LETS BUNDERSTANDING HELICOPTER FLIGHT AND CONTROL

Alright! Now its time to begin understanding how helicopters fly and what the control surfaces do. We have also added link photos that describe visually each of the controls and what they do when you apply the control inputs. For a more intense version of the information below, go to the Advanced Instruction page located in the Helicopter Flight Simulator page.

MAIN ROTOR

In order for the helo to lift off the ground, it must have a lifting force greater than its weight. The lifting force in the helicopter is generated by the large rotating blades of the main rotor. The shape of the blade is similar to that of the wing of a fixed-wing aircraft. Air flow across the wing, or blade, creates lift. Lift can be increased by either increasing the speed of the rotor or increasing the pitch of the blade. It is simpler to keep the RPM's of the rotor constant and change the pitch, or angle, of the blade. A slight upward tilt of the leading edge of all blades will considerably increase the amount of lift. There is a plate on the main rotor blade that collectively or at the same time, changes the pitch of the blades. The control is simply called the collective pitch lever. The collective control is located on the pilots left side of the seat. When the pilot pulls up on the collective it is increasing the pitch of all the blades.

In flight simulator terms, the collective is equal to the throttle on your joystick. Add throttle, you begin to create more lift. On FS helos, around 65-70% torque will begin to lift you off the tarmac. In the default Bell 206, you might have noticed you can hear the skids against the ground. You will see the collective control when you get to the link located in the cyclic section under controls.

TAIL ROTOR

The tail rotor is a smaller propeller mounted on the rear of the fuselage. The speed of the tail rotor is directly proportional to the speed of the main rotor. Thrust generated by the tail rotor is what counteracts the torque generated by the main rotor. This keeps the helicopter from spinning around and around, out of control. The pitch of the tail rotor blades are controlled by the pilot's foot pedals. You probably noticed in the FS helo if you don't add some rudder input, the helo tends to change its direction to the left. The input you apply to the joystick is the same as what a pilot does with the foot pedals. You will notice that once you are flying forward in the helicopter, you have to increase the rudder pressure in the FS helo to maintain your desired heading. In real helos, there is constant pedal pressure applied for the same reason. The foot pedals in helicopters are often called yaw pedals or anti-torque pedals. In FS we call it rudder input.

CYCLIC CONTROL

The cyclic control stick is equal to your joystick. This controls the helicopter's direction of flight. This is accomplished by adding additional pitch to selected portions of the rotating main rotor. Increasing the pitch in one area will increase the lift in that portion, and the rotor disc will tilt. If the cyclic control stick is pushed forward, the pitch will increase only on the rotor blades at the rear of the rotor disc. This will increase lift on the rear portion of the rotor disc and lift up the rear of the rotor, effectively pushing the helicopter forward. If the stick is pulled back, it will increase the pitch of the blades at the forward portion of the disc and the helicopter will fly backwards. If the stick were positioned to one side or the

other, the helicopter will fly sideways. In FS helos, the same effect will be evident. To see all the controls from the cockpit view, click here on Controls

Now that you have gone through all the initial basic stuff, its time to move on to understanding navigation and chart reading. All the information that is in this lesson will be specific to the Reno/Stead area. If at anytime you need further assistance, send me an e-mail message to get further details and aides. Breeze over the following information to give you an idea about navigating and chart reading visually because the real navigation class is about to start. You will soon be able to completely understand everything you will see on this page and be able to apply it in your everyday flight simming, if you choose too.

Beginning with the our training location, you will see some important information below.

