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APA - Autopilot Sentence "A"

Commonly used by autopilots this sentence contains navigation receiver warning flag status, cross-track-error, waypoint arrival status and initial bearing from origin waypoint to the destination waypoint for the active navigation leg of the journey.

Use of **\$--APB** with additional data fields of heading-to-steer and bearing from present position to destination is recommended.



BER - Bearing & Distance to Waypoint, Dead Reckoning, Rhumb Line

BPI - Bearing & Distance to Point of Interest

Time (UTC) and distance & bearing to, and location of, a specified waypoint from present position:

- BER: Calculated along the rhumb line from a dead reckoned present position. The use of **\$--BEC** using great circle calculations is recommended.
- BPI: Calculated along a great circle path from a measured present position. Redundant with BWC, the use of **\$--BWC** is recommended.



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DBK - Depth Below Keel

DBS - Depth Below Surface

Water depth referenced to the vessel's keel (DBK) or to the water surface (DBS). The use of **\$--DPT** is recommended in place of either of these.

\$--DBK,x.x,f,x.x,M,x.x,F*hh<CR><LF> \$--DBS,x.x,f,x.x,M,x.x,F*hh<CR><LF> Water depth, Fathoms Water depth, Meters Water depth, feet

DCN – DECCA position

Status and lines-of-position for a specified DECCA chain.

\$ -- DCN,xx,cc,x.x,A,cc,x.x,A,cc,x.x,A,A,A,A,A,X,x,N,x*hh<CR><LF>



Notes Fix data basis:

1 = Normal pattern

2 = Lane identification pattern

3 = Lane identification transmissions

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DRU - Dual Doppler Auxiliary Data

Depth, turn rate and % RPM in support of Doppler velocity systems.

The use of **\$--DPT** is recommended for depth data, **\$--RPM** for shaft rotation and **\$--ROT** for rate of turn.

\$--DRU,x.x,A,x.x,A,x.x*hh<CR><LF>

Propeller shaft rotation, % of maximum, "-" = astern Status: Rate of turn Rate of turn, degrees per minute, "-" = port Status: Depth Depth, meters

GDa - Dead Reckoning Positions

- **GLa Loran-C Positions**
- **GOa OMEGA Positions**

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GXa - TRANSIT Positions

Location and time at waypoint "c--c": \$--aF: predicted or estimated time \$--aaP: present position and time \$--aaA: past position and time

The use of waypoint location \$--WPL (for past positions) or \$--GLL (for present position) followed by time tag \$--ZDA is recommended for reporting past or present waypoint times; **\$--WPL** followed by **\$--ZTG** is recommended for estimated time.

Dead reckoned positions:

\$--GDF,hhmmss.ss,llll.ll,a,yyyyy.yy,a,c--c*hh<CR><LF> \$--GDP,hhmmss.ss,llll.ll,a,yyyyy.yy,a,c--c*hh<CR><LF> \$--GDA,hhmmss.ss,llll.ll,a,yyyyy.yy,a,c--c*hh<CR><LF>

Loran-C determined positions:

\$--GLF,hhmmss.ss,llll.ll,a,yyyyy.yy,a,c--c*hh<CR><LF> \$--GLP,hhmmss.ss,llll.ll,a,yyyyy,yy,a,c--c*hh<CR><LF> \$--GLA,hhmmss.ss,llll.ll,a,yyyyy.yy,a,c--c*hh<CR><LF>

Omega determined positions:

\$--GOF,hhmmss.ss,llll.ll,a,yyyyy.yy,a,c--c*hh<CR><LF> \$--GOP,hhmmss.ss,llll.ll,a,yyyyy.yy,a,c--c*hh<CR><LF> \$--GOA,hhmmss.ss,llll.ll,a,yyyyy.yy,a,c--c*hh<CR><LF>



TRANSIT determined positions:



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GTD - Geographical Position, Loran-C TDs

Loran-C Time Difference (TD) lines of position for present vessel position.

The use of **\$--GLC** is recommended.

\$--GTD,x.x,x.x,x.x,x.x,x.x*hh<CR><LF>

TD 5, micro-seconds TD 4, micro-seconds TD 2, micro-seconds TD 1, micro-seconds

GXA - TRANSIT Position

Location and time of TRANSIT fix at waypoint "c--c". TRANSIT system is not operational, no recommended replacement.



HCC - Compass Heading

Vessel compass heading, which differs from magnetic heading by the amount of uncorrected magnetic deviation.

The use of **\$--HDG** is recommended.

\$--HCC,x.x*hh<CR><LF>

L Compass heading, degrees

HCD - Heading and Deviation

Actual vessel magnetic heading, indicated compass heading and the difference (deviation) between them.

