4.2.2 Navigation Page Blocks

GPSRawCA	Number: 4017 "OnChange" interval: 6s

This block contains the 300 bits of a GPS C/A subframe. It is generated each time a new subframe is received, i.e. every 6 seconds.

Parameter	Type	Units	Do-Not-Use	Description
Sync1	c1			Block Header, see 4.1.1
Sync2	c1			
CRC	u2			
ID	u2			
Length	u2	1 byte		
TOW	u4	0.001 s	4294967295	SIS time stamp, see 4.1.3
WNc	u2	1 week	65535	
SVID	u1			Satellite ID, see 4.1.9
CRCPassed	u1			Status of the CRC or parity check: 0: CRC or parity check failed 1: CRC or parity check passed
ViterbiCnt	u1			Not applicable
Source	u1			Bit field: Bits 0-4: Signal type from which the bits have been received, as defined in 4.1.10 Bits 5-7: Reserved
FreqNr	u1			Not applicable
RxChannel	u1			Receiver channel (see 4.1.11).
NAVBits	u4[10]			NAVBits contains the 300 bits of a GPS C/A subframe. Encoding: For easier parsing, the bits are stored as a succession of 10 32-bit words. Since the actual words in the subframe are 30-bit long, two unused bits are inserted in each 32-bit word. More specifically, each 32-bit word has the following format: Bits 0-5: 6 parity bits (referred to as D_{25} to D_{30} in the GPS ICD), XOR-ed with the last transmitted bit of the previous word (D^*_{30})). Bits 6-29: source data bits (referred to as d_n in the GPS ICD). The first received bit is the MSB. Bits 30-31: Reserved
Padding	u1[..]			Padding bytes, see 4.1.5

GPSRawL2C	Number: 4018 "OnChange" interval: 12s

This block contains the 300 bits of a GPS L2C CNAV subframe (the so-called $D_c(t)$ data stream).

Parameter	Type	Units	Do-Not-Use	Description
Sync1	c1			Block Header, see 4.1.1
Sync2	c1			
CRC	u2			
ID	u2			
Length	u2	1 byte		
TOW	u4	0.001 s	4294967295	SIS time stamp, see 4.1.3
WNc	u2	1 week	65535	
SVID	u1			Satellite ID, see 4.1.9
CRCPassed	u1			Status of the CRC or parity check: 0: CRC or parity check failed 1: CRC or parity check passed
ViterbiCnt	u1			Viterbi decoder error count over the subframe
Source	u1			Bit field: Bits 0-4: Signal type from which the bits have been received, as defined in 4.1.10 Bits 5-7: Reserved
FreqNr	u1			Not applicable
RxChannel	u1			Receiver channel (see 4.1.11).
NAVBits	u4[10]			NAVBits contains the 300 bits of a GPS CNAV subframe. Encoding: NAVBits contains all the bits of the frame, including the preamble. The first received bit is stored as the MSB of NAVBits[0]. The unused bits in NAVBits[9] must be ignored by the decoding software.
Padding	u1[..]			Padding bytes, see 4.1.5

GPSRawL5	Number: 4019 "OnChange" interval: 6s

This block contains the 300 bits of a GPS L5 CNAV subframe (the so-called $D_c(t)$ data stream).

Parameter	Type	Units	Do-Not-Use	Description
Sync1	c1			Block Header, see 4.1.1
Sync2	c1			
CRC	u2			
ID	u2			
Length	u2	1 byte		
TOW	u4	0.001 s	4294967295	SIS time stamp, see 4.1.3
WNc	u2	1 week	65535	
SVID	u1			Satellite ID, see 4.1.9
CRCPassed	u1			Status of the CRC or parity check: 0: CRC or parity check failed 1: CRC or parity check passed
ViterbiCnt	u1			Viterbi decoder error count over the subframe
Source	u1			Bit field: Bits 0-4: Signal type from which the bits have been received, as defined in 4.1.10 Bits 5-7: Reserved
FreqNr	u1			Not applicable
RxChannel	u1			Receiver channel (see 4.1.11).
NAVBits	u4[10]			NAVBits contains the 300 bits of a GPS CNAV subframe. Encoding: NAVBits contains all the bits of the frame, including the preamble. The first received bit is stored as the MSB of NAVBits[0]. The unused bits in NAVBits[9] must be ignored by the decoding software.
Padding	u1[..]			Padding bytes, see 4.1.5

GLORawCA	Number: 4026 "OnChange" interval: 2s

This block contains the 85 bits of a GLONASS L1CA or L2CA navigation string.