4SD (Airport ID) - **RENO/STEAD AIRPORT**

RENO, NV

Location

Lat/Long: 39-40-02.572N / 119-52-31.501W
(39.6673811 / -119.8754169)
Elevation: 5046 ft.
Variation: 16E (1920)

From city: 10 miles NW of RENO

Airport Communications

UNICOM: 122.7
WX AWOS-3: 135.175
RENO APPROACH: 126.3
RENO DEPARTURE: 126.3

Radio aids to navigate to the Airport

VOR radial/distance	VOR name	Freq	Var
FMGr293/13.0	MUSTANG VORTAC	117.90	16E
SWRr016/34.5	SQUAW VALLEY VOR/DME	113.20	16E
AHCr144/38.2	AMEDEE VOR/DME	109.00	17E

Runway Information

Runway 8/26

Dimensions: 7600 x 150 ft. / 2316 x 46 m
Surface: asphalt/grooved, in good condition

Weight limitations Single wheel:	60000 lbs
Double wheel:	90000 lbs
Runway edge lights:	high intensity

	Runway 8	Runway 26
Traffic pattern:	left	Right
Markings:	non-precision instrument	non-precision instrument
Elevation:	4988.0 ft.	5046.0 ft.
Threshold crossing height:	43 ft. AGL	45 ft. AGL
Visual glide path angle:	3.00 degrees	3.00 degrees
Visual slope indicator:	4-light PAPI on left	4-light PAPI on left
Centerline lights:	**no**	**No**
Displaced threshold:	**no**	**No**
Touchdown point:	**no**	**No**

