<u>Disclaimer</u>: The following MOP is as per Survey of India requirements. For more details and other GNSS receivers, contact respective manufacturers.

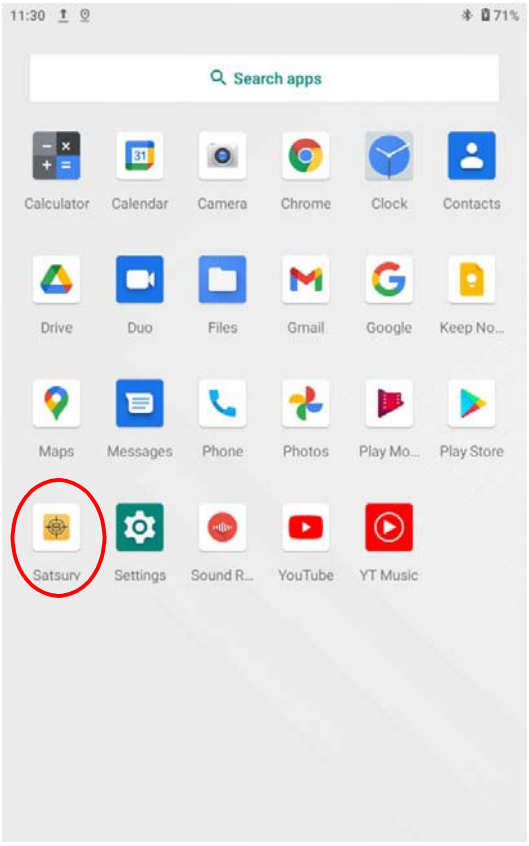
<u>RTK DATA COLLECTION USING SATLAB ROVER</u>

SATLAB Rover Receiver

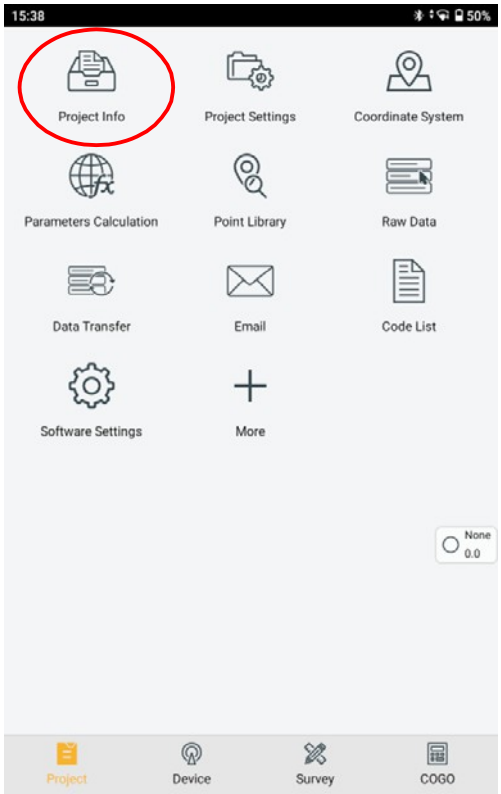
This is the controller for Satlab RTK Rover

SOP For RTK Survey Using SatlabRover

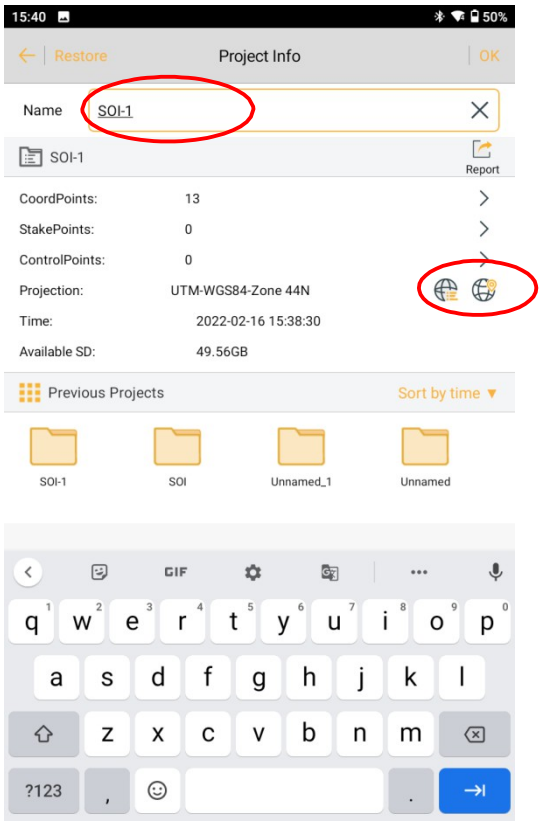
Switch on the controller and search for **Satsurv** app. Double click to open the app.



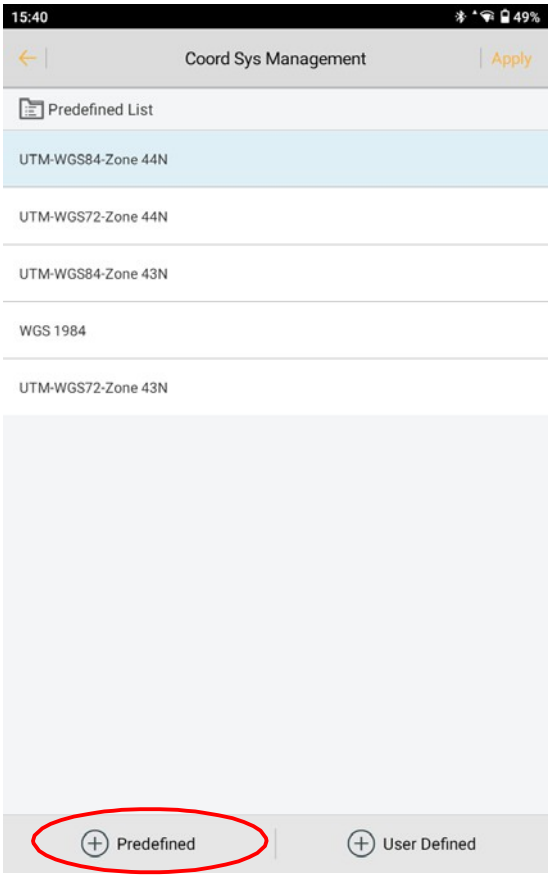
Click on **Project info.**



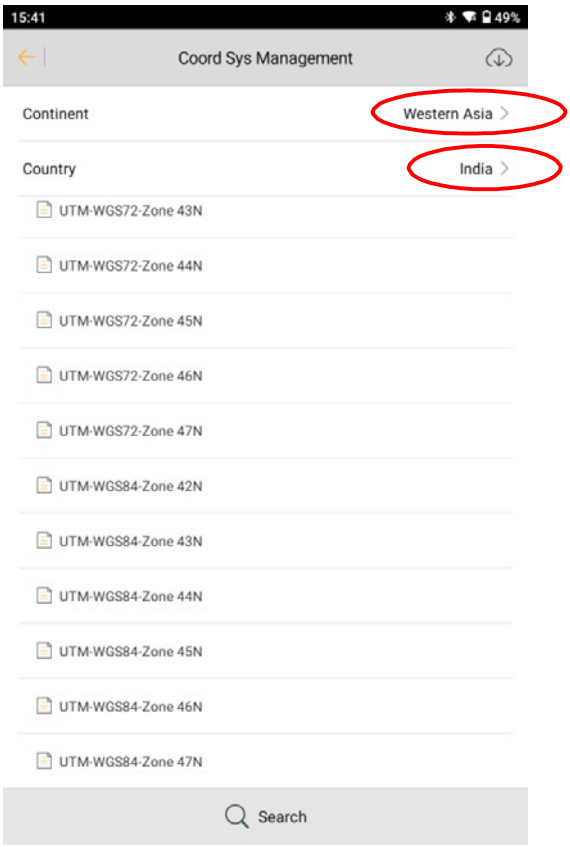
Input Project **Name.**Then click on icon to select projection