Parameter	Type	Units	Do-Not-Use	Description
Sync1	c1			Block Header, see 4.1.1
Sync2	c1			
CRC	u2			
ID	u2			
Length	u2	1 byte		
TOW	u4	0.001 s	4294967295	SIS time stamp, see 4.1.3
WNc	u2	1 week	65535	
SVID	u1			Satellite ID, see 4.1.9
CRCPassed	u1			Status of the CRC or parity check: 0: CRC or parity check failed 1: CRC or parity check passed
ViterbiCnt	u1			Not applicable
Source	u1			Bit field: Bits 0-4: Signal type from which the bits have been received, as defined in 4.1.10 Bits 5-7: Reserved
FreqNr	u1			Frequency number, with an offset of 8. See 4.1.9
RxChannel	u1			Receiver channel (see 4.1.11).
NAVBits	u4[3]			NAVBits contains the first 85 bits of a GLONASS C/A string (i.e. all bits of the string with the exception of the time mark). Encoding: The first received bit is stored as the MSB of NAVBits[0]. The unused bits in NAVBits[2] must be ignored by the decoding software.
Padding	u1[..]			Padding bytes, see 4.1.5

GALRawFNAV	Number: 4022 "OnChange" interval: 10s

This block contains the 244 bits of a Galileo F/NAV navigation page, after deinterleaving and Viterbi decoding.

Parameter	Type	Units	Do-Not-Use	Description
Sync1	c1			Block Header, see 4.1.1
Sync2	c1			
CRC	u2			
ID	u2			
Length	u2	1 byte		
TOW	u4	0.001 s	4294967295	SIS time stamp, see 4.1.3
WNc	u2	1 week	65535	
SVID	u1			Satellite ID, see 4.1.9
CRCPassed	u1			Status of the CRC or parity check: 0: CRC or parity check failed 1: CRC or parity check passed
ViterbiCnt	u1			Viterbi decoder error count over the page
Source	u1			Bit field: Bits 0-4: Signal type from which the bits have been received, as defined in 4.1.10 Bits 5-6: Reserved Bit 7: Reserved
FreqNr	u1			Not applicable
RxChannel	u1			Receiver channel (see 4.1.11).
NAVBits	u4[8]			NavBits contains the 244 bits of a Galileo F/NAV page. Encoding: NAVBits contains all the bits of the frame, with the exception of the synchronization field. The first received bit is stored as the MSB of NAVBits[0]. The unused bits in NAVBits[7] must be ignored by the decoding software.
Padding	u1[..]			Padding bytes, see 4.1.5

GALRawINAV	Number: 4023 "OnChange" interval: 2s

This block contains the 234 bits of a Galileo I/NAV navigation page, after deinterleaving and Viterbi decoding.

Parameter	Type	Units	Do-Not-Use	Description
Sync1	c1			Block Header, see 4.1.1
Sync2	c1			
CRC	u2			
ID	u2			
Length	u2	1 byte		
TOW	u4	0.001 s	4294967295	SIS time stamp, see 4.1.3
WNc	u2	1 week	65535	
SVID	u1			Satellite ID, see 4.1.9
CRCPassed	u1			Status of the CRC or parity check: 0: CRC or parity check failed 1: CRC or parity check passed
ViterbiCnt	u1			Viterbi decoder error count over the page
Source	u1			Bit field: Bits 0-4: Signal type from which the bits have been received, as defined in 4.1.10 Bit 5: Set when the nav page is the concatenation of a sub-page received from E5b, and a sub-page received from L1BC. In that case, bits 0-4 are set to L1BC. Bit 6: Reserved Bit 7: Reserved
FreqNr	u1			Not applicable
RxChannel	u1			Receiver channel (see 4.1.11).
NAVBits	u4[8]			NAVBits contains the 234 bits of an I/NAV navigation page (in nominal or alert mode). Note that the I/NAV page is transmitted as two sub-pages (the so-called even and odd pages) of duration 1 second each (120 bits each). In this block, the even and odd pages are concatenated, even page first and odd page last. The 6 tails bits at the end of the even page are removed (hence a total of 234 bits). If the even and odd pages have been received from two different carriers (E5b and L1), bit 5 of the Source field is set. Encoding: NAVBits contains all the bits of the frame, with the exception of the synchronization field. The first received bit is stored as the MSB of NAVBits[0]. The unused bits in NAVBits[7] must be ignored by the decoding software.
Padding	u1[..]			Padding bytes, see 4.1.5

GEORawL1	Number: 4020 "OnChange" interval: 1s

This block contains the 250 bits of a SBAS L1 navigation frame, after Viterbi decoding.