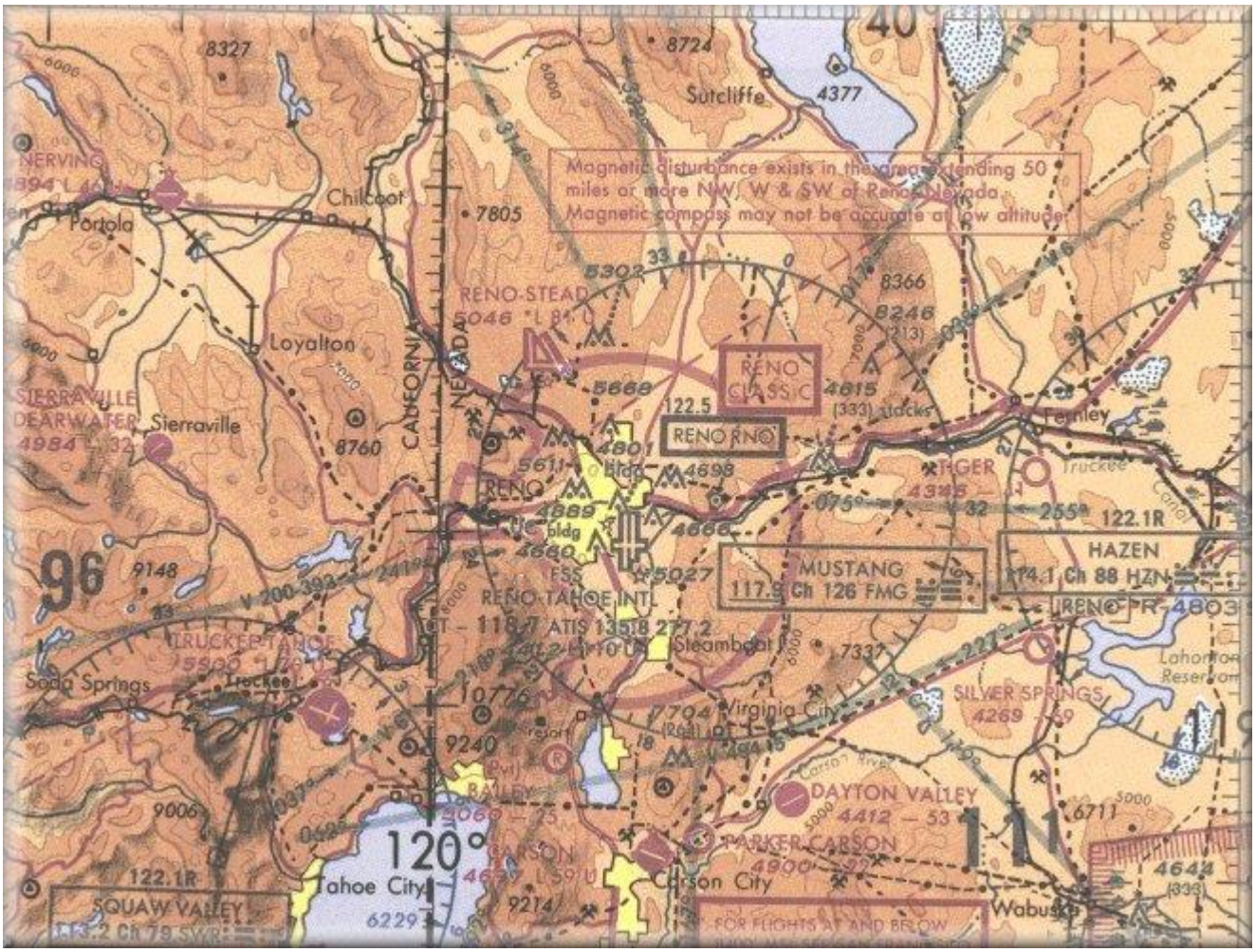
Runway 14/32

Dimensions:	8080 x 150 ft. / 2463 x 46 m
Surface:	asphalt, in fair condition
Weight limitations Single wheel:	65000 lbs
Weight limitations Double wheel:	85000 lbs
Runway edge lights:	high intensity

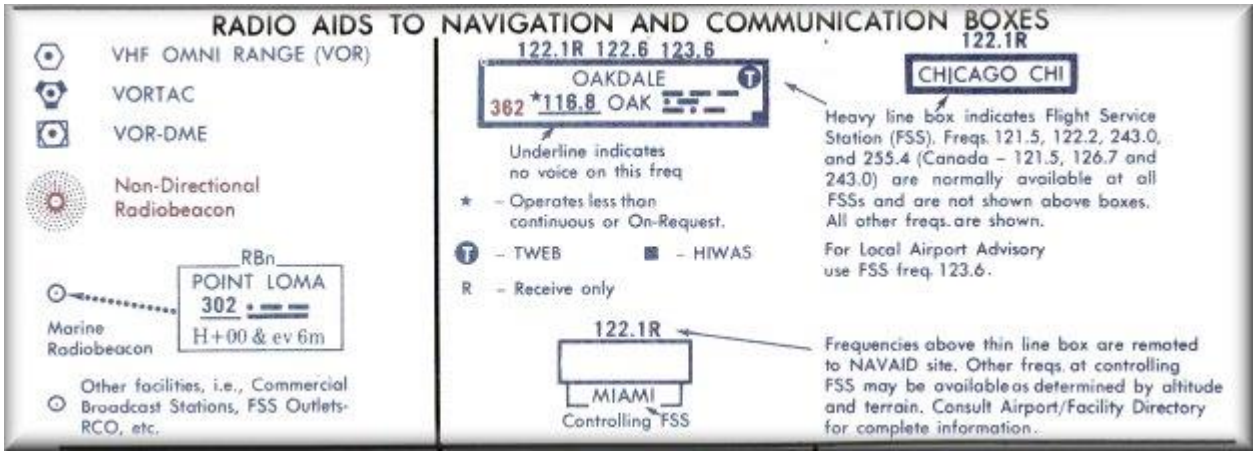
	Runway 14	Runway 32
Traffic pattern:	left	Right
Markings:	basic	Basic
Markings condition:	good	good
Elevation:	5037.0 ft.	5039.0 ft.
Runway end identifier lights:	no	no
Centerline lights:	no	no
Displaced threshold:	no	no
Touchdown point:	no	no