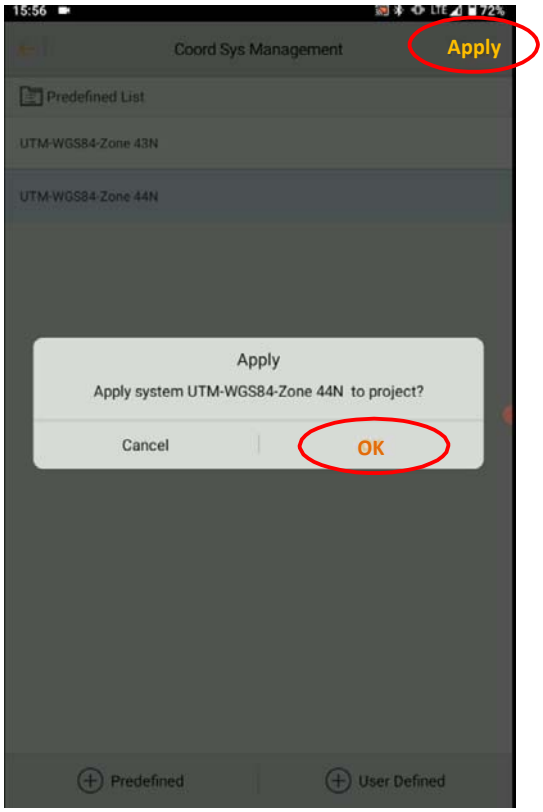
Click on **Predefined**



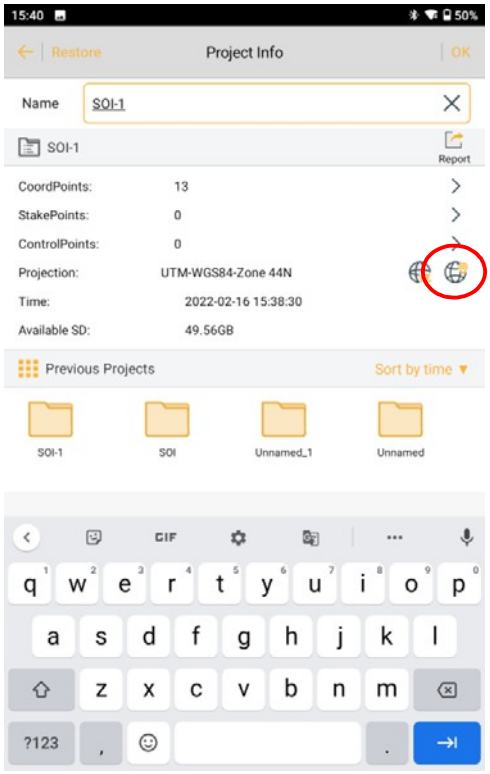
Go to**Add Predefined> western Asia > India > WGS-84 UTM 44N** or **43N** according to the project area zone.



Then Click on **Apply**>**OK**

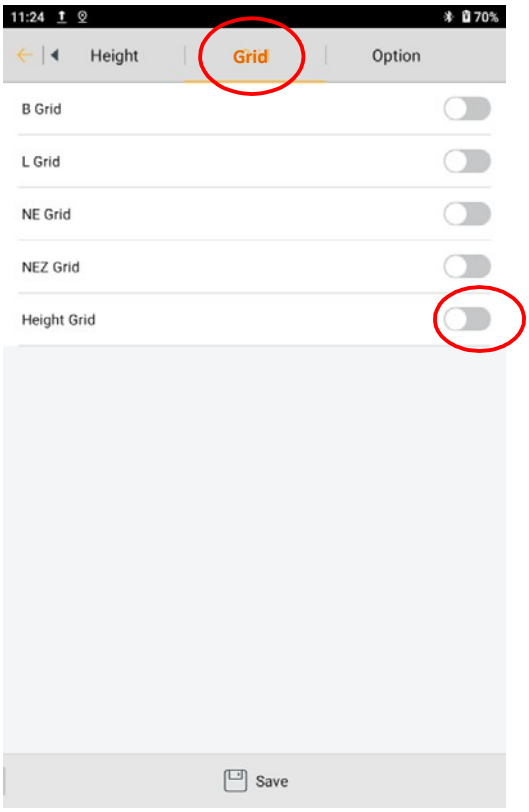


Now click on in the row of Projection in Project info tab

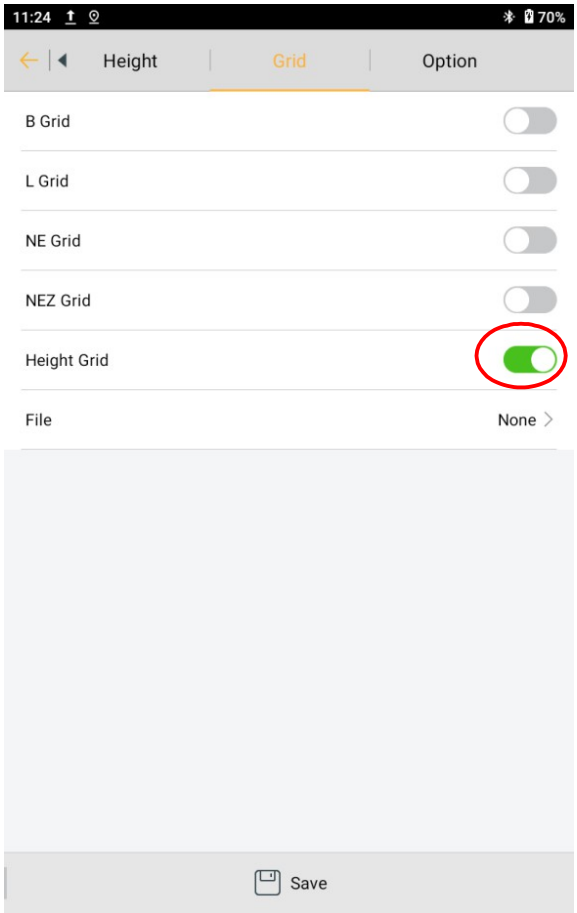


Following window will open. Then Click on and then in **Grid** tab.

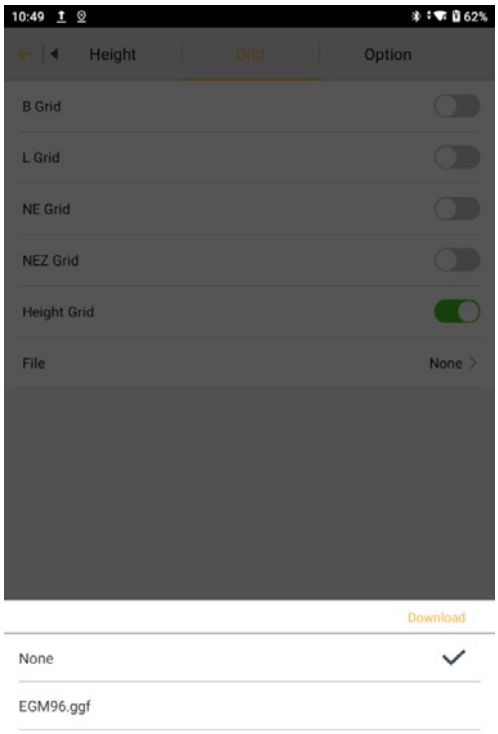
Then click on **Height Grid**



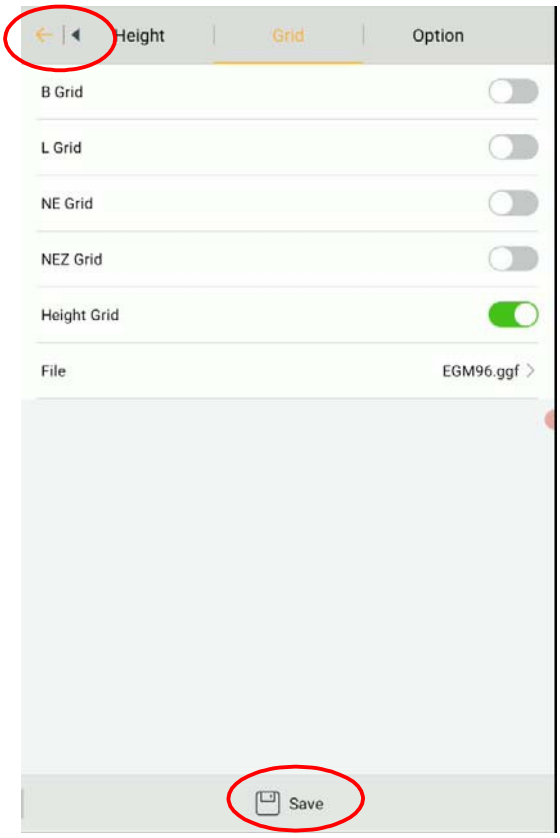
Clickin **File**



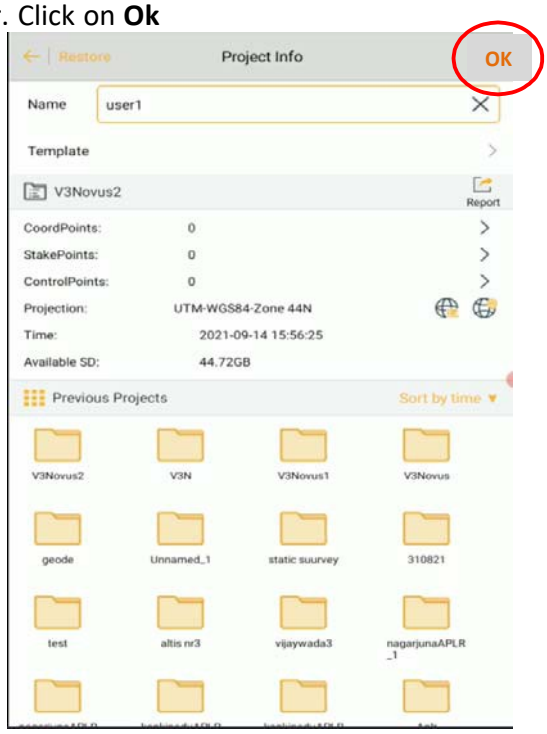
Select appropriate Geoid Model



Click on **Save.** Then Back arrow twice.