Parameter	Type	Units	Do-Not-Use	Description
Sync1	c1			Block Header, see 4.1.1
Sync2	c1			
CRC	u2			
ID	u2			
Length	u2	1 byte		
TOW	u4	0.001 s	4294967295	SIS time stamp, see 4.1.3
WNc	u2	1 week	65535	
SVID	u1			Satellite ID, see 4.1.9
CRCPassed	u1			Status of the CRC or parity check: 0: CRC or parity check failed 1: CRC or parity check passed
ViterbiCnt	u1			Viterbi decoder error count over the navigation frame
Source	u1			Bit field: Bits 0-4: Signal type from which the bits have been received, as defined in 4.1.10 Bits 5-7: Reserved
FreqNr	u1			Not applicable
RxChannel	u1			Receiver channel (see 4.1.11).
NAVBits	u4[8]			NAVBits contains the 250 bits of a SBAS navigation frame. Encoding: NAVBits contains all the bits of the frame, including the preamble. The first received bit is stored as the MSB of NAVBits[0]. The unused bits in NAVBits[7] must be ignored by the decoding software.
Padding	u1[..]			Padding bytes, see 4.1.5

GEORawL5	Number: 4021 "OnChange" interval: 1s

This block contains the 250 bits of a SBAS L5 navigation frame, after Viterbi decoding.

Parameter	Type	Units	Do-Not-Use	Description
Sync1	c1			Block Header, see 4.1.1
Sync2	c1			
CRC	u2			
ID	u2			
Length	u2	1 byte		
TOW	u4	0.001 s	4294967295	SIS time stamp, see 4.1.3
WNc	u2	1 week	65535	
SVID	u1			Satellite ID, see 4.1.9
CRCPassed	u1			Status of the CRC or parity check: 0: CRC or parity check failed 1: CRC or parity check passed
ViterbiCnt	u1			Viterbi decoder error count over the navigation frame
Source	u1			Bit field: Bits 0-4: Signal type from which the bits have been received, as defined in 4.1.10 Bits 5-7: Reserved
FreqNr	u1			Not applicable
RxChannel	u1			Receiver channel (see 4.1.11).
NAVBits	u4[8]			NAVBits contains the 250 bits of a SBAS navigation frame. Encoding: NAVBits contains all the bits of the frame, including the preamble. The first received bit is stored as the MSB of NAVBits[0]. The unused bits in NAVBits[7] must be ignored by the decoding software.
Padding	u1[..]			Padding bytes, see 4.1.5

BDSRaw	Number: 4047 "OnChange" interval: 6 seconds (non GEOs), 0.6 s (GEOs)

This block contains the 300 bits of a BeiDou navigation page, as received from the B1I, B2I or B3I signal.

Parameter	Type	Units	Do-Not-Use	Description
Sync1	c1			Block Header, see 4.1.1
Sync2	c1			
CRC	u2			
ID	u2			
Length	u2	1 byte		
TOW	u4	0.001 s	4294967295	SIS time stamp, see 4.1.3
WNc	u2	1 week	65535	
SVID	u1			Satellite ID, see 4.1.9
CRCPassed	u1			Status of the CRC or parity check: 0: CRC or parity check failed 1: CRC or parity check passed
ViterbiCnt	u1			Not applicable
Source	u1			Signal type from which the bits have been received, as defined in 4.1.10
Reserved	u1			Reserved for future use, to be ignored by decoding software.
RxChannel	u1			Receiver channel (see 4.1.11).
NAVBits	u4[10]			NAVBits contains the 300 deinterleaved bits of a BeiDou navigation subframe. Encoding: NAVBits contains all the bits of the subframe, including the preamble and the parity bits. The first received bit is stored as the MSB of NAVBits[0]. The 20 unused bits in NAVBits[9] must be ignored by the decoding software. The bits are deinterleaved.
Padding	u1[..]			Padding bytes, see 4.1.5

BDSRawB1C	Number: 4218 "OnChange" interval: 18s

This block contains the 1800 symbols of a BeiDou B-CNAV1 navigation frame (itself containing three subframes), as received from the B1C signal.