The use of **\$--HDG** is recommended.

\$--HCD,x.x,M,x.x,H,x.x,a*hh<CR><LF> Magnetic deviation, degrees E/W¹ Compass heading, degrees Magnetic heading, degrees

Notes:

1) Easterly deviation (E) subtracts from Compass Heading Westerly deviation (W) adds to Compass Heading

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HDM - Heading, Magnetic

Actual vessel heading in degrees Magnetic. The use of **\$--HDG** is recommended.

\$--HDM,x.x,M*hh<CR><LF> Heading, degrees Magnetic

HTC

HDT - Heading, True Actual vessel heading in degrees True produced by any device or system producing true heading.

\$--HDT,x.x,T*hh<CR><LF> L____Heading, degrees True

HVD - Magnetic Variation, Automatic

HVM - Magnetic Variation, Manually Set

Magnetic variation, automatically derived (calculated or from a data base) (HVD), or manually entered (HVM). The use of **\$--HDG** is recommended.

\$--HVD,x.x,a*hh<CR><LF> \$--HVM,x.x,a*hh<CR><LF> ______ Magnetic variation, degrees E/W¹

Notes:

1) Easterly variation (E) subtracts from True Heading Westerly variation (W) adds to True Heading

IMA - Vessel Identification

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MDA - Meteorological Composite

Barometric pressure, air and water temperature, humidity, dew point and wind speed and direction relative to the surface of the earth.

The use of **\$--MTW**, **\$--MWV** and **\$--XDR** is recommended.



MHU - Humidity

The use of **\$--XDR** is recommended.

 $-MHU, x.x, x.x, x.x, C*hh <\!\!CR\!\!>\!\!<\!\!LF\!\!>$



MMB - Barometer

The use of **\$--XDR** is recommended.

 $-MMB, x.x, I, x.x, B*hh <\!\!CR\!\!>\!\!<\!\!LF\!\!>$

Barometric pressure, bars Barometric pressure, inches of mercury

MTA - Air Temperature

The use of **\$--XDR** is recommended.

\$--MTA,x.x,C*hh<CR><LF> Lemmerature, degrees C

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MWH - Wave Height

Limited utility, no recommended replacement.

\$--MWH,x.x,f,x.x,M*hh<CR><LF> Wave height, meters Wave height, feet

MWS - Wind & Sea State

Limited utility, no recommended replacement.

\$--MWS,xx,xx*hh<CR><LF>

└── Beaufort Sea State Code ── Beaufort Wind Force Code

OLN - Omega Lane Numbers

Omega Lines of Positions (LOPs).

OMEGA system is not operational, no recommended replacement.



OLW - Omega Lane Width

OMEGA system is not operational, no recommended replacement.



OMP - OMEGA

OMEGA system is not operational, no recommended replacement.

\$--OMP,1,aa,2,aa,3,aa*hh<CR><LF> Pair 3, AB-GH Pair 2 Pair 1

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ONZ - Omega Zone Number

OMEGA system is not operational, no recommended replacement.

\$--ONZ,a*hh<CR><LF>

L Station identifier, A-H

Rnn - Routes

Waypoint identifiers, listed in order with starting waypoint first, for route number "nn".

The use of **\$--RTE** is recommended.

\$--Rnn,c--c,--c*hh<CR><LF> _______ 14 field sequence of route waypoint IDs ______ nn = Route number

SBK - Loran-C Blink Status

SCY - Loran-C Cycle Lock Status

Loran-C warning flags for Blink (SBK) and Cycle Lock (SCY) indicating that one or more Loran-C stations <u>being</u> used to produce Lat/Lon and other navigation data are unreliable.

The use of **\$--GLC** is recommended.

\$--SBK,A*hh<CR><LF> \$--SCY,A*hh<CR><LF> Warning Flag

SCD - Loran-C ECDs

The use of **\$--LCD** is recommended.

$$-SCD,0,xxx,1,xxx,2,xxx,3,xxx,4,xxx,5,XXX*hh
 $L_1 J L_2 J L_3 J L_4 J$ Secondary 5 ECD
Master signal ECD$$

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SDB - Loran-C Signal Strength

Limited utility, no recommended replacement.

\$--SDB,x.x*hh<CR><LF> └── Signal strength, dB

SGD - Position Accuracy Estimate

Estimate of position accuracy based on geometric dilution of precision (GDOP) and system noise, in feet and nautical miles.

Limited utility, no recommended replacement.