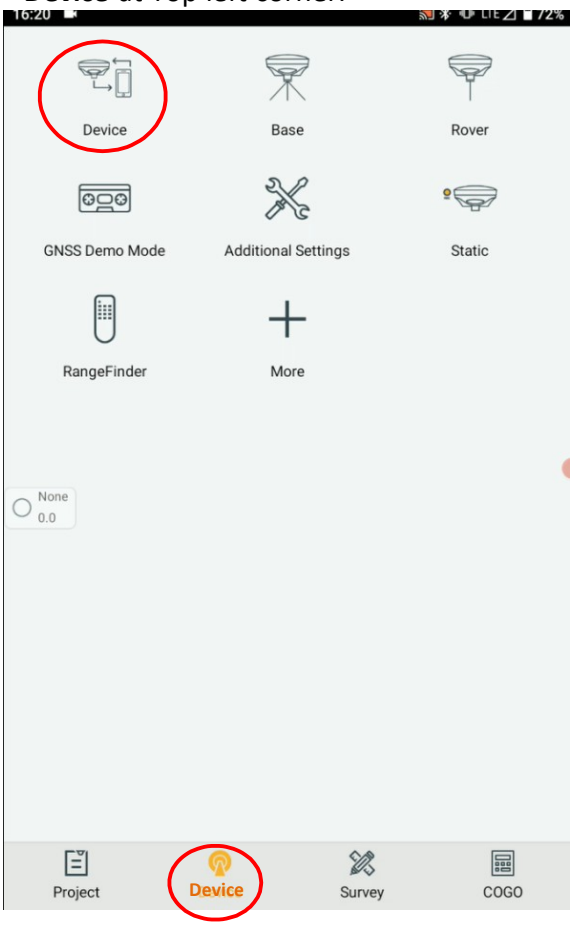


Project info window will appear. Click on **Ok**

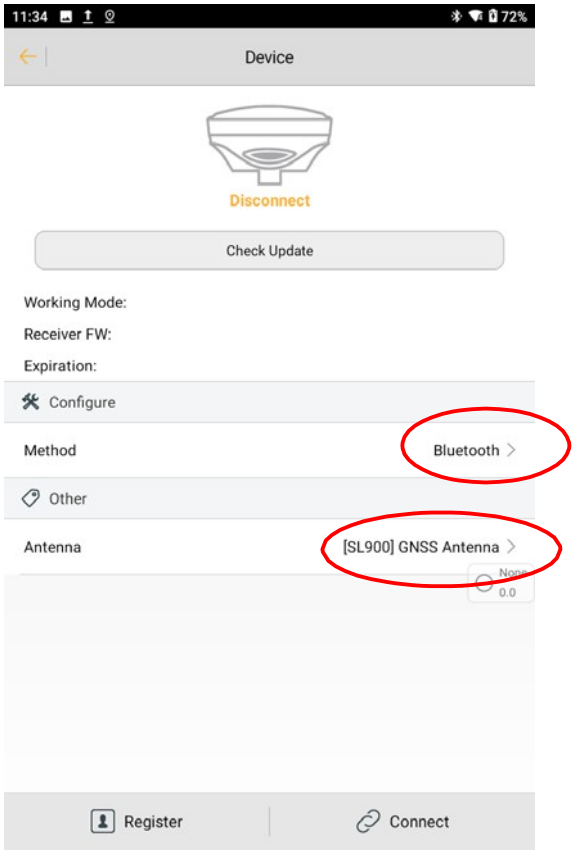


Connect device with Controller

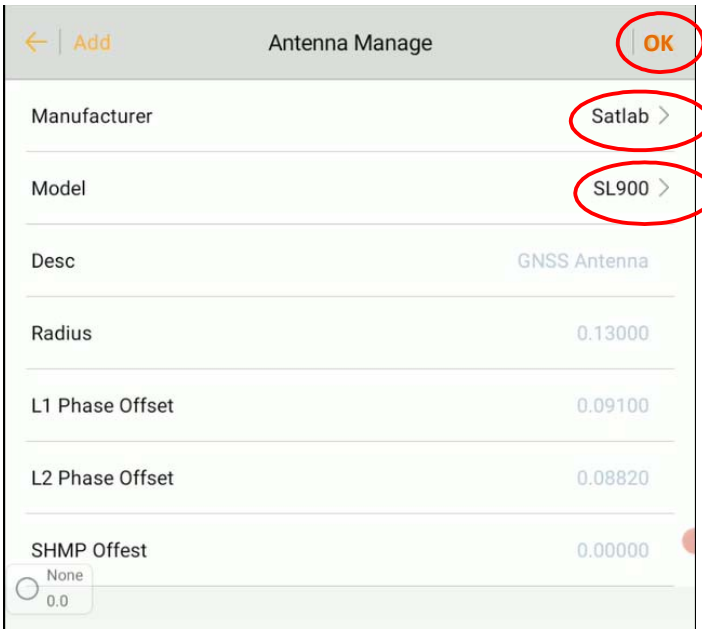
Click on **Device** tab in bottom >**Device** at Top left corner.



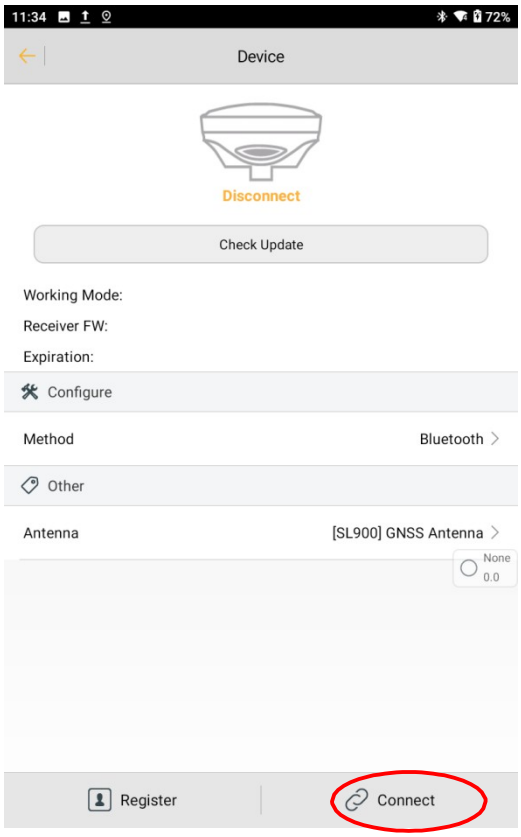
Click on **Method**>**Bluetooth** toconnect Rover with controller, thenClick on



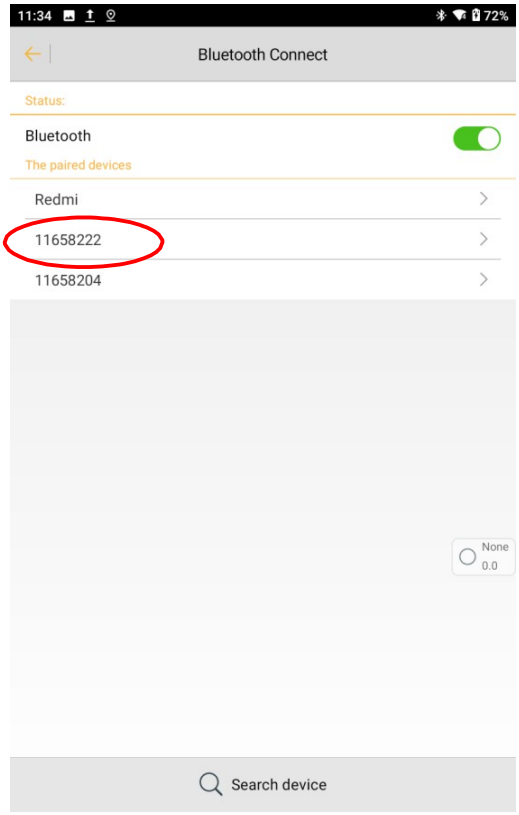
Select **Manufacturer** and **Model** of the rover. Then click on **OK**



