Pronto4 Geolocation Variables

Pronto4 systems physically drive with and report a final position `AutoGps`*`XXXX`*. The source of these GPS values may come from a number of areas such as an actual GPS device, a simulated GPS position, a forced path position, or from something like a Simultaneous Localization and Mapping (SLAM) filter. These are normally supplied by the program djLoader (i.e. dj_ldr.exe), at a rate of 10 Hz. The GPS should minimally output the Recommended Minimum C (RMC) at 1 Hz and the GGA message at 10 Hz. They are a result of either a copy from an actual GPS device or simulation. When the GPS device or simulation sends an updated value, the corresponding SharedVariables are updated.

djLoader is capable of using Wide Area Augmentation System (WAAS), Single, Real Time Kinematic (RTK), and Differential GPS (DGPS) correction.

Simulation programs that generate GPS to the `gps_sim_`*`XXXX` variables may include a switch to perform the copy from the `gps_sim_`*`XXXX` to the `AutoGps`*`XXXX` variables.

Geolocation

- `AutoGpsLat`
- `AutoGpsLon`
- `AutoGpsVel`
- `AutoGpsHead`

Liveliness

- `AutoGpsReferences` = Number of satellites in view
- `AutoGpsQuality` = 0-100% (0=Unknown, 60=Waas, 70=Single, 80=RtkFloat, 90=RtkFixed, 100=Dgps)
- `AutoGpsStamp` = ms Timer stamp when update was made

Primary Geolocation Sensor Variables

The actual GPS from the hardware updates specific GPS names such as `gps3_`*`XXXXXX`*. GPS1 and GPS2 are low-cost devices using a Trimble protocol; GPS3 and GPS4 are higher cost GPS units that use the National Marine Electronics Association (NMEA) protocol. If both GPS3 and GPS4 are present then fixed heading is also available. djLoader normally supplies and populates these values.

- `gps3_lattitude` (Note: misspelled because of history)
- `gps3_longitude`

- gps3_velocity
- gps3_heading
- gps3_references
- gps3_quality
- gps3_timestamp

Simulator Produced Variables

When a simulator is producing the GPS position, from a physics engine or forced path, the following set of GPS shared variables are produced.

- gps_sim_lattitude (Note: misspelled because of history)
- gps_sim_longitude
- gps_sim_velocity
- gps_sim_heading
- gps_sim_references
- gps_sim_quality
- gps_sim_timestamp

These are then used by the KA ProntoMimic software suite either directly or as a source for the AutoGps*XXXX* geolocation shared variable GPS set. In a simulation program, there is often a switch to perform the copy of the gps_sim_*XXXX* to the AutoGps*XXXX* for system usage.

Other Geolocation Variables

It is possible to simulate a real world robot in real time and compare the results of AutoGps*XXX* or gps3_*XXXX* and gps_sim_*XXXX* to determine performance or error. There are also a number of other GPS sets that are used for various purposes. There is also an equivalent set of compass shared variable sets. The compass is used infrequently as a singular sensor with KA software and is not discussed.

- gps1_*XXXX* - Trimble protocol, cheap GPS
- gps2_*XXXX* - Trimble protocol, cheap GPS
- gps4_*XXXX* - NMEA protocol, accurate GPS
- host_*XXXX* - Location of primary host or OCU
- host2_*XXXX* - Location of secondary host or OCU
- gps_dr_*XXXX* - Dead reckoned GPS position
- gps_ave_*XXXX* - Heavily filtered GPS position, used for stationary efforts
- crs_*XXXX* - Course GPS position
- gps34_*XXXX* - Relationship between GPS3 and GPS4

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