GPS Surveying
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Lecture – 20
GPS Data Processing (Control Point, Point & Linear Objects)

Welcome friends. Today is the concluding class on GPS surveying. Today I am going to demonstrate you the processing of GPS data as it has been collected in the last class it was shown.

As you know that too, in case of GPS surveying we have to first establish the control point then we will look for surveying of point object; that means, we want to find out the location of point objects. All objects which can be defined by it is location and we want to know the location and extent of linear objects which can be defined by some points joining together or the objects which is closed aerial extent also that can be defined by some points and joining them. So, that is what I will be demonstrating you.

As I have already told you that for control point establishment we have to take one reference station to be placed on the control point we have to take the data, on that point and that data will be processed with respect to some stations spread all over the world for the point to (Refer Time: 02:07) find out the location of point objects. We had collected the data by using stop and go method, then with respect to the reference station those location will be processed and find out using the GPS software. And for line object again with respect to reference station that provide data will be processed and that has been found through GPS processing.

Now, I want to show you the demonstration of the actual working of the software for the GPS data processing I will take up the software GNSS solution as our processing software, and through these software I will first demonstrate how to establish the control point then I will demonstrate the processing of GPS data for identification of point object location and then the line objects. So, to start with first we have to create a new project, suppose project four is the object which we like to name as then and to the modified default settings let us take what are the default settings are there except miscellaneous under miscellaneous, we take this BRS maximum range as 3000 kilometers.

I have to import the data which we have collected in the field, and that data has already been transferred to this office computer from field computer, and that is kept in a folder and from that folder I will import the data to this project work. So, that is the file which is our base data.

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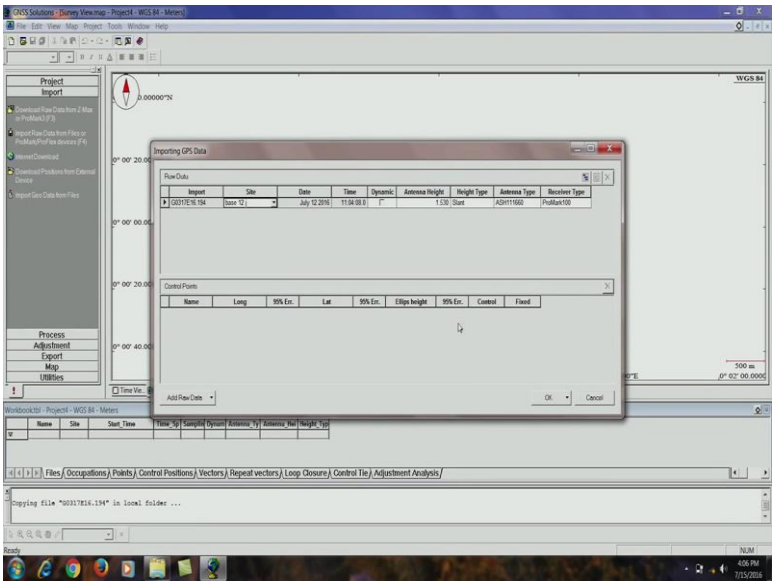

Now, with this base data I am importing, it is there, now we have to go for this BRS and so if we click here then all these station will be checked.

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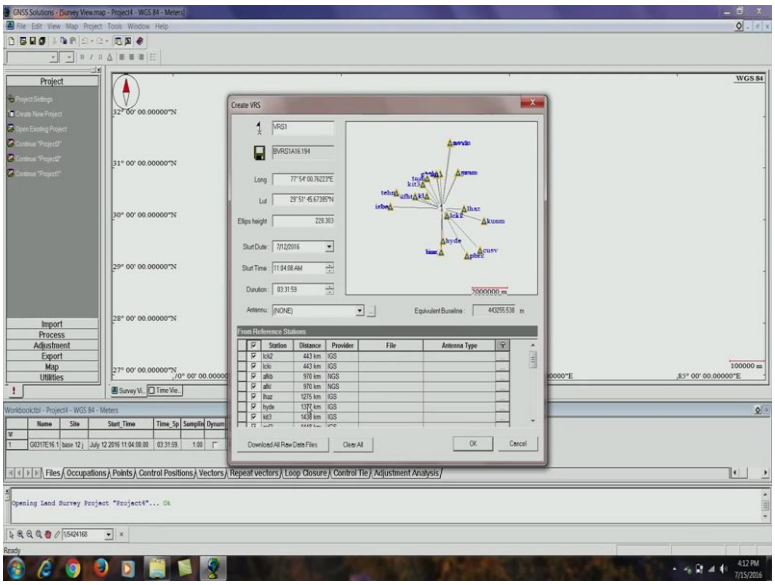