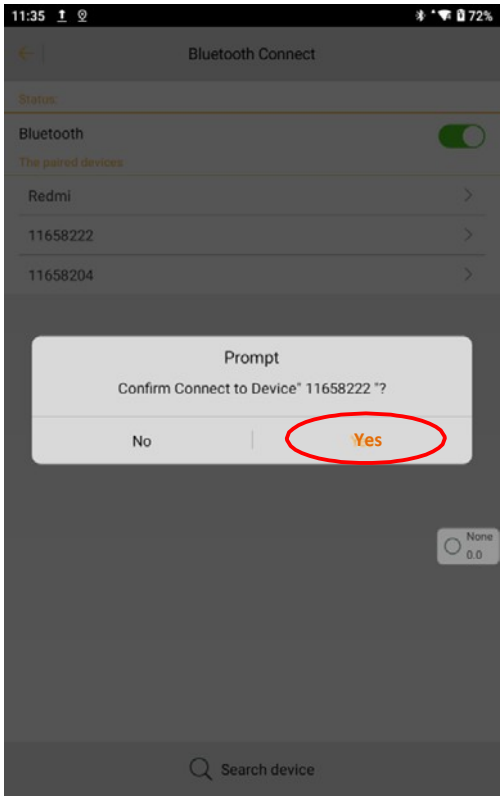
Following window will appear. Click



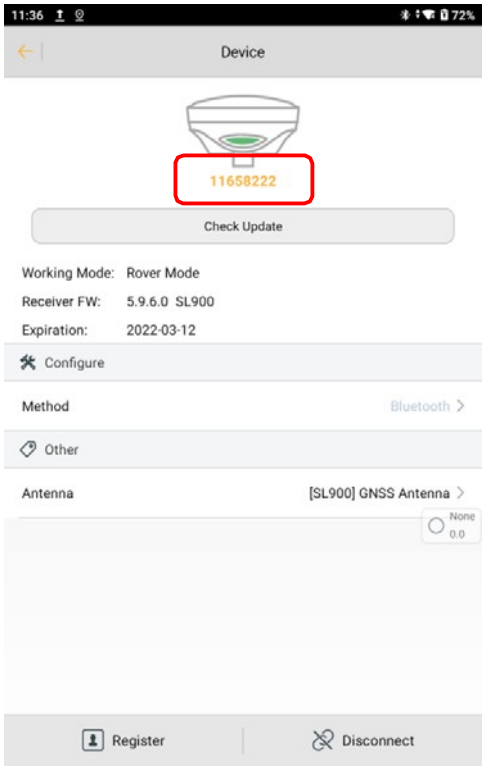
Search for the Antenna serial and then click on it.



Confirm it by clicking on

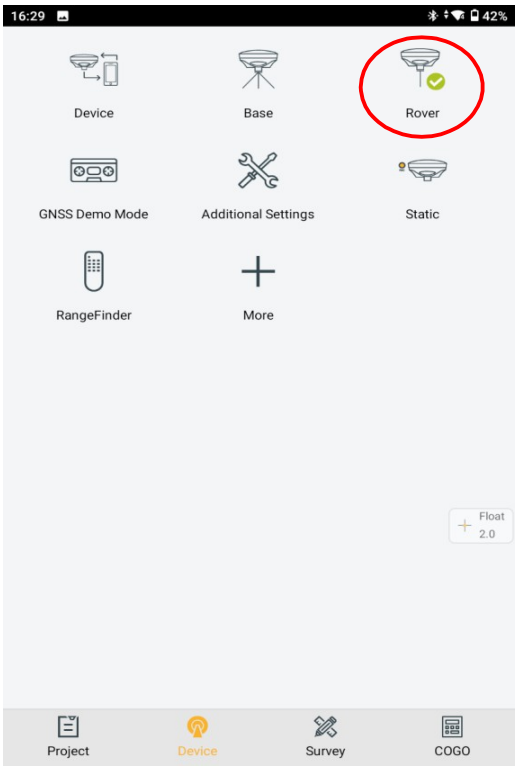


Controller is now connected with the rover and it will show Serial number of the Rover.



Again click on Back arrow

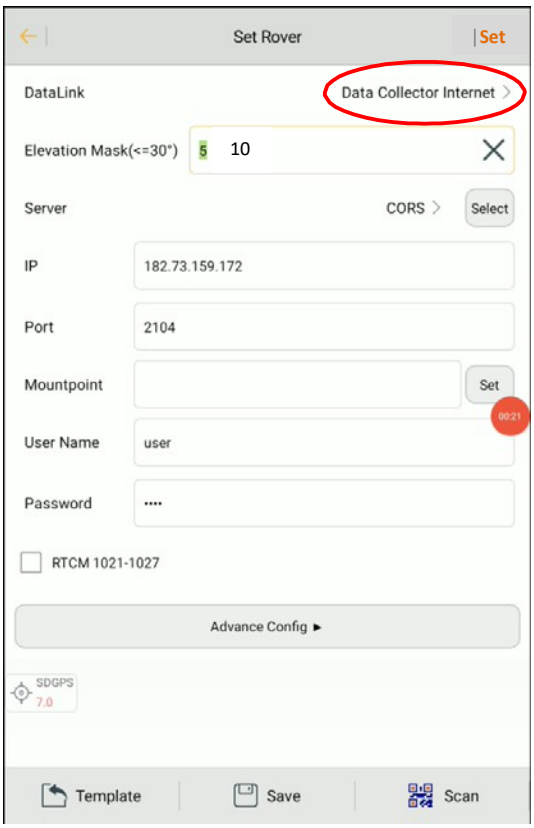
Setting Of Rover



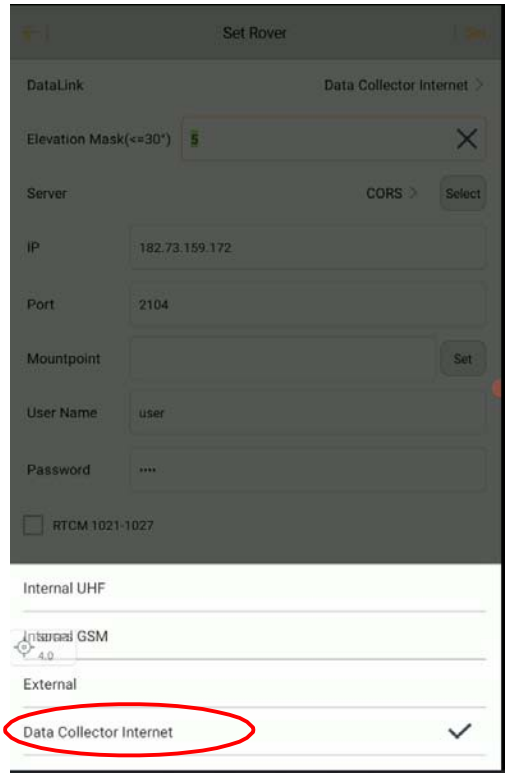
Click on **Rover**.Following Window will appear.

To connect controller with internet use either Wi-Fi connection or insert a GSM SIM having valid Internet
Data pack.

Click on **DataLink**



Select **Data Collector Internet**

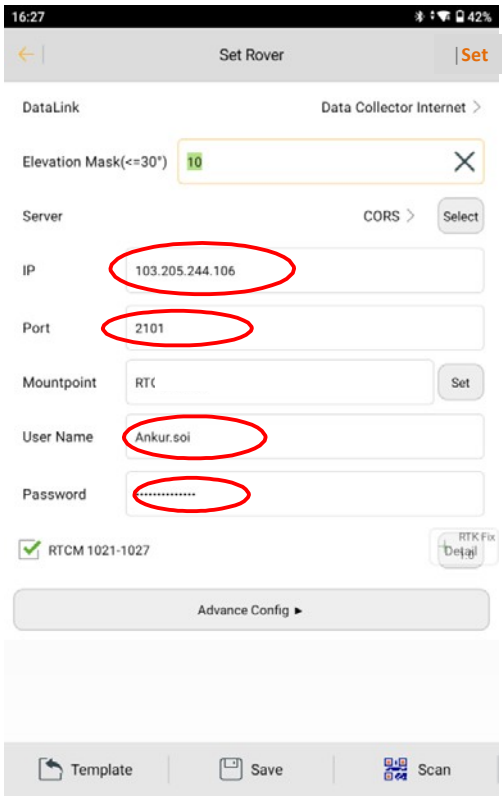


Now select **Server** type as **CORS.**

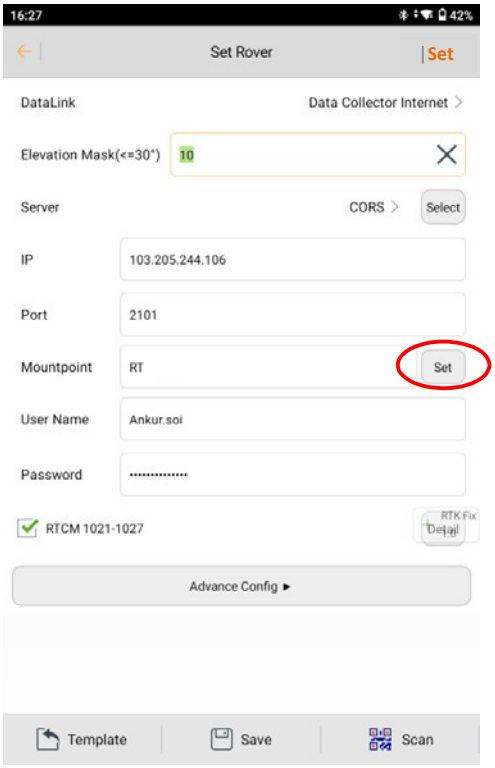
Enter **IP** address and **Port** of the CORS server which are provided by the *Network RTK Service Provider*.

