Appendix 2) IEC-61162-1 sentence

1. Sentences used in FA-100

The sentences underlined are new IEC-61162-1 sentences due to AIS.

ABK	Addressed and binary broadcast acknowledgement
ABM	Addressed Binary and safety related Message
ACA	AIS Regional Channel Assignment Message
ACK	Acknowledgement alarm
AIR	AIS Interrogation Request
ALR	Set alarm state
BBM	Broadcast Binary Message
DTM	Datum reference
GBS	GNSS Satellite fault detection
GGA	Global positioning system fix data
GLL	Geographic position, latitude/longitude
GNS	GNSS fix data
HDT	Heading true
LRI	Long Range Interrogation
LRF	Long Range Function
LR1	Long Range Reply with destination for function request “A”
LR2	Long Range Reply with destination for function request “B, C, E and F”
LR3	Long Range Reply with destination for function request “I, O, P, U and W”
OSD	Own ship data
RMC	Recommended minimum specific GNSS data
ROT	Rate of turn
SSD	Ship Static Data
TXT	Text transmission
VBW	Dual ground/water speed
VDM	VHF Data Link Message
VDO	VHF Data Link Own-vessel message
VSD	Voyage Static Data
VTG	Course over ground and ground speed

2. General

2.1 Structure

The following provides a summary explanation of the approved sentence structure:

$ aaccc,c---c*hh<CR><LF>

- $: Start of sentence
- aaccc : Address field: alphanumeric characters identifying type of talker and sentence formatter.
- ”,” : Field delimiter
- c---c : Data sentence block
- “*” : Checksum delimiter: follows last data field of the sentence
- hh : Checksum field
- <CR><LF> : End of sentence: sentence terminating delimiter.

Character symbol for data sentence block

A	Status symbol; Yes; Data valid; Warning flag clear; Auto; Ampere
a	Alphabet character variable A through Z or a through z
B	Bar (pressure, 1000nb=100 kpa), Bottom
C	Celsius (Degrees); Course-up
c	Valid character; Calculating
D	Degrees(of arc)
E	Error; East; Engine
F	Fathoms (1 fathom equals 1,828 766 m)
f	Feet (1 foot equals 0,304 79 m)
G	Great circle; Green
g	Good
H	Compass heading; Head-up; Hertz; Humidity
h	Hours; HEX number
I	Inches (1 inch equals 0,0254 m)
J	Input operation completed
K	Kilometers; km/h
k	Kilograms
L	Left; Local; Lost target
l	Latitude; Litres; l/s
M	Meters; m/s; Magnetic; Manual; Cubic meters
m	Minutes; message
N	Nautical miles; Knots; North; North-up; Newtons
n	Numeral; address
P	Purple; Proprietary (only when following “$”); Position sensor; Per cent; Pascal(pressure)

Q	Query; Target-being-acquired
R	Right; Rhumb line; Red; Relative; Reference; Radar tracking; revolutions/min(RPM)
S	South; Statute miles (1609,31m); Statute miles/h; Shaft
s	Seconds
T	Time difference; True; Track; Tracked target
t	Test
U	Dead reckoning estimate
u	Sign, if minus "—"(HEX 2D)
V	Data invalid; No; Warning flag set; Manual; Volt
W	West; Water; Wheelover
x	Numeric character variable
y	Longitude
Z	Time

Talker Identifier mnemonics

Identifier	Talker device
AG	Heading/track controller (autopilot) general
AP	Heading/track controller (autopilot) magnetic
AI	Automatic identification system
CD	Communications; digital selective calling (DSC)
CR	Communications; data receiver
CS	Communications; satellite
CT	Communications; radio-telephone (MF/HF)
CV	Communications; radio-telephone (VHF)
CX	Communications; scanning receiver
DE	DECCA navigator
DF	Direction finder
EC	Electronic chart systems (ECS)
EI	Electronic chart display and information system (ECDIS)
EP	Emergency position indicating radio beacon (EPIRB)
ER	Engine room monitoring systems
GP	Global positioning system (GPS)
GL	GLONASS receiver
GN	Global navigation satellite system (GNSS)
HC	Heading sensor; compass, magnetic
HE	Heading sensor; gyro, north seeking
HN	Heading sensor; gyro, non-north seeking
II	Integrated instrumentation
IN	Integrated navigation
LC	LORAN: LORAN-C
P	Proprietary code
RA	Radar and/or radar plotting