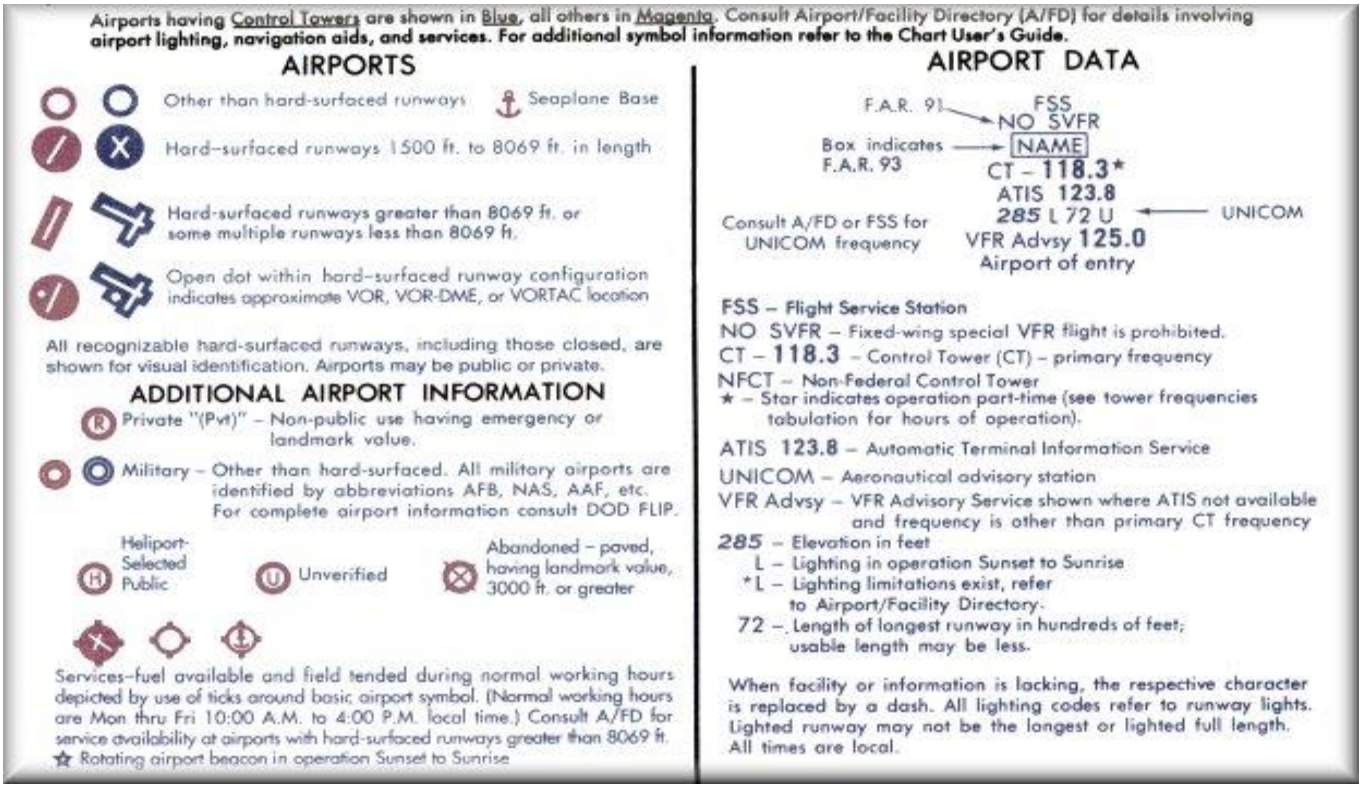
Chart for our area

The chart below is for our area at the LZ flight school. The chart has much of the needed information we will use while flying. It may look really confusing to some but I have added a key below to help you understand all the information you are currently looking at. On the next page you will begin to put all this together, I promise.


Magnetic disturbance exists in the area extending 50 miles or more NW, W & SW of Reno, Nevada. Magnetic compass may not be accurate at low altitudes
Sutcliffe
Chilcoot
Portola
Loyalton
Sierraville
RENO-STEAD
RENO CLASS C
RENO RNO
MUSTANG
117.9 Ch 126 FMG
HAZEN
114.1 Ch 88 HZN
RENO-TAHOE INTL
ATIS 135.8 277.2
Truckee
Soda Springs
Steamboat
Virginia City
SILVER SPRINGS
DAYTON VALLEY
PARKER-CARSON
Tahoe City
Carson City
Wabuska
SQUAW VALLEY
FOR FLIGHTS AT AND BELOW