So, and we are trying to download data files of these stations particularly in which stations the observations are available for 12 July because 12 July is the day on which the data for this (Refer Time: 05:34) station has been collected during this time - start time and duration. So, now, the software is checking whether these (Refer Time: 05:45) stations also has the data for this date and during these hours. So, only those stations for which the data will be available then only will be considered, that can be considered for our further processing, so in order to know that we need to carry on this process.

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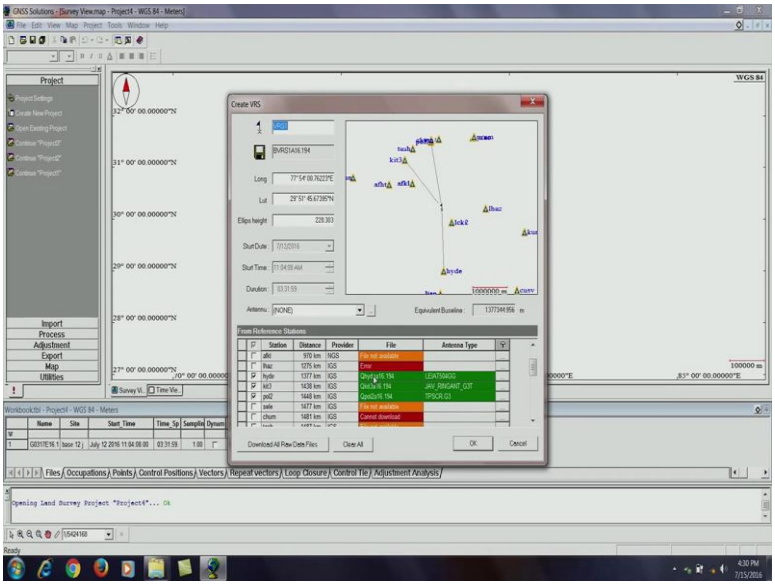

So, now, you can see here at for some stations files are not available; that means, for this station a f k l data has not been collected during the observation period which we are looking for. This station there is some error in downloading the data, but you can see here that some stations like h y d e, k i t 3, p o l 2, the data is available for that period and also it has been downloaded during this processing.

Similar to that there are some stations for which there will be data available, among those stations we have to select which are the stations we will be looking for our data, further processing. Now in doing that actually, we should first see that we should like to have the stations around all station in such a way so that the stations provide us a good network, as we have discussed in the closed network. So, in this case I can see that the station here this, this and this will be good. So, let me select those stations from here then you will see the network. So, I will like to go for k i t 3 then r i s c, c u s v and another is

n o v m. Now you can see that this will form a good network of triangle and, so I am selecting these four stations as our reference data to get the location of this station.

Now we have to click. Now, we have to import the data that has been downloaded and that is available in this office computer. So, generally it is the name of the folder v r s extension. So, now, these are the data which we are looking for i i s c, c u s v and n o v m this observation files we are in need to work. So, we have to open. So, we are importing this thing.