\$--SGD,x.x,N,x.x,f*hh<CR><LF> L____ Accuracy, feet Accuracy, nautical miles

SGR - Loran-C Chain Identifier

The unique Loran-C Chain identifier, representing Group Repetition Interval (GRI) in <u>tens</u> of microseconds (Group Repetition Interval = {Chain ID}*10, microseconds). The use of **\$--GLC** is recommended.

\$--SGR,xxxx*hh<CR><LF> └── GRI, tens of microseconds

SIU - Loran-C Stations in Use

The use of **\$--GLC** is recommended.

\$--SIU,1,2,3,4,5,6,7,8*hh<CR><LF> Stations in use, null fields for stations not in use

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SLC - Loran-C Status

Blink, Cycle, and SNR warning status and SNR value for all stations. Stations used in lat/lon conversion are identified.

The use of **\$--GLC** and/or **\$--LCD** is recommended.



SNC - Navigation Calculation Basis

Basis for navigation calculations, Great Circle or Rhumb Line.

Limited utility, no recommended replacement.

```
$--SNC,a*hh<CR><LF>
└ Great Circle or Rhumb Line, G/R
```

SNU - Loran-C SNR Status

Loran-C warning flag for Signal-To-Noise-Ratio indicating that one or more Loran-C stations being used to produce Lat/Lon and other navigation data are unreliable.

The use of **\$--GLC** is recommended.

\$--SNU,A*hh<CR><LF> └ Warning Flag

SPS - Loran-C Predicted Signal Strength

Limited utility, no recommended replacement.

\$--SPS,xx*hh<CR><LF> └ Signal strength, dB

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SSF - Position Correction Offset

Amount of offset, and direction of offset, applied to measured position Lat/Lon to produce a displayed position Lat/Lon. Limited utility, no recommended replacement.

\$--SSF,x.x,a,x.x,a*hh<CR><LF>

Longitude offset, minutes E/W

Latitude offset, minutes N/S

STC - Time Constant

Time constant specified manually for use in navigation calculations. Limited utility, no recommended replacement.

```
$--STC,xxx*hh<CR><LF>
```

└ Time constant, 000 to 999 seconds

STR - Tracking Reference

Transmitted prior to a sentence containing velocity-based data to indicate when velocity is measured over-the-ground or relative to the water.

The use of appropriate ground or water-referenced approved sentences such as **\$--VBW**, **\$--VHW or \$--VTG** is recommended.

 $-STR,a*hh<\!CR>\!<\!LF>$ A = Ground reference, V = Water reference

SYS - Hybrid System Configuration

Limited utility, no recommended replacement.

\$--SYS,L,O,T,G,D*hh<CR><LF>



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TEC - TRANSIT Satellite Error Code & Doppler Count

TRANSIT system is not operational, no recommended replacement.

\$--TEC,A,A,A*hh<CR><LF>

L Status: Iteration number Status: Doppler count

- Status: Maximum angle

TEP - TRANSIT Satellite Predicted Elevation

TRANSIT system is not operational, no recommended replacement.

 $-TEP, x.x, D*hh <\!\!CR\!>\!\!<\!\!LF\!\!>$

Elevation, degrees

TGA - TRANSIT Satellite Antenna & Geoidal Heights -

TRANSIT system is not operational, no recommended replacement.

\$--TGA,x.x,M,x.x,M,x.x,M*hh<CR><LF> Antenna geoidal height, meters Geoidal height, meters Antenna height, meters

TIF - TRANSIT Satellite Initial Flag

TRANSIT system is not operational, no recommended replacement.

\$--TIF,a*hh<CR><LF>

Normal operation = A Set initialization data = V Initialization data complete = J

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TRF - TRANSIT Fix Data

Time, date, position and information related to a TRANSIT fix. TRANSIT system is not operational, no recommended replacement.



TRP - TRANSIT Satellite Predicted Direction of Rise

TRANSIT system is not operational, no recommended replacement.

\$--TRP,aa*hh<CR><LF> └ Southeasterly = SE, southwesterly = SW

TRS - TRANSIT Satellite Operating Status

TRANSIT system is not operational, no recommended replacement.

VCD - Current at Selected Depth

Limited utility, no recommended replacement.

\$--VCD,x.x,f,x.x,M,x.x,N,x.x,M*hh<CR><LF> Current, meters/second Current, knots Depth, feet and meters

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VPE - Speed, Dead Reckoned Parallel to True Wind

Limited utility, no recommended replacement.

\$--VPE,x.x,N,x.x,M*hh<CR><LF> Speed, meters/second, "-" = downwind Speed, knots, "-" = downwind

VTA - Actual Track

Limited utility, possible use of **\$--VTG** for a portion of the data.