SD	Sounder, depth
SN	Electronic positioning system, other/general
SS	Sounder, scanning
TI	Turn rate indicator
VD	Velocity sensor: Doppler, other/general
VM	Velocity sensor: speed log, water, magnetic
VW	Velocity sensor: speed log, water, mechanical
VR	Voyage data recorder
YX	Transducer
ZA	Timekeepers, time/date: atomic clock
ZC	Timekeepers, time/date: chronometer
ZQ	Timekeepers, time/date: quartz
ZV	Timekeepers, time/date: radio update
WI	Weather instruments

2.2 IEC-61162-1 AIS sentences

The sentence underlined is new IEC-61162-1 sentences due to AIS.

ABK Addressed and binary broadcast acknowledgement

The ABK-sentence is generated when a transaction, initiated by reception of an ABM, AIR, or BBM sentence, is completed or terminated.

This sentence provides information about the success or failure of a requested ABM broadcast of either ITU-R M. 1371 messages 6 or 12. The ABK process utilizes the information received in ITU-R M. 1371 messages 7 and 13. Upon reception of either a VHF Data-link message 7 or 13, or the failure of messages 6 or 12, the AIS unit delivers the ABK sentence to the external application.

This sentence is also used to report to the external application the AIS unit's handling of the AIR (ITU-R M. 1371 message 15) and BBM (ITU-R M. 1371 message 8 and 14) sentences. The external application initiates an interrogation through the use of the use of the AIR-sentence, or a broadcast through the use of the BBM sentence. The AIS unit generates an ABK sentence to report the outcome of the AIR or BBM broadcast process.

$--ABK, xxxxxxxxx, a, x.x, x, x *hh<CR><LF>
a b c d e

a: MMSI of the addressed destination AIS unit

b: AIS channel of reception

c: ITU-R M.1371 message ID

d: Message Sequence Number

e: Type of acknowledgement

ABM Addressed Binary and safety related Message

This sentence supports ITU-R M. 1371 messages 6 and 12. It provides and external application with a means to exchange data using an AIS. The message data is defined by the application only - not the AIS. After receiving this sentence, the AIS initiates a radio broadcast on the VHF Data Link (VDL) of either message 6 or 12.

$--ABM, x, x, x, xxxxxxxxx, x, x.x, s--s, x*hh<CR><LF>
a b c d e f g h

a: Total number of sentences needed to transfer the message, 1 to 9
b: Sentence number, 1 to 9
c: Sequential Message identifier, 0 to 3
d: The MMSI of destination AIS unit for the ITU-R M.1371 message
e: AIS channel for broadcast of the radio message
f: ITU-R M.1371 message ID (6 or12)
g: Encapsulated data
h: Number of fill-bits, 0 to 5

ACA AIS Regional Channel Assignment Message

An AIS unit can receive regional channel management information four ways:
- ITU-R M. 1371 message 22
- DSC telecommand received on channel 70
- manual operator input, and
- an ACA-sentence.

The AIS unit may store channel management information for future use. Channel management information is applied based upon the actual location of the AIS unit. An AIS unit is “using” channel management information when the information is being used to manage the operation of the VHF receivers and/or transmitter inside the AIS unit.
This sentence is used to both enter and obtain channel management information.

