions.
FFU, DTA, ILC, TPH, MVA, and OAL DMEs must be operational for COALDALE transitions.

TAKE-OFF OBSTACLES
Rwy 34R: Post 12’ from DER, 349° right of centerline, 4’ AGL/4227’ MSL
Rwy 35: Post 55’ from DER, 249° left of centerline, 4’ AGL/4220’ MSL

(NARRATIVE ON FOLLOWING PAGE)
**The Symbols**

RNAV stands for Area Navigation. It will allow you to fly any course within a network of NAVAIDS, such as NDBs or VORs, without having to navigate direct TO/FROM beacons. This type of navigation will let you shorten your flight distances in your flight, reduce airspace and ATC congestion and you will be able to fly into airports IFR which do not have approaches or departures.

The first thing for you to do is learn and understand the symbols on a RNAV Approach plate.

Let’s look at altitude symbols:

**HIDUT**

11000

For example at the HIDUT Intersection, a line above and below and altitude 11,000 ft means that you will cross that point **AT** that altitude 11,000 ft (it is mandatory).

**TOOLE**

13000

A line below the altitude, as depicted at the TOOLE Intersection means that you must cross at or above 13,000 ft.

**MUSAW**

FL230 250 KIAS

A line above the altitude such as at the MUSAW intersection means that you must cross at or below FL230. Additionally at the MUSAW, and again at BUCCO you have a speed restriction of exactly 250 KIAS as well. A line above and below an airspeed indicates a mandatory speed restriction, and may or may not provide additional information.

**Resume normal speed after MUSAW**

At MUSAW, you can resume normal speed (normally above 250 KIAS) after passing MUSAW.

This symbol is an RNAV Waypoint and is a non-compulsory position reporting point. It means you are not required to let ATC know.

This symbol is an RNAV Waypoint and **IS** a compulsory reporting point. You **ARE** required to report to ATC when crossing at these points.
The Notes. Always read the notes:

NOTE: If unable to accept climb rates and crossing restrictions, advise ATC on initial contact.
NOTE: DME/DME/IRU or GPS required.
NOTE: Radar required.
NOTE: RNAV 1.
NOTE: Turbojet aircraft only.
NOTE: For Non-GPS equipped aircraft:

- FFU and DTA DMEs must be operational for BRYCE CANYON, MILFORD, and BERYL transitions.
- FFU, DTA, ILC, TPH, MVA, and OAL DMEs must be operational for COALDALE transitions.

Do you meet the requirements for this departure!

The RNAV Departure Flight

Let's assume that you are going to depart KSLC from Runway 34L. The first thing you need to do is read the Take-Off Minimums on Page one:

**TAKE-OFF MINIMUMS**

Rwy 34L: Standard with minimum climb of 430’ per NM to 10700. ATC climb of 264’ per NM from 11000 to 13000.

Then, look at Page two of the departure and figure out two things. First, read the Runway 34L departure route information:

**TAKE-OFF RUNWAY 34L**: Climb heading 341° to 4727, then left turn direct SAPEE, then via depicted route to EDETH, thence. . . .

Then look at which NAVAID transition you want to use for the flight.

- **BERYL TRANSITION (EDETH1.BERYL)**
- **BRYCE CANYON TRANSITION (EDETH1.BCE)**
- **COALDALE TRANSITION (EDETH1.OAL)**
- **MILFORD TRANSITION (EDETH1.MLF)**
And Finally:

. . . . via (transition) maintain FL230 or lower filed altitude. Expect filed altitude 10 minutes after departure.

Now if you refer back to Page one of the RNAV departure, you will see that the BERYL and MILFORD transitions are used for destinations to the South. The BRYCE CANYON transition will get you routing back to the East. The COALDALE transition takes you toward the West. Now, you can go in any direction you want after your last transition waypoint - however they are set up to facilitate those primary directions.

You will use the the BRYCE CANYON transition and you should write it in your flight plan as EDETH1.BCE.

Now you have all of your information. Your flight plan has been filed and you have a copy of the departure. You have programmed the FMC / FMS system with the RNAV departure information and you are ready for departure.

Get your clearance and depart as per the departure instructions given to you by ATC. You will be told to “turn left 260 after departure by tower with a 1200 FPM climb rate. Departure will tell you “Proceed direct SAPEE, climb via the Edeth 1 departure as published.

Verify your position on the GPS or FMC/FMS and continue past SAPEE on a 243 degree heading to BUCCO. Plan to cross BUCCO at or below 10,000 ft and at 230 knots. The (6) under our heading indicates the mileage between SAPEE and BUCCO (6 miles).

Continue as depicted on the RNAV instructions and ATC until you arrive at EDETH.

Cross EDETH at 13,000 ft on a heading of 173 degrees towards SEVYR. You notice that there is a star and another altitude listed at the EDETH Intersection. This is the MOCA (Minimum Obstruction Clearance Altitude). This tells you that there is a specified altitude in effect between radio fixes which meets obstruction clearance requirements for the entire route segment and that assures acceptable navigational signal coverage only within 22 miles of a high VOR. You have to be at least 8,100 ft to receive the MLF VOR.

Continue past the SEVYR intersection and on to the MLF VOR, climbing to FL220. We have station passage at MLF and continue to climb to FL240 and direct to the BCE VOR.

You continue on your route as filed at this point.
Acknowledgements and Legal Stuff

- Delta Virtual Airlines 2008 Copyright ©2008 Global Virtual Airlines Group. All rights reserved.
- For flight simulation purposes only. In no way are we affiliated with Delta Air Lines, its affiliates, or any other airline.
- All logos, images, and trademarks remain the property of their respective owners. Delta Virtual Airlines is a non-profit entity engaged in providing an avenue for flight simulation enthusiasts.
- This 1st edition manual was created on April 2008 by Andrew Kaufman, Scott Clarke and George Lewis.
- The authors grant unlimited rights to Delta Virtual Airlines for modification and non-profit electronic duplication and distribution. Materials from outside sources were used and other copyrights may apply. All cited sections remain the property of their authors.
- While we strive to mirror real-world operations, this manual is not designed for use in the operation of real-world aircraft.

NOT FOR REAL WORLD AVIATION USE