30.18.12 UBX-NAV-PVT (0x01 0x07)

30.18.12.1 Navigation Position Velocity Time Solution

Message	**NAV-PVT**					
Description	**Navigation Position Velocity Time Solution**					
Firmware	Supported on: • u-blox 8 / u-blox M8 from protocol version 15 up to version 22					
Type	Periodic/Polled					
Comment	**Note that during a leap second there may be more (or less) than 60 seconds in a minute; see the description of leap seconds for details.** This message combines position, velocity and time solution, including accuracy figures					
Message Structure	*Header*	*Class*	*ID*	*Length (Bytes)*	*Payload*	*Checksum*
	0xB5 0x62	0x01	0x07	92	*see below*	CK_A CK_B

Payload Contents:

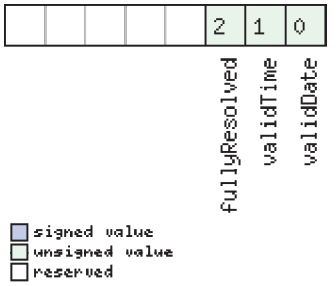
Byte Offset	*Number Format*	*Scaling*	*Name*	*Unit*	*Description*
0	U4	-	`iTOW`	ms	GPS time of week of the navigation epoch. See the description of iTOW for details.
4	U2	-	`year`	y	Year (UTC)
6	U1	-	`month`	month	Month, range 1..12 (UTC)
7	U1	-	`day`	d	Day of month, range 1..31 (UTC)
8	U1	-	`hour`	h	Hour of day, range 0..23 (UTC)
9	U1	-	`min`	min	Minute of hour, range 0..59 (UTC)
10	U1	-	`sec`	s	Seconds of minute, range 0..60 (UTC)
11	X1	-	`valid`	-	Validity flags (see graphic below)
12	U4	-	`tAcc`	ns	Time accuracy estimate (UTC)
16	I4	-	`nano`	ns	Fraction of second, range -1e9 .. 1e9 (UTC)
20	U1	-	`fixType`	-	GNSSfix Type: 0: no fix 1: dead reckoning only 2: 2D-fix 3: 3D-fix 4: GNSS + dead reckoning combined 5: time only fix
21	X1	-	`flags`	-	Fix status flags (see graphic below)
22	X1	-	`flags2`	-	Additional flags (see graphic below)
23	U1	-	`numSV`	-	Number of satellites used in Nav Solution
24	I4	1e-7	`lon`	deg	Longitude
28	I4	1e-7	`lat`	deg	Latitude
32	I4	-	`height`	mm	Height above ellipsoid
36	I4	-	`hMSL`	mm	Height above mean sea level
40	U4	-	`hAcc`	mm	Horizontal accuracy estimate
44	U4	-	`vAcc`	mm	Vertical accuracy estimate
48	I4	-	`velN`	mm/s	NED north velocity
52	I4	-	`velE`	mm/s	NED east velocity
56	I4	-	`velD`	mm/s	NED down velocity
60	I4	-	`gSpeed`	mm/s	Ground Speed (2-D)

NAV-PVT continued

Byte Offset	*Number Format*	*Scaling*	*Name*	*Unit*	*Description*
64	I4	1e-5	`headMot`	deg	Heading of motion (2-D)
68	U4	-	`sAcc`	mm/s	Speed accuracy estimate
72	U4	1e-5	`headAcc`	deg	Heading accuracy estimate (both motion and vehicle)
76	U2	0.01	`pDOP`	-	Position DOP
78	U1[6]	-	`reserved1`	-	Reserved
84	I4	1e-5	`headVeh`	deg	Heading of vehicle (2-D)
88	U1[4]	-	`reserved2`	-	Reserved

Bitfield valid

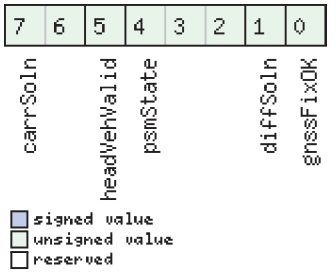
This graphic explains the bits of `valid`



Name	*Description*
`validDate`	1 = valid UTC Date (see Time Validity section for details)
`validTime`	1 = valid UTC Time of Day (see Time Validity section for details)
`fullyResolved`	1 = UTC Time of Day has been fully resolved (no seconds uncertainty)

Bitfield flags

This graphic explains the bits of `flags`



Name	*Description*
`gnssFixOK`	1 = valid fix (i.e within DOP & accuracy masks)
`diffSoln`	1 = differential corrections were applied
`psmState`	Power Save Mode state (see Power Management): 0: PSM is not active 1: Enabled (an intermediate state before Acquisition state 2: Acquisition 3: Tracking 4: Power Optimized Tracking 5: Inactive