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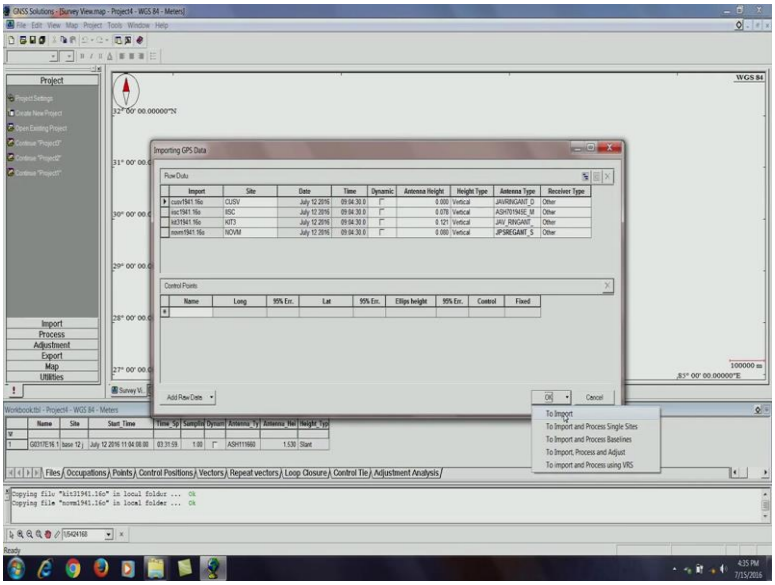

Now this is the network of triangle. So, now, we have to select the - we can go to there we can define the control points.

Now, we will like to take these four as our control point. Now, what these control points actually these latitude, longitude and height whichever is available here that is actually form the data.

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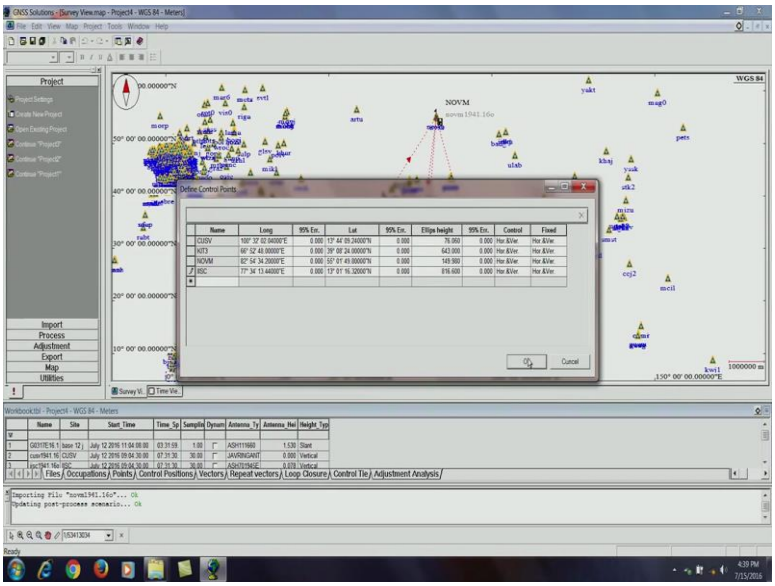

Now, before we go for any further processing, actually we should first download the actual positions of these stations which are available in the internet site and that has to be those data has to replace these data. Now, first c u s v we have the only actual longitude then latitude 13.7359, then ellipsoidal height 76.06, for kit3 it is 66.88, latitude 39.14 and height 643 for n o v m it is 82.9095 then latitude 55.0305 and height 149.9800 and for i i s e 77.5704, 13.0212 and height 816.600.

So, these this is the location of the control points and available from igs site. Now we can process this, we can now process all baseline.