Enter your**User Name** and **Password**(created by you during registration for NRTK services or as provided by

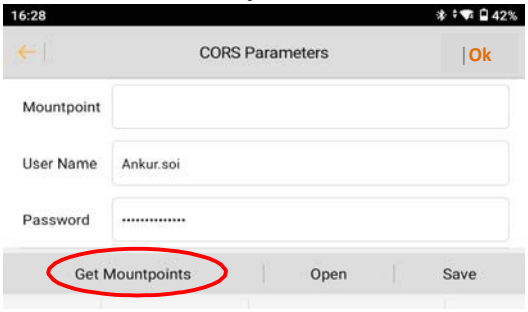
Network RTK Service Provider).



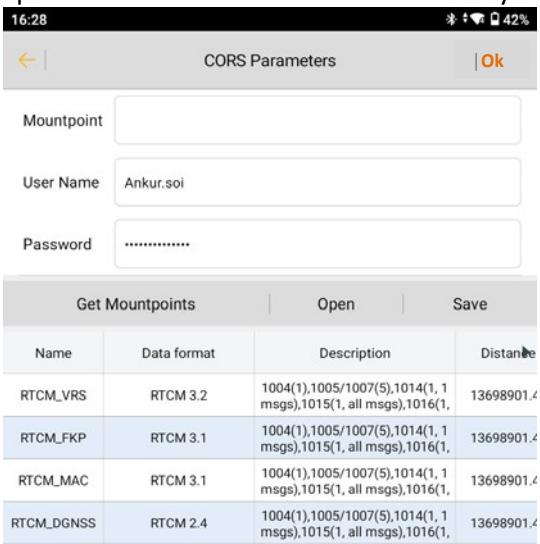
Now click on **Set**



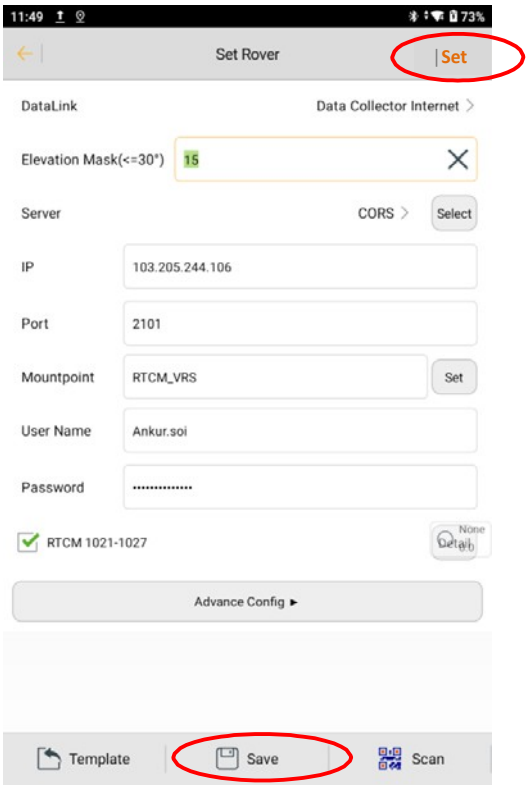
Following window will appear. Click on **Get Mountpoints**



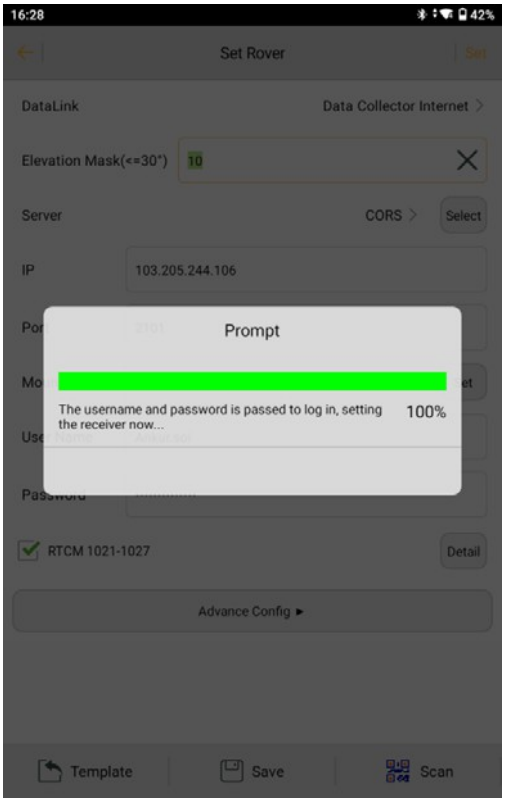
Now choose appropriate Mountpoint from the list as recommended by instrument OEM.



Click on **Save** and then on **Set**

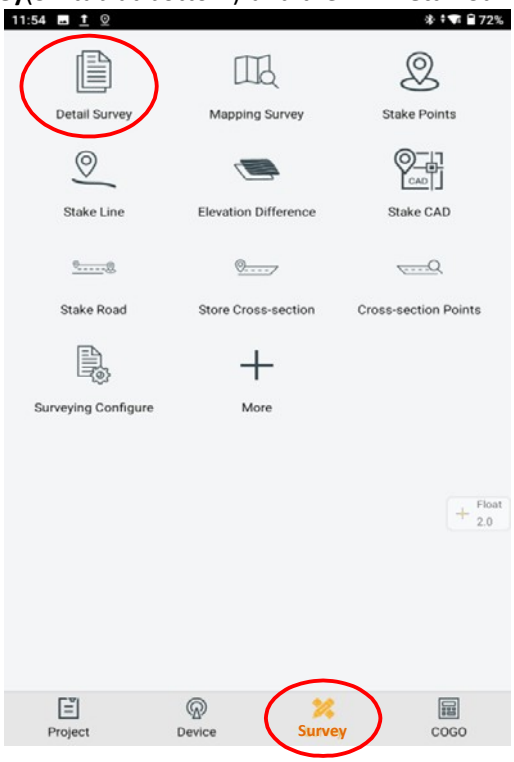


You will get voice prompt after connecting with CORS

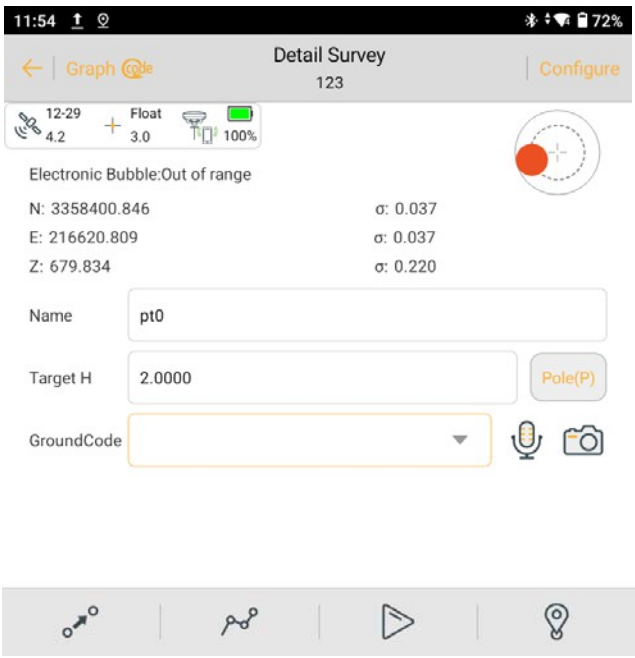


FOR TOPOGRAPHY OR DETAILS SURVEY

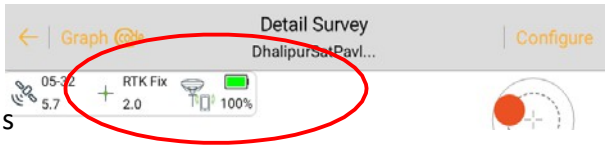
Now for survey work Click on **Survey**(3rd tab at bottom) and then in **Detail Survey** (1sticon at top left)



Following window will appear. Now input **Point name**, **Target H**(Antenna height)and **GroundCode**(Land mark)



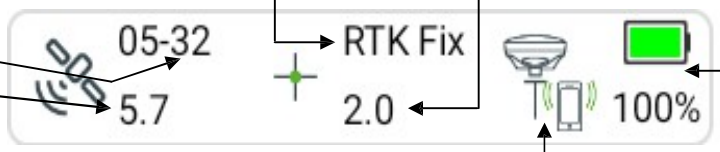
Here we can see small icons



It shows the following information:

Satellite information
No of Satellites
PDOP

RTK Related Information
RTK ambiguity
Base Data Age (Latency)