$--ACA, x, llll.ll, a, yyyyy.yy, a, llll.ll, a, yyyyy.yy, a, x,
a b c d e f
xxxx, x, xxxx, x, x, x, a, x, hhmmss.ss *hh<CR><LF>
g h i j k l m n o

a: Sequence Number, 0 to 9
b: Region Northeast corner latitude-N/S
c: Region Northeast corner longitude-E/W
d: Region Southwest corner latitude-N/S
e: Region Southwest corner longitude-E/W
f: Transition Zone Size (Value of 1 NM to a value of 8NM)
g: Channel A
h: Channel A bandwidth

i: Channel B
j: Channel B bandwidth
k: TX/Rx mode control

Value	0	1	2	3	4	5
CHA	TX/RX	TX/RX	RX	RX	RX	Not used
CHB	TX/RX	RX	TX/RX	RX	Not used	RX

l: Power level control (12.5W/2W)

m: Information source

A: ITU-R M.1371 message22 (Channel management address message)
B: ITU-R M.1371 message22 (Channel management broadcast geographical area message)
C: IEC 61162-1 AIS channel assignment sentence
D: DSC channel70 telecommand
M: Operator manual input

n: In-use flag

o: Time of “in-use” change

ACK Acknowledgement alarm

This sentence is used to acknowledge an alarm condition reported by device.

$--ACK, xxx *hh<CR><LF>
a

a: Local alarm number(identifier)

AIR AIS Interrogation Request

This sentence supports ITU-R M. 1371 message 15. It provides an external application with the means to initiate a request for specific ITU-R M. 1731 messages from distant mobile or base AIS stations.

$--AIR, xxxxxxxxx, x.x, x, x.x, x, xxxxxxxxx, x.x, x *hh<CR><LF>
a b c d e f g h

a: MMSI of interrogated station-1

b: ITU-R M.1371 message requested from station-1 note)

c: massage sub-section (Reserved for future use)

d: number of second message from station-1 note)

e: massage sub-section (Reserved for future use)

f: MMIS interrogated station-2

g: number of message requested from station-2note)

h: massage sub-section (Reserved for future use)

Note) Example of messages that may be requested from a distant mobile AIS station include:
Message3: Position report
Message5: Ship static and voyage related data
Mesage9: Standard SAR aircraft position report
Message18: Standard class B equipment position report
Message19: Extended class B equipment position report
Message21: Aids-to-Navigation report
Example of messages that may be requested from a distant AIS base station include:
Message4: Base station report
Message17: GNSS broadcast binary message
Message20: Data link management message
Message22: Channel management

ALR Set alarm state

This sentence is used to report an alarm condition on a device and its current state of acknowledgement.

$--ALR, hhmmss.ss, xxx, A, A, c--c *hh<CR><LF>
a b c d e

a: Time of alarm condition change, UTC

b: Local alarm number(identifier) [identification number of alarm source]

c: Alarm condition (A= threshold exceeded, V=not exceeded)

d: Alarm's acknowledge state (A=acknowledged, V=unacknowledged)

e: Alarm's description text

BBM Broadcast Binary Message

This sentence supports generation of an ITU-R M. 1371 Binary Broadcast Message (message 8) or Safety Related Broadcast Message (message 14). After receiving this sentence, the AIS initiates a VHF broadcast of either message 8 or 14 within four seconds.
The success or failure if the broadcast confirmed through the use of the "Addressed and binary Broadcast Acknowledgement (ABK)" sentence formatter, and the processes that support the generation of an ABK-sentence. The AIS is limited in the amount of encapsulated data that can be sent in each slot and frame. If the length of the message would exceed five slots, or the AIS broadcast would exceed the limit of 20 RATDMA slot transmissions for the current frame, the AIS will return an ABK-sentence with an acknowledgement of "2" – message could not be broadcast.