The symbols are deinterleaved. The receiver attempts to correct bit errors using the LDPC parity bits, but unrecoverable errors are still possible at low C/N0. It is therefore always needed to check the CRC status before using the navigation bits. A separate CRC check is provided for subframe 2 and 3.

Parameter	Type	Units	Do-Not-Use	Description
Sync1	c1			Block Header, see 4.1.1
Sync2	c1			
CRC	u2			
ID	u2			
Length	u2	1 byte		
TOW	u4	0.001 s	4294967295	SIS time stamp, see 4.1.3
WNc	u2	1 week	65535	
SVID	u1			Satellite ID, see 4.1.9
CRCSF2	u1			Status of the CRC check of subframe 2: 0: failed 1: passed
CRCSF3	u1			Status of the CRC check of subframe 3: 0: failed 1: passed
Source	u1			Signal type from which the bits have been received, as defined in 4.1.10
Reserved	u1			Reserved for future use, to be ignored by decoding software.
RxChannel	u1			Receiver channel (see 4.1.11).
NAVBits	u4[57]			NAVBits contains the 1800 deinterleaved symbols of a BeiDou B1C (B-CNAV1) navigation frame. Encoding: NAVBits contains all the symbols of the frame. The first received symbol (i.e. the first symbol of subframe 1) is stored as the MSB of NAVBits[0]. The 24 unused bits in NAVBits[56] must be ignored by the decoding software.
Padding	u1[..]			Padding bytes, see 4.1.5

BDSRawB2a	Number: 4219 "OnChange" interval: 3s

This block contains the 576 symbols of a BeiDou B-CNAV2 navigation frame, as received from the B2a signal.

The receiver attempts to correct bit errors using the LDPC parity bits, but unrecoverable errors are still possible at low C/N0. It is therefore always needed to check the CRC status before using the navigation bits.

Parameter	Type	Units	Do-Not-Use	Description
Sync1	c1			Block Header, see 4.1.1
Sync2	c1			
CRC	u2			
ID	u2			
Length	u2	1 byte		
TOW	u4	0.001 s	4294967295	SIS time stamp, see 4.1.3
WNc	u2	1 week	65535	
SVID	u1			Satellite ID, see 4.1.9
CRCPassed	u1			Status of the CRC or parity check: 0: CRC or parity check failed 1: CRC or parity check passed
ViterbiCnt	u1			Not applicable
Source	u1			Signal type from which the bits have been received, as defined in 4.1.10
Reserved	u1			Reserved for future use, to be ignored by decoding software.
RxChannel	u1			Receiver channel (see 4.1.11).
NAVBits	u4[18]			NAVBits contains the 576 symbols of a BeiDou B2a (B-CNAV2) navigation frame. Encoding: NAVBits contains all the symbols of the frame, excluding the preamble. The first received symbol (i.e. the MSB of the PRN field) is stored as the MSB of NAVBits[0].
Padding	u1[..]			Padding bytes, see 4.1.5

QZSRawL1CA	Number: 4066 "OnChange" interval: 6s

This block contains the 300 bits of a QZSS C/A subframe.

Parameter	Type	Units	Do-Not-Use	Description
Sync1	c1			Block Header, see 4.1.1
Sync2	c1			
CRC	u2			
ID	u2			
Length	u2	1 byte		
TOW	u4	0.001 s	4294967295	SIS time stamp, see 4.1.3
WNc	u2	1 week	65535	
SVID	u1			Satellite ID, see 4.1.9
CRCPassed	u1			Status of the CRC or parity check: 0: CRC or parity check failed 1: CRC or parity check passed
Reserved	u1			Reserved
Source	u1			Bit field: Bits 0-4: Signal type from which the bits have been received, as defined in 4.1.10 Bits 5-7: Reserved
Reserved2	u1			Reserved for future use, to be ignored by decoding software.
RxChannel	u1			Receiver channel (see 4.1.11).
NAVBits	u4[10]			NAVBits contains the 300 bits of a QZSS C/A subframe. Encoding: Same as GPSRawCA block.
Padding	u1[..]			Padding bytes, see 4.1.5

QZSRawL2C	Number: 4067 "OnChange" interval: 12s

This block contains the 300 bits of a QZSS L2C CNAV subframe.