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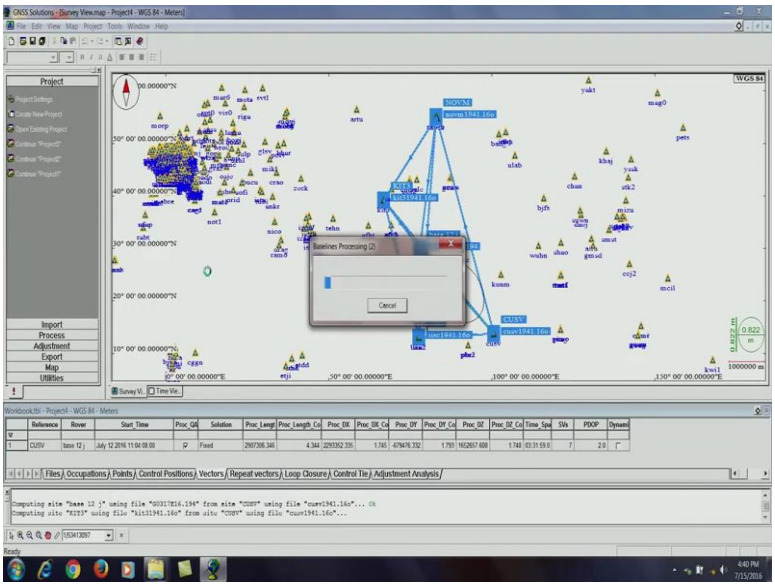

So, that will after processing the stations as baseline we will get the location of the reference station and for our further work we will be using that position of the reference station as our known point. Now of course, in this processing you can see there are big ellipse circle which are the error circle and actually we need to reduce this for during our further processing so that these errors are not moved.

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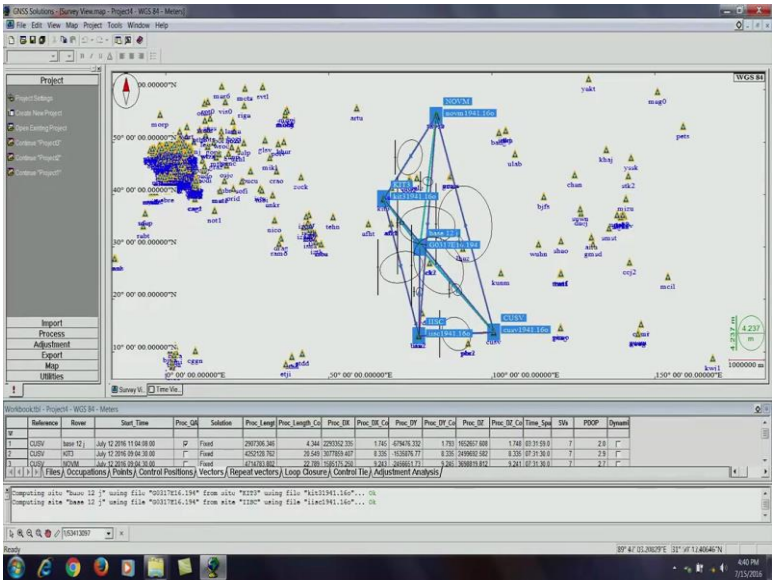

Now, with this I got let us see what is the output that we can get from land survey report.

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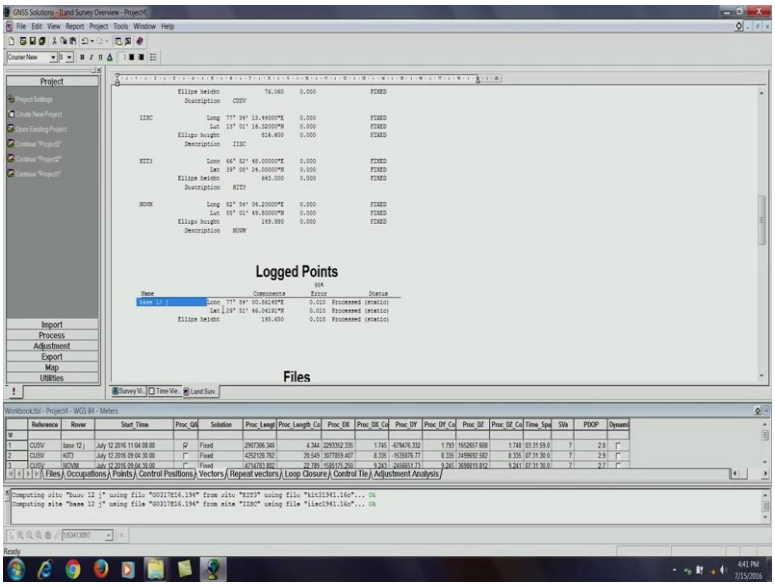

So, this provides us the location of the base station as 77 degree, 54 degree 54 minute as the east and that latitude like this and (Refer Time: 15:14) height like this. So, this is the data which we got as the location for our reference station. So, for further processing we will be using this as our known position. So, now, this can be, we have set this the report now we can we want to exit out of this. Next, I will like to demonstrate how to process data that has been collected for object point objects.

