**Amostra de dados obtida pelo módulo GPS.**

$GPGGA,070926.000,,,,,0,0,,,M,,M,,\*42

$GPGLL,,,,,070926.000,V,N\*70

$GPGSA,A,1,,,,,,,,,,,,,,,\*1E

$GPGSV,1,1,01,15,,,31\*7E

$GPRMC,070926.000,V,,,,,,,231010,,,N\*46

$GPVTG,,T,,M,,N,,K,N\*2C

$GPGGA,070927.000,,,,,0,0,,,M,,M,,\*43

$GPGLL,,,,,070927.000,V,N\*71

$GPGSA,A,1,,,,,,,,,,,,,,,\*1E

$GPGSV,1,1,01,15,,,31\*7E

$GPRMC,070927.000,V,,,,,,,231010,,,N\*47

$GPVTG,,T,,M,,N,,K,N\*2C

$GPGGA,070928.000,,,,,0,0,,,M,,M,,\*4C

$GPGLL,,,,,070928.000,V,N\*7E

$GPGSA,A,1,,,,,,,,,,,,,,,\*1E

$GPGSV,1,1,01,15,,,31\*7E

$GPRMC,070928.000,V,,,,,,,231010,,,N\*48

$GPVTG,,T,,M,,N,,K,N\*2C

**Amostra de dados coletada 10/07/2014 7:17**

$GPGGA,101823.000,0304.274122,S,06003.709460,W,1,3,4.24,10.352,M,-10.721,M,,\*48

$GPGLL,0304.274122,S,06003.709460,W,101823.000,A,A\*51

$GPGSA,A,2,18,22,21,,,,,,,,,,4.36,4.24,1.00\*0B

$GPGSV,2,1,08,18,71,136,41,22,65,328,48,21,30,177,29,29,29,119,34\*7E

$GPGSV,2,2,08,11,,,21,23,,,22,25,,,41,31,,,26\*77

$GPRMC,101823.000,A,0304.274122,S,06003.709460,W,1.560,49,100714,,,A\*44

$GPVTG,49,T,,M,1.560,N,2.890,K,A\*2F

$GPZDA,101823.000,10,07,2014,,\*5E

$GPGGA,101824.000,0304.274391,S,06003.709329,W,1,3,4.25,10.367,M,-10.721,M,,\*48

$GPGLL,0304.274391,S,06003.709329,W,101824.000,A,A\*56

$GPGSA,A,2,18,22,21,,,,,,,,,,4.36,4.25,1.00\*0A

$GPGSV,2,1,08,18,71,136,33,22,65,328,46,21,30,177,32,29,29,119,30\*7B

$GPGSV,2,2,08,11,,,21,23,,,22,25,,,38,31,,,35\*7B

$GPRMC,101824.000,A,0304.274391,S,06003.709329,W,0.842,49,100714,,,A\*4F

$GPVTG,49,T,,M,0.842,N,1.560,K,A\*22$GPZDA,101824.000,10,07,2014,,\*59

$GPGGA,101825.000,0304.274588,S,06003.709283,W,1,3,4.25,10.382,M,-10.721,M,,\*4D

$GPGLL,0304.274588,S,06003.709283,W,101825.000,A,A\*58

$GPGSA,A,2,18,22,21,,,,,,,,,,4.36,4.25,1.00\*0A

$GPGSV,2,1,08,18,71,136,25,22,65,328,41,21,30,177,25,29,29,119,26\*7A

$GPGSV,2,2,08,11,,,22,23,,,22,25,,,25,31,,,32\*73

$GPRMC,101825.000,A,0304.274588,S,06003.709283,W,0.257,49,100714,,,A\*4F

$GPVTG,49,T,,M,0.257,N,0.476,K,A\*2B

$GPZDA,101825.000,10,07,2014,,\*58

UTC:183110.00

Lat:304.29290

Dir:S

Lon:6003.73925

Dir:W

Alt:58.8

UTC:183116.00

Lat:304.29290

Dir:S

Lon:6003.73925

Dir:W

Alt:58.8

UTC:183122.00

Lat:304.29574

Dir:S

Lon:6003.74169

Dir:W

Alt:59.7

UTC:183128.00

Lat:304.29568

Dir:S

Lon:6003.74169

Dir:W

Alt:59.7

**Parsing de dados GPS:**

**-GGA**

Essential fix data which provide 3D location and accuracy data.

$GPGGA,123519,4807.038,N,01131.000,E,1,08,0.9,545.4,M,46.9,M,,\*47

Where:

GGA Global Positioning System Fix Data

123519 Fix taken at 12:35:19 UTC

4807.038,N Latitude 48 deg 07.038' N

01131.000,E Longitude 11 deg 31.000' E

1 Fix quality: ­

0 = invalid

1 = GPS fix (SPS)

2 = DGPS fix

3 = PPS fix

4 = Real Time Kinematic

5 = Float RTK

6 = estimated (dead reckoning) (2.3 feature)

7 = Manual input mode

8 = Simulation mode

08 Number of satellites being tracked

0.9 Horizontal dilution of position

545.4,M Altitude, Meters, above mean sea level

46.9,M Height of geoid (mean sea level) above WGS84 ellipsoid

(empty field) time in seconds since last DGPS update

(empty field) DGPS station ID number

\*47 the checksum data, always begins with \*

If the height of geoid is missing then the altitude should be suspect. Some non-standard implementations report altitude with respect to the ellipsoid rather than geoid altitude. Some units do not report negative altitudes at all. This is the only sentence that reports altitude.