Keys


RADIO AIDS TO NAVIGATION AND COMMUNICATION BOXES
VHF OMNI RANGE (VOR)
VORTAC
VOR-DME
Non-Directional Radiobeacon
RBn
POINT LOMA
302
H+00 & ev 6m
Marine Radiobeacon
Other facilities, i.e., Commercial Broadcast Stations, FSS Outlets-RCO, etc.
122.1R 122.6 123.6
OAKDALE
362 *116.8 OAK
Underline indicates no voice on this freq
* – Operates less than continuous or On-Request.
T – TWEB
■ – HIWAS
R – Receive only
122.1R
MIAMI
Controlling FSS
122.1R
CHICAGO CHI
Heavy line box indicates Flight Service Station (FSS). Freqs. 121.5, 122.2, 243.0, and 255.4 (Canada – 121.5, 126.7 and 243.0) are normally available at all FSSs and are not shown above boxes. All other freqs. are shown.
For Local Airport Advisory use FSS freq. 123.6.
Frequencies above thin line box are remoted to NAVAID site. Other freqs. at controlling FSS may be available as determined by altitude and terrain. Consult Airport/Facility Directory for complete information.



BEGIN

Now that you have gone through the Intro and Understanding helicopter portion, you get to move on to the fun stuff now. How about a couple tips to start with. When you first begin flying the helicopters, I bet you were viewing your flight through the cockpit view with the instruments all there and you were watching through a small portion around the panel. No good. TIP 1: Fly from the virtual cockpit view. You do this to start with and until you feel comfortable flying IFR (Instrument flight rules).

Flying in the virtual cockpit will give you much better visibility to reference your helicopter's position relevant to objects, such as real flying. Some of the helicopters don't have any portion of the panel in the virtual cockpit view and some do. TIP 2: Prior to take off place your mouse cursor on the point of the horizon on the screen. Doing this will help give you a reference point in relationship to the nose of the aircraft to indicate level, when no instruments are viewed. From this point you are feeling the helicopter and taking in input from what you're viewing. Without adding instruments in the equation, it allows limited input to concentrate on to master flight. Once you get the FEEL for the helo, then you can play around with the different instrument clusters available while flying. The cursor will stay in place through your flight in FS 98 but I noticed in FS 2000 it disappears.

From the Cockpit

All those gauges. What do they do and how do they help me? I have added a simple point and click section to help you answer those questions. After you take a quick tour here, then move on to the next section which takes you into the cockpit while in flight. Then you will be able to put all this together. Click below and enjoy.

To The Panel

Now take a tour from the cockpit and view the different instrument readings while performing different maneuvers. These are screen shots to help you visually see what goes on inside the cockpit.

I hope that helped you understand the instruments in a easy format. That should have given you a real good visual aid to put everything in perspective.

From the Tower

Now that you have that completed, how about some flying? Click on the Video button below and head to the Flight Training Video Center. You can download the videos and fly left seat with me before you take over the controls.

NAVIGATION

Alright, you saw the all the charts and navigational goodies on the last page. All the information just related to the Reno/ Stead area was a bunch of numbers and letters. How about all the airport information? What in the world is all that? Well you really didn't believe you would learn how to navigate and understand all that stuff by just looking at the key did you? Heck no. This is where you will get all the information that you will need to learn all about chart reading and how to navigate properly. Get ready to get some of the best instruction related to navigation and chart reading for FS. The LZ is very fortunate to have our charts and navigation instruction link prepared and ready to go. Now its with great pleasure to introduce to you the person responsible for making this happen for the LZ, Charlie Wood. Follow the links for your nav training and enjoy the information. Experience your learning curve taking a drastic swing upward toward the clouds.

AIR NAVIGATION

NDB NAVIGATION

NDB APPROACHES

VOR NAVIGATION

VOR APPROACHES

ILS APPROACHES

http://www.thelz.com/navigate.html

http://www.aero.com/publications/helicoptorial/hc.htm

http://www.cybercom.net/~copters/helo_pilot.html