December 3, 2001. Went to LTO to host a group. Got the idea that I will continue with my double star observing before and after the group. Before to get those stars about to set and after to continue east with the double star observing. At sunset, temperature was about 50 degrees and there was a high haze in the SE with overhead and to the NW clear.

6:05 PM *57 Aquilae* Magnitude 5.8, 6.5 with 36" separation
Drawing #45
Two evenly bright white stars.

6:15 PM *31Cygni* Magnitude3.8, 6.7, 4.8 with separation 107", 337"
Drawing #46
This is a 3 star system. Near the top of FOV is a white star, a bit dimmer than the middle star which is a red-orange star. Then on a line at 7 o'clock is a dim white star compared to the other two. The 1st and 2nd stars are about 3x times the separation as the 2nd and 3rd stars.

6:20 PM *61 Cygni* Magnitude 5.2, 6.0 with separation 28"
Drawing #47
Two evenly bright, dim red stars. The top star is a bit brighter than the bottom star.

6:25 PM *Gamma Delphinus* Magnitude 4.5, 5.5 with separation 9.6"
Drawing #48
The yellow star on the right is 2x as bright as the blue-white star on the left. These are pretty close together.

6:43 PM *Alpha Capricornus* Magnitude 3.6, 4.2 with separation 378"
Drawing #49
Two really bright stars with the one on the bottom noteably brighter then the star on the top. These are off-white, almost yellow stars with a good separation.

6:46 PM *Beta Capricornus* Magnitude 3.4, 6.2 with separation 206"
Drawing #50
The star on the bottom right is a yellow star substantially brighter than blue star that is above it and to the left.

9:09 PM *Beta Cephei* Magnitude 3.2, 7.9 with separation 13.3"
Drawing #51
Very bright blue-white and a very small, dim blue companion star , close together and below the brighter.

Seeing is fairly good. Sky is clear. Wind is calm.

9:13PM *Struve 2816* Magnitude 5.6, 7.7, 7.8 with separation 11.6", 20"

Drawing #52

Multiple star system. The center is the brightest. Very blue star. The one at 11 o'clock is 2x the separation as the companion at 3 o'clock. All look like blue stars. The 11 o'clock star is a bit brighter than the 3 o'clock star.

9:15 PM *Epsilon Pegasi* Magnitude 2.4, 8.4 with separation 142"

Drawing #53

Two stars with one on bottom a very bright red-orange star and the one a fair distance from it is very dim and is hard to see its color. Probably blue-white. It is much dimmer than the other brighter star.

9:18 PM *Xi Cephi* Magnitude 4.4, 6.5 with separation 7.7"

Drawing #54

2 blue stars. Very close together. One on right is 2x as bright as one on the left.

9:26 PM *Zeta Aquarii* Magnitude 4.3, 4.5 with separation 1.8"

Drawing #55

Very hard to see. Very close. Its on the horizon and is boiling a bit. Can see two blue stars of about the same magnitude. Most of the time it is an elongated oval, but then the seeing steadies and you can see two eyes together.

9:28 PM *94 Aquarii* Magnitude 5.3, 7.3 with separation 12.7"

Drawing #56

Two off-white stars. Low on horizon. Star on left is substantially brighter than the star on the right and there is a bit of separation between them.

9:31 PM *Delta Cehpei* Magnitude 3.9, 6.3 with separation 41"

Drawing #57

Easy to see two blue stars. The one on the top is maybe an off-white even yellow star. The one on the bottom is definitely blue-white and is a bit dimmer than the one on the top.

9:34 PM *8 Lacerta* Magnitude 5.7, 6.5 with separation 22.4"

Drawing #58

Had to look at instructions to see how many stars were here. There are two evenly bright blue-white stars and a fainter one below these and to the right. Then there is a bit brighter one to the right of the main two.

NOTE: Its hard to draw these stars in the dark, balancing a red light on my chin and trying to see where the pencil tip is on the paper.

9:45 PM *Sigma Cassiopeiae* Magnitudes 5.0, 7.1 with separation 3"
Drawing #59
This one is close. The star on the right dominates the star on the left. It's a bright blue-white star. Keeping my eye off the eyepiece a bit, I can easily see the much dimmer and possible red in colored star. It is off to the left at about 10 o'clock.

9:48 PM *Eta Cassiopeiae* Magnitude 3.4, 7.5 with separation 12"
Drawing #60
Easily seen double. The brighter star is a yellow star and the companion on the left is much dimmer and maybe a red star. It is definitely a different color than the 1st.

9:54 PM *65 Piscium* Magnitude 6.3, 6.3 with separation 4.4"
Drawing #61
2 evenly bright blue stars. Can see the separation between them but are very close. Again, holding my eye off the EP and waiting for the seeing to steady, I can easily see the separation and 2 stars. Can see the separation most of the time. 2 little eyes.

9:55 PM *Psi 1 Piscium* Magnitude 5.6, 5.8 with separation 30"
Drawing #62
2 evenly bright blue-white stars with s good separation between them.

