

IaRTN GNSS Surveying

Overview: Use the Iowa Real-Time Network for GNSS surveying.


- Requires a cellular data signal that supports a reliable connection
- Check the operating status of the IaRTN at: iowadot.gov/rtn

Equipment: Trimble TSC3 w/ internal cellular connection, or external mifi, GNSS Receiver, Trimble Access v2015.22

Setting up Survey Job

Start a New Job using the Data Collector for the Rover

(This can be done prior to setting up the survey equipment.)



1. Turn the TSC3 controller on by pressing the green power button.
2. Press the **Trimble** button  or Click *Start... Trimble Access*.
3. Click *General Survey*
4. Click on *Jobs... New Job*
5. Input the new *Job name*,
6. Set Template as ***nrcs-gps***
7. Click *Linked Files* if you want to select coordinate files that have existing points to be referenced into this project.
8. Tab down to the 2nd screen and type in the *operator name* & any other *notes*
9. Click **Accept**.

Surveying using IaRTN

Set up the GPS & Enable Data Connection

10. Turn on R8/ R10 that will be used as the Rover. (External radio antenna is not needed at this point.) Turn the TSC3 controller on by pressing the green power button.

11. Enable the internal or external cellular connection:

For systems using a Mifi device	For systems using the internal connection
a. Turn on Mifi Data cellular device.	i. <u>Click</u> the Trimble Access button  .
b. <u>Click</u> the Trimble Access button  .	ii. <u>Click</u> <i>Internet Setup</i>
c. <u>Click</u> <i>Internet Setup</i>	iii. <u>Select</u> Connect using: <i>Phone/Modem</i>
d. The display should show “Internet Connection (WiFi) Established” <ul style="list-style-type: none">• If not refer to the notes for TSC3 Wireless Hookup to Jetpack.	iv. <u>Click</u> Connect
e. <u>Press</u> ESC .	v. Wait for display to change to “Internet Connection (Internal Modem) Established”
	vi. <u>Press</u> ESC .

12. Click *General Survey*

13. Controller will connect to GPS unit via Bluetooth. Watch for satellites beneath the battery level on the right side of screen. If having problems connecting to the rover GPS, see **Setting GPS Bluetooth Connections**.

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Capture Observed Control Point

14. Click *Measure... Iowa RTN... Measure Points*.
 15. If asked select the **RTCM3_IMAX** Identifier. Click
 16. The Controller will initialize the GPS survey. Watch for **RTN:Fixed** to appear and for the Vertical precision to get down to around 0.10 ft.
 17. Take a Control Point using the Rover:
 the *Point Name* for the TBM 1 (e.g. 501),
 Code = tbm 1
 18. *Method = Observed control point*
 19. *Antenna Height = 2m*
 20. *Measured to = Bottom of antenna mount*
 21. Set up bipod on benchmark and Click
 22. Once the 3 minutes of data collection has occurred click .
- Repeat for additional control points.

Point Names for Survey Shots

Instrument Points use 1, 2, 3 ...

Benchmarks use 501, 502, 503 ...

Turning Points use 201, 202, 203 ...

Topog shots – start at 1000

Continuous Topo – start at 3000

Conduct Topo Survey

23. Setup the Rover GPS with the Data Collector Attached
24. Click *Measure... Base-Rover... Measure Points*.
25. *When Reliability reaches 100%* Click
26. Take normal topo shots:
 the *Point Name* for the shot (e.g. 1000), Code = g
27. *Method = Topo Point*
28. *Antenna Height = 2m* or adjust as needed.
29. *Measured to = Bottom of antenna mount*
30. Click
31. Once the 5 seconds of data collection has occurred click .
32. Press when done collecting points.

When setting additional control points set the *Method = Observed Control Point*


Conduct Continuous Topo Survey

33. Click *Measure... Base-Rover... Continuous Topo*.
34. *Method = Fixed Distance*
35. *Antenna Height =* adjust as needed.
36. *Measured to = Bottom of antenna mount*
37. *Distance = 50* or as desired
38. Offset = *None*
39. the *Point Name* for the topo shots (e.g. 3000), Code = g
40. Click .
41. To stop continuous topo click .
42. Press when done collecting points.

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Job & Point Information (Optional but helpful)

43. To review point coordinates, click *Jobs... Point Manager*. Press **ESC** when done.
44. To review GPS quality of points, click *Jobs... QC Graph*. click *Display... Vertical Precision*. and press **ESC** when done.
45. To review Map of job, click *Jobs... Map*. Press **ESC** when done.
46. To review job details in the order of work done, click *Jobs... Review Job*. Antenna Height errors can be corrected or Notes can be added here. Press **ESC** when done.
47. To review or change linked files, units, or coordinate system, click *Jobs... Properties of Job*. Press **ESC** when done.

Note: Using the Trimble Globe Key  allows the user to keep multiple items open and allows switching among tasks.

Note: Check out the Favorites button at the right side of the screen.

Recheck Control Points

48. Before ending the survey, **return to the control points** and take a 2nd shot on those points. Compare the coordinates to the earlier results.

Quit out of Survey

49. When survey is completed, click *Measure... End GNSS Survey*
50. Click **Yes** to Power Down Receiver.
51. Press **ESC**. Click **Yes** to Shut Down General Survey.

If using internal connection

- a) Click *Internet Setup*
 - b) Click **Hang Up**
 - c) Press **ESC**.
52. Press **ESC** to Close Trimble Access. Click **OK** to confirm Access shutdown.

Setting GPS Bluetooth Connections

Settings for GPS Base-Rover mode via Bluetooth

- a) Click on *Instrument... GNSS Functions... Bluetooth...*
- b) Set Connect to GNSS Base = Serial Number of the Trimble R8/R10 being used as the Base
- c) Set Connect to GNSS Rover = Serial Number of the Trimble R8/R10 being used as the Rover
- d) Click Press

Check to see that Bluetooth is turned on

- a) Click on *Instrument... GNSS Functions... Bluetooth...*
- b) Click *Config*
- c) Select *Mode*
- d) Checkmark *Turn on Bluetooth*
- e) Click Press

Creating a new Bluetooth connection to a receiver

- a) Click on *Instrument... GNSS Functions... Bluetooth...*
- b) Click *Config*
- c) Select *Devices*
- d) Click *Add new device...*
- e) In the *Select a Bluetooth Device* list click on the Receiver that you need to create the connection to.
- f) Click Click
- g) *Your device has been added* Click
- h) Click Press