Similarly, we can create a new project again suppose project five and where we can import raw data files.

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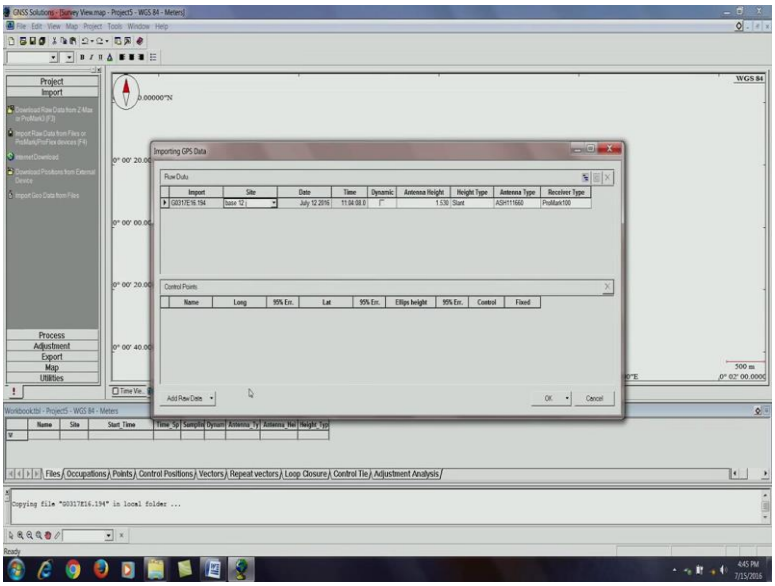

So, now first we have to import the base data and then we will import the other point data which is available in this file. So, all those data has been importing it.

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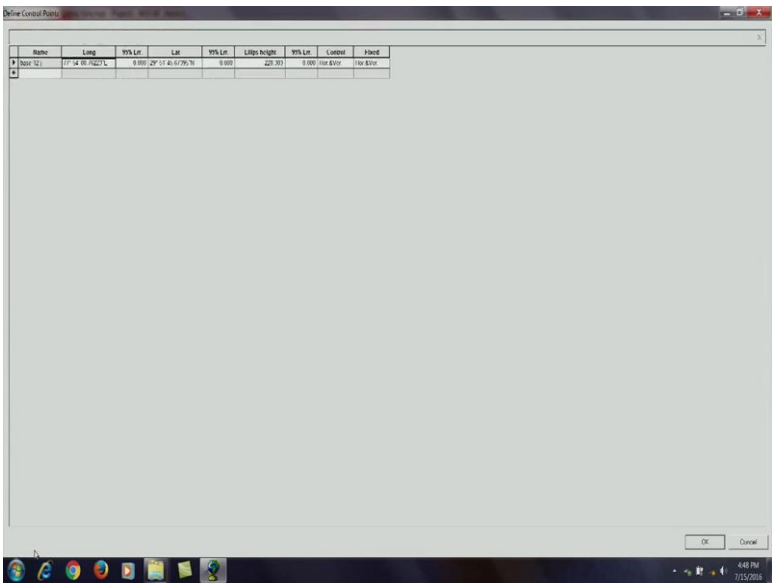

So, this is the control point where 77 degree 50 minutes and 86148 then this is 46.04191 and height 195.650. So, in these ways we have to give the input of the control point location. Now, we need to process the data as baseline, actually there are four objects here if we make this it is the scale for plotting if we make this a scale large then we will be able to see the location here you can see objects are there, these are the point object.