9:58 PM *Zeta Piscium* Magnitude 5.6, 6.5 with separation 23"
Drawing #63
2 blue-white stars. Easy to see because of the separation. The one on the bottom is about ½ as bright as the one on the top.

10:00 PM *Gamma Arietis* Magnitude 4.8, 4.8 with separation 7.8"
Drawing #64
The 3rd star in the constellation. Two little blue-white stars. close together but a definate separation between them. 2 little eyes.

10:05 PM *Lambda Arietis* Magnitude 4.9, 7.7 with separation 37"
Drawing #65
2 stars, a good distance apart. The one on the bottom is a much brighter white star than the one on the top. Maybe 2x as bright. The one on the top is an off-white star.

10:08 PM *Alpha Piscium* Magnitude 4.2, 5.1 with separation 1.7"
Drawing #66
Star is right where the 2 fish lines connect. This is a hard one to see. Two equally bright, blue-white, very shiney stars. They overwhelm each other. Keeping eye off EP and waiting for seeing to steady, can see the separation. Most of the time it is an elongated figure 8. They are up and down in the EP and right on top of each other. I liked this one.

10:12 PM *Gamma Andromedae* Magnitude2.3, 5.5 with separation 9.8"
Drawing #67
This is a pretty one. Its like Alberio. Very bright red star on the bottom and a little bit dimmer blue companion on the top. Nice color contrast.

10:16 PM *Iota Triangui* Magnitude 5.3, 6.9 with separation 3.9"
Drawing #68
Close pair. The one on the left is a bit brighter than one on right. Left is an off-white, even a red star with right a blue-white star.

10:21 PM *Polaris* Magnitude 2.0, 9.0 with separation 18.4"
Drawing #69
Polaris is a very bright blue-white star. Its companion is very dim and overpowered by Polaris. Its hard to tell its color but is an off-white colored star. It is not red by no means. Much dimmer than primary.

10:24PM *Gamma Ceti* Magnitude 3.5, 7.3 with separation 2.8"
Drawing #70
Bottom star of bowl of neck where body and head meet. Seeing must not be as good as I thought for these close guys are hard to separate. These are two blue-white stars. The one on the right is definitely a lot brighter than the one on the left. When the seeing got good once, the dim star on the left looked almost red in color and not white. Most of the time it is one smudge of a star.

10:30 PM Saturn.
Saw lane in ring. Planet is more golden then rings. Planet sticking out underneath the rings. There are 9 points of light all around the planet. The ones on the right are much brighter. 2 are close to the planet and underneath. Can see the band on the planet.

10:33 PM *Eta Persei* Magnitude 3.8, 8.5 with separation 28.3"
Drawing #71
Definitely a red star on the right and its companion at 10 o'clock, much fainter and is a blue star.

10:35 PM *Struve 331* Magnitude 5.3, 6.7 with separation 12.1"
Drawing #72
Close double. Star on left is 2x as star on the right. Both blue-white stars. Fairly close.

Moon is a 3rd quarter moon adding to the sky glow tonight.

10:38 PM *32 Eridani* Magnitude 4.8, 6.1 with separation 6.8"
Drawing #73
Two closely spaced stars. One on bottom is brighter than the other and is an orange-red star and the one on the top is a blue star. Easy to separate.

10:41 PM *Chi Tauri* Magnitude5.5, 7.6 with separation 19.4"
Drawing #74
Dimmer set. One on bottom is 3x the mag as one on the top. Both are white stars.

10:43PM *1 Camelopardalis* Magnitude 5.7, 6.8 with separation 10.3"
Drawing #75
2 close, white stars. One on right is a hair brighter than the on top-left. Same color, basically white.

10:47PM *55 Eridani* Magnitude 6.7, 6.8 with separation 9.2"
Drawing #76
2 evenly bright, pale white stars. Easy to see.

10:52 PM *Rigel* Magnitude0.1, 6.8 with separation 9.5"
Drawing #77
Definitely see star on right is a blue-white star. The star on left is a yellow or red star. Sky is boiling and can see elongated figure 8. Brighter star dominates the dimmer star. Played with focus and watched star to see the separation when seeing cleared.

10:55 PM *118 Tauri* Magnitude 5.8, 6.6 with separation 4.8"
Drawing #78
Very dim, close pair. Easy to separate. One on right is maybe 2x as bright as one on left. Both blue-white stars.

10:57 PM *Delta Orionis* Magnitude 2.2, 6.3 with separation 52.6"
Drawing #79
Upper most right belt star. Easy to see. One on left is substantially brighter than the one on the right. Left star is a blue-white star and right star is just a white star. Lots of separation between these two as compared to the most recent ones I have been looking at.

11:00 PM *Struve 747* Magnitude 4.8, 5.7 with separation 35.7"
Drawing #80
Looks like in Orion Nebula area. See nebulosity in EP. Several pairs of stars in FOV but one in center matches the magnitude and separation in instructions. One on bottom is a hair brighter than one on top. Both blue-white stars.