-GLL

Geographic Latitude and Longitude is a holdover from Loran data and some old units may not send the time and data active information if they are emulating Loran data. If a gps is emulating Loran data they may use the LC Loran prefix instead of GP.

$GPGLL,4916.45,N,12311.12,W,225444,A,\*1D

Where:

GLL Geographic position, Latitude and Longitude

4916.46,N Latitude 49 deg. 16.45 min. North

12311.12,W Longitude 123 deg. 11.12 min. West

225444 Fix taken at 22:54:44 UTC

A Data Active or V (void)

\*1D checksum data

Note that, as of the 2.3 release of NMEA, there is a new field in the GLL sentence at the end just prior to the checksum. For more information on this field see here

**-GSA**

GPS DOP and active satellites. This sentence provides details on the nature of the fix. It includes the numbers of the satellites being used in the current solution and the DOP. DOP (dilution of precision) is an indication of the effect of satellite geometry on the accuracy of the fix. It is a unitless number where smaller is better. For 3D fixes using 4 satellites a 1.0 would be considered to be a perfect number, however for overdetermined solutions it is possible to see numbers below 1.0.

There are differences in the way the PRN's are presented which can effect the ability of some programs to display this data. For example, in the example shown below there are 5 satellites in the solution and the null fields are scattered indicating that the almanac would show satellites in the null positions that are not being used as part of this solution. Other receivers might output all of the satellites used at the beginning of the sentence with the null field all stacked up at the end. This difference accounts for some satellite display programs not always being able to display the satellites being tracked. Some units may show all satellites that have ephemeris data without regard to their use as part of the solution but this is non-standard.

$GPGSA,A,3,04,05,,09,12,,,24,,,,,2.5,1.3,2.1\*39

Where:

GSA Satellite status

A Auto selection of 2D or 3D fix (M = manual)

3 3D fix - values include:

1 = no fix

2 = 2D fix

3 = 3D fix

04,05... PRNs of satellites used for fix (space for 12)

2.5 PDOP (dilution of precision)

1.3 Horizontal dilution of precision (HDOP)

2.1 Vertical dilution of precision (VDOP)

\*39 the checksum data, always begins with \*

**-GSV**Satellites in View shows data about the satellites that the unit might be able to find based on its viewing mask and almanac data. It also shows current ability to track this data. Note that one GSV sentence only can provide data for up to 4 satellites and thus there may need to be 3 sentences for the full information. It is reasonable for the GSV sentence to contain more satellites than GGA might indicate since GSV may include satellites that are not used as part of the solution. It is not a requirment that the GSV sentences all appear in sequence. To avoid overloading the data bandwidth some receivers may place the various sentences in totally different samples since each sentence identifies which one it is.

The field called SNR (Signal to Noise Ratio) in the NMEA standard is often referred to as signal strength. SNR is an indirect but more useful value that raw signal strength. It can range from 0 to 99 and has units of dB according to the NMEA standard, but the various manufacturers send different ranges of numbers with different starting numbers so the values themselves cannot necessarily be used to evaluate different units. The range of working values in a given gps will usually show a difference of about 25 to 35 between the lowest and highest values, however 0 is a special case and may be shown on satellites that are in view but not being tracked.

$GPGSV,2,1,08,01,40,083,46,02,17,308,41,12,07,344,39,14,22,228,45\*75

Where:

GSV Satellites in view

2 Number of sentences for full data

1 sentence 1 of 2

08 Number of satellites in view

01 Satellite PRN number

40 Elevation, degrees

083 Azimuth, degrees

46 SNR - higher is better for up to 4 satellites per sentence

\*75 The checksum data, always begins with \*

**-RMC**

NMEA has its own version of essential gps pvt (position, velocity, time) data. It is called RMC, The Recommended Minimum, which will look similar to:

$GPRMC,123519,A,4807.038,N,01131.000,E,022.4,084.4,230394,003.1,W\*6A

Where:

RMC Recommended Minimum sentence C

123519 Fix taken at 12:35:19 UTC

A Status A=active or V=Void.

4807.038,N Latitude 48 deg 07.038' N

01131.000,E Longitude 11 deg 31.000' E

022.4 Speed over the ground in knots

084.4 Track angle in degrees True

230394 Date - 23rd of March 1994

003.1,W Magnetic Variation

\*6A The checksum data, always begins with \*

**-VTG**

Velocity made good. The gps receiver may use the LC prefix instead of GP if it is emulating Loran output.

$GPVTG,054.7,T,034.4,M,005.5,N,010.2,K\*48

where:

VTG Track made good and ground speed

054.7,T True track made good (degrees)

034.4,M Magnetic track made good

005.5,N Ground speed, knots

010.2,K Ground speed, Kilometers per hour

\*48 Checksum

Note that, as of the 2.3 release of NMEA, there is a new field in the VTG sentence at the end just prior to the checksum. For more information on this field see here.

Receivers that don't have a magnetic deviation (variation) table built in will null out the Magnetic track made good.