\$--VTA,x.x,T,x.x,M,x.x,N,x.x,N*hh<CR><LF> Distance made good, naut. miles Speed made good, knots Track made good, degrees Magnetic Track made good, degrees True

VTI - Intended Track

Limited utility, no recommended replacement.

\$--VTI,x.x,T,x.x,M,x.x,N,x.x,N*hh<CR><LF> Distance made good, naut. miles Speed made good, knots Intended track, degrees Magnetic Intended track, degrees True

VWE - Wind Track Efficiency

Limited utility, no recommended replacement.

\$--VWE,x.x*hh<CR><LF> Efficiency, percent

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VWR - Relative (Apparent) Wind Speed and Angle

Wind angle in relation to the vessel's heading and wind speed measured relative to the moving vessel.

The use of **\$--MWV** is recommended.

\$--VWR,x.x,a,x.x,N,x.x,M,x.x,K*hh<CR><LF> Wind speed, Km/Hr Wind speed, meters/second Measured wind Speed, knots Measured wind angle relative to the vessel, 0 to 180°, left/right L/R of vessel heading

VWT - True Wind Speed and Angle

True wind angle in relation to the vessel's heading and true wind speed referenced to the water. True wind is the vector sum of the Relative (Apparent) wind vector and the vessel's velocity vector relative to the water along the heading line of the vessel. It represents the wind at the vessel if it were stationary relative to the water and heading in the same direction.

The use of **\$--MWV** is recommended.

\$--VWT,x.x,a,x.x,N,x.x,M,x.x,K*hh<CR><LF> Wind speed, Km/Hr Wind speed, meters/second Calculated wind Speed, knots Calculated wind angle relative to the vessel, 0 to 180°, left/right L/R of vessel heading

WDC - Distance to Waypoint

Distance from present position to the specified waypoint.

The use of **\$--BWC** is recommended.

\$--WDC,x.x,N,c--c*hh<CR><LF> Waypoint identifier Distance, nautical miles

WDR - Waypoint Distance, Rhumb Line

The use of **\$--WDC** using great circle calculations is recommended.

\$--WDR,x.x,N,c--c*hh<CR><LF> Waypoint ID Distance, nautical miles

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WFM - Route Following Mode

Limited utility, no recommended replacement.

\$--WFM,a*hh<CR><LF> └── Mode: "A" = automatic, "V" = manual

WNR - Waypoint-to-Waypoint Distance, Rhumb Line

The use of **\$--WNC** using great circle calculations is recommended.



YWP - Water Propagation Speed

Limited utility, no recommended replacement.

\$--YWP,x.x,f,x.x,M*hh<CR><LF> ______Speed, meters/second Speed, feet/second

YWS - Water Profile

Limited utility, no recommended replacement.



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ZAA - Time, Elapsed/Estimated

Elapsed time from point-of-interest. The use of **\$--ZFO** is recommended.

\$--ZFI,hhmmss.ss,hhmmss.ss,c--c*hh<CR><LF> Waypoint ID Elapsed time from waypoint UTC

Arrival time at point-of-interest. The use of **\$--ZTG** is recommended.

\$--ZPI,hhmmss.ss,hhmmss.ss,c--c*hh<CR><LF> Waypoint ID UTC Estimated time of arrival at waypoint.

The use of **\$--ZTG** is recommended.

\$--ZTA,hhmmss.ss,hhmmss.ss,c--c*hh<CR><LF> Waypoint ID Estimated arrival time at waypoint UTC

Estimated time to event/point-of-interest. The use of **\$--ZTG** is recommended.

Arrival time at waypoint. The use of **\$--ZTG** is recommended.

\$--ZWP,hhmmss.ss,hhmmss.ss,c--c*hh<CR><LF> Waypoint ID Arrival time at waypoint UTC

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ZCD - Timer

Limited utility, no recommended replacement.

\$--ZCD,xxxxxx,a*hh<CR><LF>
 Control: "+" = count up
 "-" = count down
 "V" = stop count
 Timer initial value, seconds

ZEV - Event Timer

Limited utility, no recommended replacement.



ZLZ - Time of Day

Time of day in hours-minutes-seconds, both with respect to (UTC) and the local time zone.

The use of **\$--ZDA** is recommended.

```
$--ZLZ,hhmmss.ss,hhmmss.ss,xx*hh<CR><LF>
Local zone description<sup>1</sup>, 00 to12
UTC
```

Notes:

1) Zone description is the number of whole hours <u>added to local time</u> to obtain GMT, Zone description is negative for East longitudes.

ZZU - Time, UTC

The use of **\$--ZDA** is recommended.

```
$--ZZU,hhmmss.ss*hh<CR><LF>
UTC
```