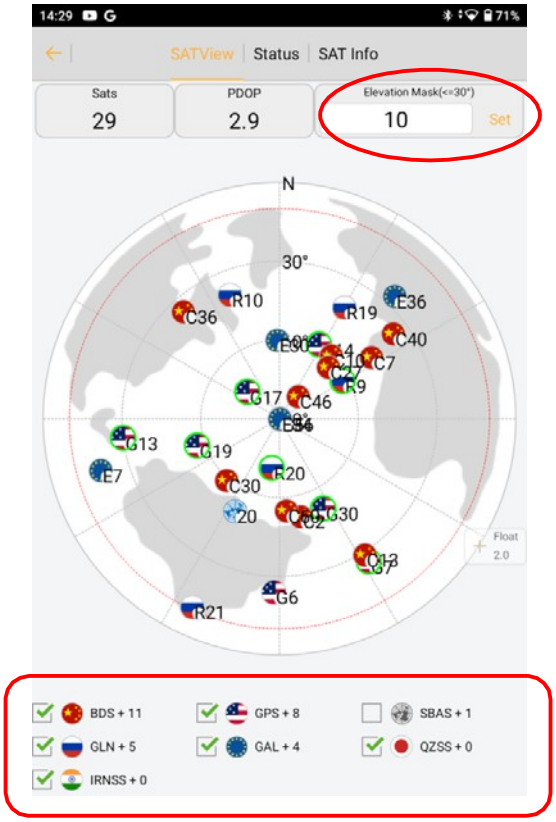


Battery Status of the Rover

Data Collector Internet Status It shows the Connectivity of Data Collector, Server and Login Account.

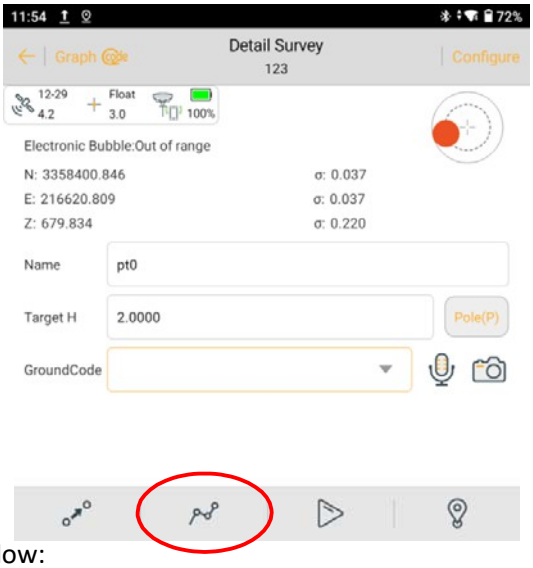
Click at satellite icon 

.A window will open as shown below. Here we can set **Elevation Mask**. Also we can check on/off Satellite constellations.

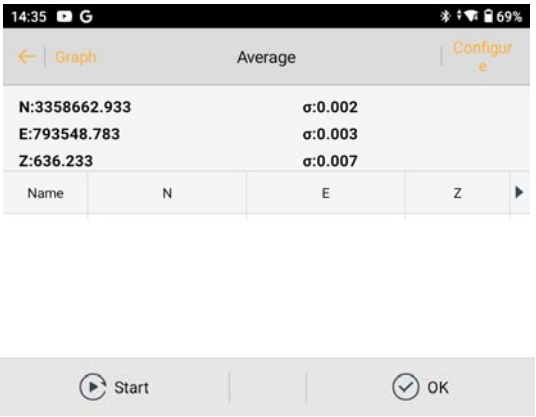


Now click on back arrow and come to Detail Survey window.

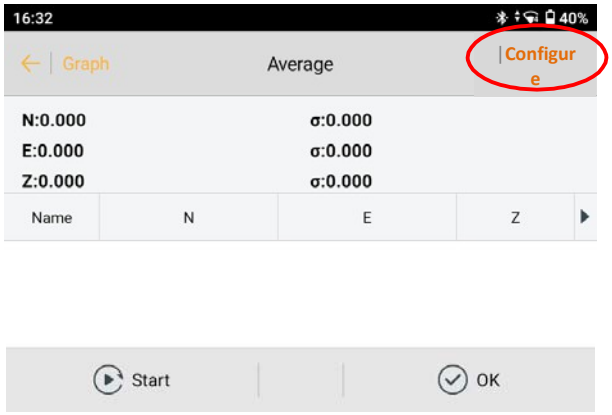
Now to start survey work click on  (second icon in the bottom line).



A window will open as shown below:



Click on **Configure**to set survey quality.



~~Points to be Considered~~

During RTK Survey:

PDOP
1. GPS only <3
2. Multi constellation <1.5

Nos of Satellites
1. GPS only > 6
2. Multi constellation > 12

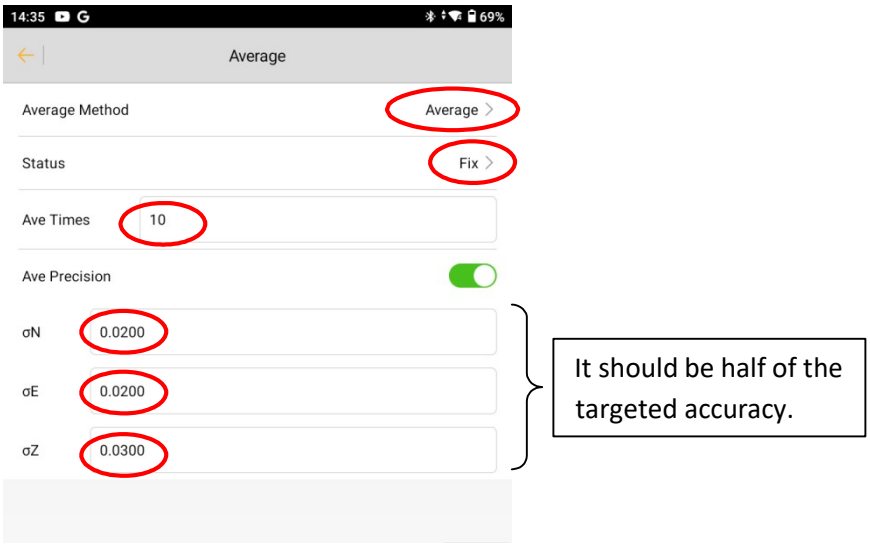
Solution type must be FIXED only.

Base Data Age should not be less than 1 sec.

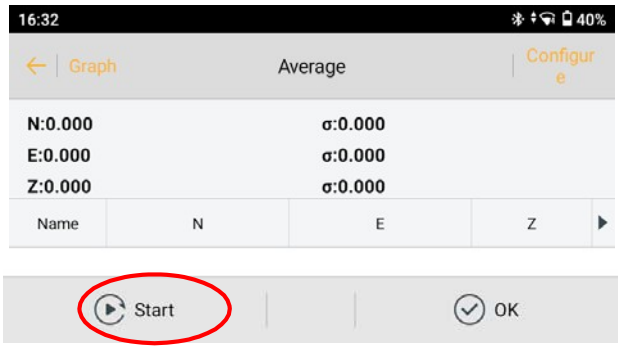
σ_x,σ_y to be fixed as half of desired horizontal accuracy.

σ_z fixed double of σ_x.

Below shown window will appear. Here we can set **Average Method**, **Status**of RTK survey to record dataand**Ave Times** to record number of observation at a point to get average. After that we can set **Average Precision**.



Now click on back arrow and click **Start**

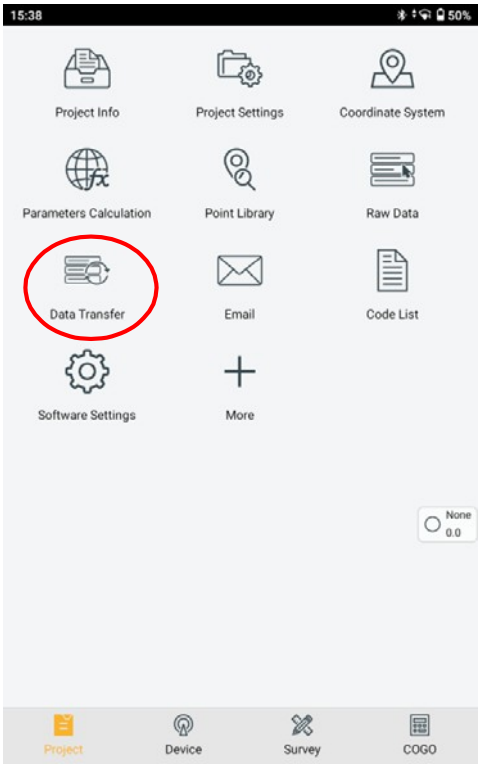


It will start recording. Wait to complete it and then click **OK**.

