

Differential GPS Set-up

Standard Global Positioning Satellite (GPS) values for a specific location change, or "drift", over a period of time as subtle variables change (e.g., satellites rotate around Earth). Differential GPS takes GPS measurements over a period of time and calculates a very accurate GPS coordinate. This is recommend for at the tower GPS for regular use.

These procedures are for Kairos provided software and Novatel GPS' and include procedures for setting:

- the tower to calculate differential GPS
- the vehicle to use differential GPS

Other GPS units may require different set-up procedures.

A standard Kairos Pronto4, including CBL-075, CBL-089, and CBL-045 are recommended. If not available, the GPS will need to be connected to a Com Port and appropriately powered.

Tower

- 1. Plug the serial end of CBL-075 to the end of CBL-089 labeled "To PC".
- 2. Connect the short, unlabeled pigtail portion of CBL-045 to the other end of CBL-089.
- 3. Connect the main connector on the pigtail end of CBL-045 into the battery port labeled "LOAD".
- 4. Plug the USB end of CBL-075 into a USB port on the GCS laptop.
- 5. Turn on the GCS laptop.
- 6. In djLoader (loaded by default on GCS start), on the GPS3 tab:
 - a. In the "GPS3 Comms" area, verify "Opened COM1" is displayed.
 - b. In the "Adjust:" drop-down, select the "Configure DGPS base" option.
 - c. In the lower-right corner of the GPS3 tab, click the **>>Send** button.

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🖪. djLoader , Version 2.2.38				
COM10 GPS3 Qual				Devices
GPS3 Status Data Status RMC Message Not Received Antenna Status	GPS3Comms Init Chnl to Closed Opened COM1		Auto Restart	Quit INU CMP1 CMP2 VIBE GPS1
Battery Ram Status RTC Status	Lat: Lor: Velocity Heading Cur> Avg>	ChkSum Obtained ChkSum Cale ChkSum Error Packet Error	Save Config Ignore Chksum Send DGPS Set Off Send	GPS2 GPS3 GPS4 SVP OBDII LSR 3D Laser Range Wheel 0D0 Ethernet
Messages O: Can't open GPS3: COM p	Log GPS3 to B:\GPS3.LOG Adjust	changed tchanged to AAS on AAS Off NOS - EUROPE Infigure DGPS Mobile Infigure DGPS Base Infigure DGPS Base	▼ E ^ >>Send	

- d. In the upper-left corner, verify the Antenna Status is "9 WAAS".
- e. In the Adjust drop-down, select the amount of time to average the GPS position.

It is recommended to exceed a 24 hour period.

f. In the lower-right corner of the GPS3 tab, click the >>Send button.

🔁, djLoader , Version 2.2.38		
COM10 GPS3 Qual		Devices
GPS3 Status Data Status RMC Message Not Received Antenna Status 9 WAAS 19 WAAS 13 22:59 0 GPS Fix not valid 13:22:01	GPS3 Comms Auto Restar 0133*52 Open Close 0S COM10 68.5 FINESTEERING 1691 415764.01 SOL_COMPUTED WARS 48.60010322978 -111.905 Clear RTS 7 1.1840 2.9466 '133'' 3.000 0.0001 10 6 0 6033*50 000 4036 0.0061807.N.11154.336 H 100 DTR 05 COMPUTED WARS 40.60010301180 -111.905 125 COM1 SOL_COMPUTED WARS 40.60010301180 -111.905 157600.n.8.1 157600.n.8.1	t Quit I INU CMP1 CMP2 VIBE GPS1 GPS2 VIBE GPS3
Battery Ram Status RTC Status	Lat: 40.60010301 ChkSum Dbtained [80 Save Config Lor: .111.90560411 ChkSum Calc [80 Ignore Velocity ChkSum Calc [80 ChkSum Calc [80 ChkSum Calc [80 Heading Packet Error ChkSum Calc [80 ChkSum Calc [80 Cur> Avg> Set Off 196	GPS4 GPS4 SVP OBDII S LSR 3D S Laser Range Wheel OD0 Ethemet
Satellites (in use) # 06	Log GPS3 to B:\GPS3LDG Adjust Contigure DGPS Base E >> Send DGPS Average: 17 hours DGPS Average: 18 hours DGPS Average: 19 hours DGPS Average: 19 hours DGPS Average: 20 hours DGPS Average: 21 hours DGPS Average: 22 hours DGPS Ave	
	DCPC Average: 23 hours	

- 7. Wait at least the selected amount of time.
- 8. In djLoader, on the GPS3 tab:
 - a. In the upper-left corner the Antenna status should be "7LocalGPSFix value" and the average value should be fixed in the Lat and Long fields.

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b. In the right side of the GPS3 tab, ensure the "Send DGPS" checkbox is checked.

🕽 djLoader, Version 2.2.38	
COM10 GPS3 Qual	
GPS3 Status GPS3 Comms Auto Restatt Data Status GPS3 Comms Auto Restatt MEC Message Not Received Anterna Status GPS3 Comms Clear 7 Local GPS Fix valid S3.40, 7, 65.2.5.8, 1327.900, H, -16.257, H, 94, 52.400, H, -16.257, H, 94, 53.40, 75.500, R8,11 Clear RTS 1 S2206 S 40.66006498967 -111.96560858765 1327.9 Vi25 COM1 2 WAAS 13.22.59 S 40.66006498967 -111.96560858765 1327.9 Vi25 COM1 3 WAAS 13.22.59 GPS Fix not valid S we Config GPS3 GPS3 ChkSum Obtained [81 Save Config Battery Ram Status Cur> Velocity Packet Error No Error Seed GPS3 Mode Satellites (in use) # 05 Log GPS3 to B:\GPS3.LOG Adjust Configure DGPS Base E >>Seed Ethernet Messages Clear Clear Statelites (in use) # 05 <	:D ;e ;)

Vehicles

- 1. Ensure CBL-045 is connected between P208, P209 and P105.
- Restore djLoader, on the GPS3 tab, in the GPS3 Comms section, in the "Adjust" drop-down, select the Configure DGPS Mobile profile, and click the >> Send button.

djLoader , Version 2.4.8			×
COM10 GPS3 Qual		Devices	5
GPS3 Status Data Status Data Status Unknown Antenna Status	GPS3 Comms \$GPGGA	V Auto Restart Quit Open Close Inv Llear RTS CMP1 V:25 COM1 CMP2 V:25 COM1 GPS1 57600.n.8.1 GPS2 GPS2	-
Battery Ram Status RTC Status Mode Satellites (in use) #	Lat Packet Error: Lon ChkSum Error ChkSum Error ChkSum Rx[103 Cur> Avg> Log GPS3 to B:\GPS3.LOG Adjust Contigure DGPS Mobile	Save Config GP54 Use UDP 6000 Ignore Chksum DBDII Send DGPS Binary LSR 3D Use GPHDT Heading Lser Range Set Off Send Send)
Messages 20: Restart GPS3! 21: Restart GPS3!	Clear		

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- This sends the following command to the GPS: PSRDIFFSOURCE RTCA ANY COM COM2 57600 N 8 1 N OFF OFF INTERFACEMODE COM2 RTCA NONE OFF SAVECONFIG
- 4. Verify or launch C:\GC07\receiveCorrection.py.



- 5. This receives a binary correction broadcast on port 6543 and sends it to COM3 which is attached to the GPS receiver. Data will start to flow showing the number of bytes received and sent to the GPS receiver.
- 6. Once the correction is received, in the upper-left corner of djLoader's GPS3 tab, the GPS Data Status should change to 2 Diff GPS.

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