Parameter	Type	Units	Do-Not-Use	Description
Sync1	c1			Block Header, see 4.1.1
Sync2	c1			
CRC	u2			
ID	u2			
Length	u2	1 byte		
TOW	u4	0.001 s	4294967295	SIS time stamp, see 4.1.3
WNc	u2	1 week	65535	
SVID	u1			Satellite ID, see 4.1.9
CRCPassed	u1			Status of the CRC or parity check: 0: CRC or parity check failed 1: CRC or parity check passed
ViterbiCnt	u1			Viterbi decoder error count over the subframe
Source	u1			Bit field: Bits 0-4: Signal type from which the bits have been received, as defined in 4.1.10 Bits 5-7: Reserved
Reserved	u1			Reserved for future use, to be ignored by decoding software.
RxChannel	u1			Receiver channel (see 4.1.11).
NAVBits	u4[10]			NAVBits contains the 300 bits of a QZSS CNAV subframe. Encoding: NAVBits contains all the bits of the frame, including the preamble. The first received bit is stored as the MSB of NAVBits[0]. The unused bits in NAVBits[9] must be ignored by the decoding software.
Padding	u1[..]			Padding bytes, see 4.1.5

QZSRawL5	Number: 4068 "OnChange" interval: 6s

This block contains the 300 bits of a QZSS L5 CNAV subframe.

Parameter	Type	Units	Do-Not-Use	Description
Sync1	c1			Block Header, see 4.1.1
Sync2	c1			
CRC	u2			
ID	u2			
Length	u2	1 byte		
TOW	u4	0.001 s	4294967295	SIS time stamp, see 4.1.3
WNc	u2	1 week	65535	
SVID	u1			Satellite ID, see 4.1.9
CRCPassed	u1			Status of the CRC or parity check: 0: CRC or parity check failed 1: CRC or parity check passed
ViterbiCnt	u1			Viterbi decoder error count over the subframe
Source	u1			Bit field: Bits 0-4: Signal type from which the bits have been received, as defined in 4.1.10 Bits 5-7: Reserved
Reserved	u1			Reserved for future use, to be ignored by decoding software.
RxChannel	u1			Receiver channel (see 4.1.11).
NAVBits	u4[10]			NAVBits contains the 300 bits of a QZSS CNAV subframe. Encoding: NAVBits contains all the bits of the frame, including the preamble. The first received bit is stored as the MSB of NAVBits[0]. The unused bits in NAVBits[9] must be ignored by the decoding software.
Padding	u1[..]			Padding bytes, see 4.1.5

NAVICRaw	Number: 4093 "OnChange" interval: 12s

This block contains the 292 bits of a NavIC/IRNSS subframe.

Parameter	Type	Units	Do-Not-Use	Description
Sync1	c1			Block Header, see 4.1.1
Sync2	c1			
CRC	u2			
ID	u2			
Length	u2	1 byte		
TOW	u4	0.001 s	4294967295	SIS time stamp, see 4.1.3
WNc	u2	1 week	65535	
SVID	u1			Satellite ID, see 4.1.9
CRCPassed	u1			Status of the CRC or parity check: 0: CRC or parity check failed 1: CRC or parity check passed
ViterbiCnt	u1			Viterbi decoder error count over the subframe
Source	u1			Signal type from which the bits have been received, as defined in 4.1.10
Reserved	u1			Reserved for future use, to be ignored by decoding software.
RxChannel	u1			Receiver channel (see 4.1.11).
NAVBits	u4[10]			NavBits contains the 292 bits of a NavIC/IRNSS subframe. Encoding: NAVBits contains all the bits of the frame, with the exception of the preamble. The first received bit is stored as the MSB of NAVBits[0]. The unused bits in NAVBits[9] must be ignored by the decoding software.
Padding	u1[..]			Padding bytes, see 4.1.5