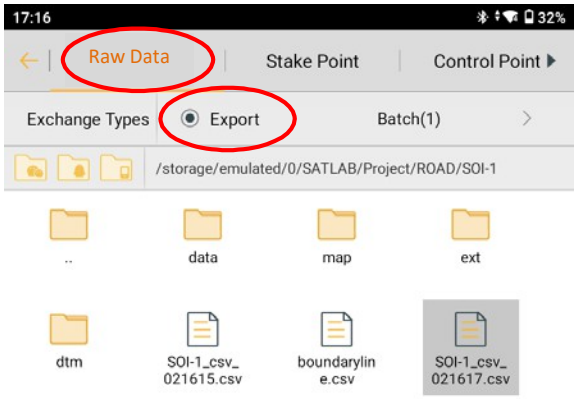
It will average the 10 records and store in point library.

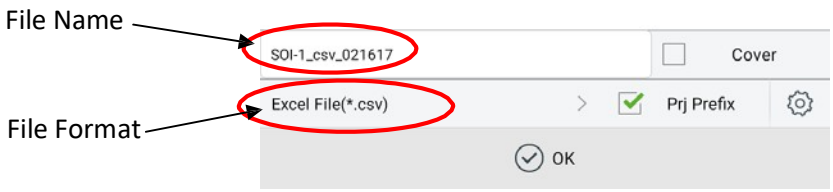
DATA EXPORT

After completing survey work to export data click **Project** and then on **Data Transfer.**



Then go to **Raw Data** tab and then click on **Export** radio button. Select desired format and input file name then click **OK**





Data will store on internal memory of controller. To open it go to **file explorer>satlab>out.** Select the exported file and open or share to other location.

Exported file will contain information as shown below.:

Point Name
Projected Co-ordinates
Geographic co-ordinates
Orthometric Height
Ellipsoidal Height