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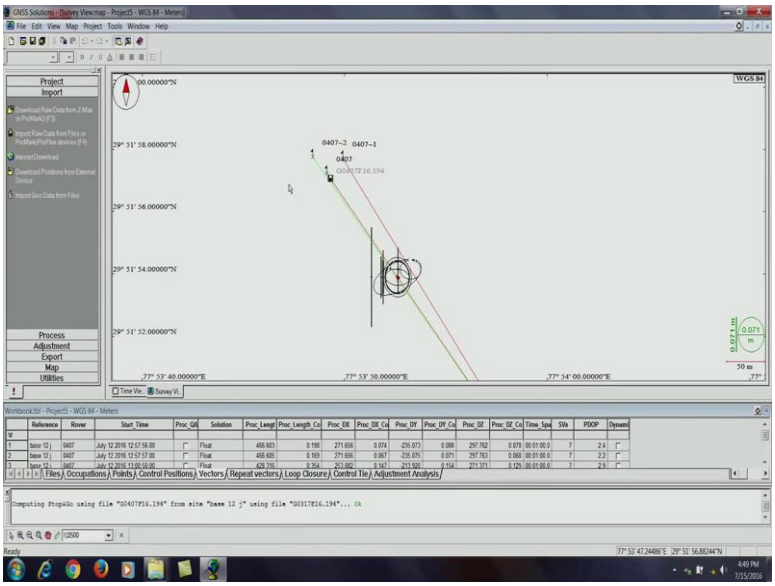

So, again from land survey report we can get the location of these points, now you can see here we have so many points are there 407 407 407 4071 4072. So, these are the points and their location we get it here. These are the locations.

So, 407 4071 there are three objects and these are the location of this points. So, these locations can be used for further mapping. In this way we can process the point data and point object data and we can get the location which subsequently can be taken to mapping software to plot it. Next I will like to demonstrate you the processing of line objects. Similarly we have to again create a project suppose it is project six and we have to import raw data files. So, again we have to take the same base data because with respect to that base we have taken all the other data, lower data and the for line objects we have taken data in this file. So, we are opening it and again now we need to go for, so all this we have to import. So, I have imported it.

Now again we should go for control point selection, if we select it you can take this is as a again we have to change these data as it is original coordinate which is the correct coordinate like 86148, here 46.04191 and it is 195.650. So, with this now I can project process was base line. So, now, you will see what are the lines. Now you can see here that these are the lines which really we have plotted.

View you can see here. So, these are the lines along which we have current and this is the road. So, this is the corner of the roads and this is an area actually this is a garden

area this is also a field and there is a road. So, you can see here actually there is a road also, but we have not taken that data there. So, the roads and the boundary of the field have been nicely depicted through this surveying road. Now if we go again to some land survey report here we can see that we will get the location of all the points, you can see here that these are the lines that has been taken his 3 d lengths and 2 d lengths are given. There are 100s of epox of observation and corresponding to each epoch you can see. So, many points are there. So, all these points we can download and then taken to the mapping software and we can map the point, adjoining those points we will get the boundary of the roads as well as the boundary of the fields.

So, you can see here that so many points 360 370 399 400t like that. So, 1071 points are there and they are coordinate latitude, longitude and height is there. So, all these thing if we take in an excel sheet and from there we can go for mapping software to plot these points and joining these points we can get the corner of the road as well as the boundary of the field.

So, in that way we can go for GPS surveying to establish the point location or point objects and points along the lines showing the roads - corner of the roads or the boundaries and joining them we can get the linear object or objects aerial objects.

So, with this I like to conclude the demonstration of GPS surveying software and with these I conclude about the GPS surveying data software processing. Thus I have demonstrate to you how to process GPS data to find out the control point then I had demonstrated to process the data, to find out the location of objects than lines like the corner of roads the boundary of areas.

It may be noted that during processing we got the error ellipse more than what is expected out of GPS data processing, and this can be improved by rigorous processing of the GPS data. By improving the quality of the GPS data about the different stages as explained during different lessons, with this I want to conclude your course on GPS surveying hope you enjoyed the course, wish you all the best for your final examination.

Thank you.