id	Name	N	E	Z	B	L	H	AntH	ÏfN	ÏfE	ÏfZ	Ave Time	Status	StartLocal time	EndLocal time	StartUTC	EndUTC	Desc	Latency	Sats	Shared Sats	PDOP	Elevation(Â°)	VRS Name	Base B	Base L	Base H(Phase	Station	Tilt Angel	Tilt Azi
1	VRSSatlab1	3368833.27	759032.419	379.598	30:25:25.59937	77:41:48.38939	379.598	2.09	0	0	0.01	1	RTK Fix	04:56.0	04:56.0	34:56.0	34:56.0	VrsSatlab	2	34	13	2.058	10	RTCM_VRS	30:25:25.66003	77:41:48.40600	377.6329	0	00:19:49	227:21:51.81
2	VRSSatlab2	3368833.27	759032.422	379.597	30:25:25.59944	77:41:48.38951	379.597	2.09	0	0	0.01	1	RTK Fix	05:01.0	05:01.0	35:01.0	35:01.0	VrsSatlab	2	34	13	2.1	10	RTCM_VRS	30:25:25.66003	77:41:48.40600	377.6329	0	00:19:28	226:00:36.91
3	VRSSatlab3	3368833.27	759032.421	379.598	30:25:25.59943	77:41:48.38949	379.598	2.09	0	0	0.01	1	RTK Fix	05:06.0	05:06.0	35:06.0	35:06.0	VrsSatlab	1	34	13	2.1	10	RTCM_VRS	30:25:25.66003	77:41:48.40600	377.6329	0	00:19:49	227:53:03.81
4	VRSSatlab4	3368833.27	759032.42	379.598	30:25:25.59945	77:41:48.38945	379.598	2.09	0	0	0.01	1	RTK Fix	05:11.0	05:11.0	35:11.0	35:11.0	VrsSatlab	1	34	13	2.1	10	RTCM_VRS	30:25:25.66003	77:41:48.40600	377.6329	0	00:18:19	223:53:51.56
5	VRSSatlab5	3368833.27	759032.422	379.592	30:25:25.59937	77:41:48.38951	379.592	2.09	0	0	0.01	1	RTK Fix	05:16.0	05:16.0	35:16.0	35:16.0	VrsSatlab	2	34	13	2	10	RTCM_VRS	30:25:25.66003	77:41:48.40600	377.6329	0	00:19:41	230:35:19.68
6	VRSSatlab6	3368833.27	759032.42	379.602	30:25:25.59937	77:41:48.38943	379.602	2.09	0	0	0.01	1	RTK Fix	05:21.0	05:21.0	35:21.0	35:21.0	VrsSatlab	2	34	13	2.047	10	RTCM_VRS	30:25:25.66003	77:41:48.40600	377.6329	0	00:19:09	224:00:21.26
7	VRSSatlab7	3368833.26	759032.42	379.595	30:25:25.59928	77:41:48.38946	379.595	2.09	0	0	0.01	1	RTK Fix	05:26.0	05:26.0	35:26.0	35:26.0	VrsSatlab	2	34	13	2	10	RTCM_VRS	30:25:25.66003	77:41:48.40600	377.6329	0	00:19:49	227:02:03.81
8	VRSSatlab8	3368833.26	759032.419	379.598	30:25:25.59930	77:41:48.38938	379.598	2.09	0	0	0.01	1	RTK Fix	05:31.0	05:31.0	35:31.0	35:31.0	VrsSatlab	2	34	13	2.043	10	RTCM_VRS	30:25:25.66003	77:41:48.40600	377.6329	0	00:19:49	227:28:27.81
9	VRSSatlab9	3368833.26	759032.423	379.598	30:25:25.59927	77:41:48.38953	379.598	2.09	0	0	0.01	1	RTK Fix	05:36.0	05:36.0	35:36.0	35:36.0	VrsSatlab	2	34	13	2.042	10	RTCM_VRS	30:25:25.66003	77:41:48.40600	377.6329	0	00:20:10	228:43:08.65
10	VRSSatlab10	3368833.26	759032.423	379.596	30:25:25.59925	77:41:48.38953	379.596	2.09	0	0	0.01	1	RTK Fix	05:41.0	05:41.0	35:41.0	35:41.0	VrsSatlab	2	34	13	2.039	10	RTCM_VRS	30:25:25.66003	77:41:48.40600	377.6329	0	00:19:19	228:14:54.16
11	VRSSatlab11	3368833.27	759032.421	379.597	30:25:25.59933	77:41:48.38947	379.597	2.09	0	0	0.01	1	RTK Fix	05:46.0	05:46.0	35:46.0	35:46.0	VrsSatlab	2	34	13	2	10	RTCM_VRS	30:25:25.66003	77:41:48.40600	377.6329	0	00:20:10	229:01:08.65
12	VRSSatlab12	3368833.27	759032.419	379.602	30:25:25.59940	77:41:48.38939	379.602	2.09	0	0	0.01	1	RTK Fix	05:51.0	05:51.0	35:51.0	35:51.0	VrsSatlab	2	34	13	2	10	RTCM_VRS	30:25:25.66003	77:41:48.40600	377.6329	0	00:19:49	226:47:39.81
13	VRSSatlab13	3368833.27	759032.42	379.595	30:25:25.59940	77:41:48.38943	379.595	2.09	0	0	0.01	1	RTK Fix	05:56.0	05:56.0	35:56.0	35:56.0	VrsSatlab	2	34	13	2.034	10	RTCM_VRS	30:25:25.66003	77:41:48.40600	377.6329	0	00:19:19	228:22:42.16
14	VRSSatlab14	3368833.26	759032.419	379.597	30:25:25.59930	77:41:48.38942	379.597	2.09	0	0	0.01	1	RTK Fix	06:01.0	06:01.0	36:01.0	36:01.0	VrsSatlab	2	34	13	2	10	RTCM_VRS	30:25:25.66003	77:41:48.40600	377.6329	0	00:21:17	232:12:22.81
15	VRSSatlab15	3368833.26	759032.417	379.6	30:25:25.59927	77:41:48.38934	379.6	2.09	0	0	0.01	1	RTK Fix	06:06.0	06:06.0	36:06.0	36:06.0	VrsSatlab	2	34	13	2	10	RTCM_VRS	30:25:25.66003	77:41:48.40600	377.6329	0	00:20:54	230:41:38.04
16	VRSSatlab16	3368833.27	759032.419	379.59	30:25:25.59935	77:41:48.38940	379.59	2.09	0	0	0.01	1	RTK Fix	06:11.0	06:11.0	36:11.0	36:11.0	VrsSatlab	2	34	13	2	10	RTCM_VRS	30:25:25.66003	77:41:48.40600	377.6329	0	00:20:10	228:31:44.65
17	VRSSatlab17	3368833.27	759032.419	379.589	30:25:25.59933	77:41:48.38941	379.589	2.09	0	0	0.01	1	RTK Fix	06:16.0	06:16.0	36:16.0	36:16.0	VrsSatlab	2	34	13	2.026	10	RTCM_VRS	30:25:25.66003	77:41:48.40600	377.6329	0	00:20:31	230:41:06.76
18	VRSSatlab18	3368833.26	759032.419	379.59	30:25:25.59930	77:41:48.38940	379.59	2.09	0	0	0.01	1	RTK Fix	06:21.0	06:21.0	36:21.0	36:21.0	VrsSatlab	2	34	13	2	10	RTCM_VRS	30:25:25.66003	77:41:48.40600	377.6329	0	00:20:54	231:24:50.04
19	VRSSatlab19	3368833.27	759032.417	379.59	30:25:25.59934	77:41:48.38931	379.59	2.09	0	0	0.01	1	RTK Fix	06:26.0	06:26.0	36:26.0	36:26.0	VrsSatlab	2	34	13	2.022	10	RTCM_VRS	30:25:25.66003	77:41:48.40600	377.6329	0	00:20:39	227:09:28.42
20	VRSSatlab20	3368833.27	759032.42	379.586	30:25:25.59938	77:41:48.38942	379.586	2.09	0	0	0.01	1	RTK Fix	06:31.0	06:31.0	36:31.0	36:31.0	VrsSatlab	2	34	13	2	10	RTCM_VRS	30:25:25.66003	77:41:48.40600	377.6329	0	00:21:22	230:44:50.91
21	FkpSatlab1	3368833.25	759032.408	379.599	30:25:25.59894	77:41:48.38895	379.599	2.09	0.01	0.01	0.03	1	RTK Fix	07:40.0	07:40.0	37:40.0	37:40.0	FkpSatlab	1	34	9	2.2	10	RTCM_FKP	30:25:50.19966	77:37:35.91332	351.771	0	00:22:41	230:09:59.24
22	FkpSatlab2	3368833.26	759032.41	379.596	30:25:25.59913	77:41:48.38908	379.596	2.09	0.01	0.01	0.03	1	RTK Fix	07:45.0	07:45.0	37:45.0	37:45.0	FkpSatlab	2	34	9	2.2	10	RTCM_FKP	30:25:50.19966	77:37:35.91332	351.771	0	00:22:41	229:51:59.24
23	FkpSatlab3	3368833.26	759032.409	379.588	30:25:25.59913	77:41:48.38902	379.588	2.09	0.01	0.01	0.03	1	RTK Fix	07:50.0	07:50.0	37:50.0	37:50.0	FkpSatlab	1	34	9	2.2	10	RTCM_FKP	30:25:50.19966	77:37:35.91332	351.771	0	00:21:08	227:16:57.04
24	FkpSatlab4	3368833.26	759032.41	379.587	30:25:25.59904	77:41:48.38905	379.587	2.09	0.01	0.01	0.03	1	RTK Fix	07:55.0	07:55.0	37:55.0	37:55.0	FkpSatlab	1	34	9	2.2	10	RTCM_FKP	30:25:50.19966	77:37:35.91332	351.771	0	00:22:19	228:29:38.75
25	FkpSatlab5	3368833.26	759032.409	379.582	30:25:25.59905	77:41:48.38901	379.582	2.09	0.01	0.01	0.03	1	RTK Fix	08:00.0	08:00.0	38:00.0	38:00.0	FkpSatlab	1	34	9	2.167	10	RTCM_FKP	30:25:50.19966	77:37:35.91332	351.771	0	00:20:39	227:44:16.42
26	FkpSatlab6	3368833.26	759032.408	379.58	30:25:25.59918	77:41:48.38895	379.58	2.09	0.01	0.01	0.03	1	RTK Fix	08:05.0	08:05.0	38:05.0	38:05.0	FkpSatlab	1	34	9	2.164	10	RTCM_FKP	30:25:50.19966	77:37:35.91332	351.771	0	00:21:29	228:19:11.86
27	FkpSatlab7	3368833.26	759032.41	379.586	30:25:25.59902	77:41:48.38907	379.586	2.09	0.01	0.01	0.03	1	RTK Fix	08:10.0	08:10.0	38:10.0	38:10.0	FkpSatlab	1	34	9	2.162	10	RTCM_FKP	30:25:50.19966	77:37:35.91332	351.771	0	00:22:19	228:33:50.75
28	FkpSatlab8	3368833.26	759032.409	379.576	30:25:25.59920	77:41:48.38902	379.576	2.09	0.01	0.01	0.03	1	RTK Fix	08:15.0	08:15.0	38:15.0	38:15.0	FkpSatlab	1	34	9	2.2	10	RTCM_FKP	30:25:50.19966	77:37:35.91332	351.771	0	00:22:08	225:20:55.59
29	FkpSatlab9	3368833.26	759032.411	379.573	30:25:25.59914	77:41:48.38908	379.573	2.09	0.01	0.01	0.03	1	RTK Fix	08:20.0	08:20.0	38:20.0	38:20.0	FkpSatlab	1	34	9	2.2	10	RTCM_FKP	30:25:50.19966	77:37:35.91332	351.771	0	00:20:59	222:21:14.24
30	FkpSatlab10	3368833.26	759032.408	379.586	30:25:25.59912	77:41:48.38897	379.586	2.09	0.01	0.01	0.03	1	RTK Fix	08:25.0	08:25.0	38:25.0	38:25.0	FkpSatlab	2	34	9	2.2	10	RTCM_FKP	30:25:50.19966	77:37:35.91332	351.771	0	00:20:18	226:26:23.63
31	FkpSatlab11	3368833.26	759032.409	379.573	30:25:25.59912	77:41:48.38903	379.573	2.09	0.01	0.01	0.03	1	RTK Fix	08:30.0	08:30.0	38:30.0	38:30.0	FkpSatlab	1	34	9	2.154	10	RTCM_FKP	30:25:50.19966	77:37:35.91332	351.771	0	00:20:31	230:45:18.76
32	FkpSatlab12	3368833.26	759032.413	379.568	30:25:25.59903	77:41:48.38917	379.568	2.09	0.01	0.01	0.03	1	RTK Fix	08:35.0	08:35.0	38:35.0	38:35.0	FkpSatlab	1	34	9	2.2	10	RTCM_FKP	30:25:50.19966	77:37:35.91332	351.771	0	00:19:28	225:10:12.91
33	FkpSatlab13	3368833.26	759032.413	379.561	30:25:25.59907	77:41:48.38917	379.561	2.09	0.01	0.01	0.03	1	RTK Fix	08:40.0	08:40.0	38:40.0	38:40.0	FkpSatlab	1	34	9	2.2	10	RTCM_FKP	30:25:50.19966	77:37:35.91332	351.771	0	00:20:29	223:39:27.51
34	FkpSatlab14	3368833.26	759032.413	379.562	30:25:25.59917	77:41:48.38916	379.562	2.09	0.01	0.01	0.03	1	RTK Fix	08:45.0	08:45.0	38:45.0	38:45.0	FkpSatlab	1	34	9	2.148	10	RTCM_FKP	30:25:50.19966	77:37:35.91332	351.771	0	00:19:49	227:10:27.81
35	FkpSatlab15	3368833.26	759032.414	379.562	30:25:25.59919	77:41:48.38922	379.562	2.09	0.01	0.01	0.03	1	RTK Fix	08:50.0	08:50.0	38:50.0	38:50.0	FkpSatlab	2	34	9	2.1	10	RTCM_FKP	30:25:50.19966	77:37:35.91332	351.771	0	00:19:28	226:03:36.91
36	FkpSatlab16	3368833.26	759032.406	379.564	30:25:25.59912	77:41:48.38893	379.564	2.09	0.01	0.01	0.03	1	RTK Fix	08:55.0	08:55.0	38:55.0	38:55.0	FkpSatlab	1	34	9	2.1	10	RTCM_FKP	30:25:50.19966	77:37:35.91332	351.771	0	00:19:28	227:05:24.91
37	FkpSatlab17	3368833.26	759032.411	379.565	30:25:25.59919	77:41:48.38905	379.565	2.09	0.01	0.01	0.03	1	RTK Fix	09:00.0	09:00.0	39:00.0	39:00.0	FkpSatlab	2	34	9	2.142	10	RTCM_FKP	30:25:50.19966	77:37:35.91332	351.771	0	00:19:09	224:15:21.26
38	FkpSatlab18	3368833.26	759032.412	379.566	30:25:25.59924	77:41:48.38912	379.566	2.09	0.01	0.01	0.03	1	RTK Fix	09:05.0	09:05.0	39:05.0	39:05.0	FkpSatlab	1	34	9	2.14	10	RTCM_FKP	30:25:50.19966	77:37:35.91332	351.771	0	00:19:28	226:22:48.91
39	FkpSatlab19	3368833.26	759032.413	379.574	30:25:25.59916	77:41:48.38916	379.574	2.09	0.01	0.01	0.03	1	RTK Fix	09:10.0	09:10.0	39:10.0	39:10.0	FkpSatlab	1	34	9	2.1	10	RTCM_FKP	30:25:50.19966	77:37:35.91332	351.771	0	00:19:28	226:32:24.91
40	FkpSatlab20	3368833.27	759032.416	379.566	30:25:25.59936	77:41:48.38928	379.566	2.09	0.01	0.01	0.03	1	RTK Fix	09:15.0	09:15.0	39:15.0	39:15.0	FkpSatlab	2	34	9	2.1	10	RTCM_FKP	30:25:50.19966	77:37:35.91332	351.771	0	00:18:38	225:11:55.24