$--BBM, x, x, x, x, x.x, s--s, x *hh<CR><LF>
a b c d e f g

a: Total number of sentences needed to transfer the message, 1 to 9

b: Sentence number, 1 to 9

c: Sequential message identifier, 0 to 9

d: AIS channel for broadcast of the radio message

e: ITU-R M.1371 message ID, 8 or 14

f: Encapsulated data
Binary data parameter for Message 8 or safety related text parameter for Message 14.

g: Number of fill-bits, 0 to 5

DTM Datum reference

Local geodetic datum and datum offsets from a reference datum. This sentence is used to define the datum to which a position location, and geographic locations in subsequent sentences, are referenced. Latitude, longitude and altitude offsets from the reference datum, and the selection of the reference datum, are also provided.

$--DTM, ccc, a, x.x, a, x.x, a, x.x, ccc *hh<CR><LF>
a b c d e f

a: Local datum
- WGS84=W84
- WGS72=W72
- SGS85=S85,
- PE90=P90
- User define=999
- IHO datum code

b: Local datum subdivision code

c: Lat offset, min, N/S

d: Lon offset, min, E/W

e: Altitude offset, m

f: Reference datum
- WGS84=W84
- WGS72=W72
- SGS85=S85
- PE90=P90

GBS GNSS Satellite fault detection

This message is used to support receiver autonomous integrity monitoring (RAIM).

$--GBS, hhmmss.ss, x.x, x.x, x.x, xx, x.x, x.x, x.x *hh<CR><LF>
a b c d e f g h

a: UTC time of the GGA or GNS fix associated with this sentence

b: Expected error in latitude

c: Expected error in longitude

b: Expected error in altitude

e: ID number of most likely failed satellite

f: Probability of missed detection for most likely failed satellite

g: Estimate of bias on most likely failed satellite

h: Standard deviation of bias estimate

GGA Global positioning system fix data

Time, position and fix-related data for a GPS receiver.

$--GGA, hhmmss.ss, llll.ll, a, yyyyy.yy, a, , x,
a b c d
xx, x.x, x.x, M, x.x, M, x.x, xxxx *hh<CR><LF>
e f g h i j k l

a: UTC of position

b: Latitude, N/S

c: Longitude, E/W

d: GPS quality indicator

0=Fix not available or invalid,
1=GPS SPS mode, fix valid,
2=Differential GPS, SPS mode, fix valid,
3=GPS PPS mode ,fix valid,
4=Real Time kinematic. Satellite system used in RTK mode with fixed integers
5=Float RTK. Satellite system used in RTK mode with floating integers,
6=Dead reckoning mode,
7=Manual input mode,
8=Simulator mode

e: Number of satellites in use, 00-12, may be different from the number in view

f: Horizontal dilution of precision

g: Antenna altitude above/below mean sea level (geoid)

h: Units of antenna altitude, m

i: Geoidal separation (difference between the WGC-84)

j: Units of geoidal separation, m

k: Age of differential GPS data

l: Differential reference station ID, 0000-1023

GLL Geographic position, latitude/longitude

Latitude and longitude of vessel position, time of position fix and status.

$--GLL, llll.ll, a, yyyyy.yy, a, hhmmss.ss, A, a *hh<CR><LF>
a b c d e

a: Latitude, N/S

b: Longitude, E/W

c: UTC of position

d: Status

A=data valid, V=data invalid

e: Mode indicator

A=Autonomous, M=Manual input, E=Dead reckoning
D=differential, S=Simulator, N=Data not valid

GNS GNSS fix data

Fix data for single or combined satellite navigation systems (GNSS).

$--GNS, hhmmss.ss, llll.ll, a, yyyyy.yy, a, , c--c,
a b c d
xx, x.x, x.x, x.x, x.x, x.x *hh<CR><LF>
e f g h i j

a: UTC of position

b: Latitude, N/S

c: Longitude, E/W

d: Mode indicator 1st char.=GPS, 2nd=GLONASS, 3rd=other satellite system

N=No fix	F=Float RTK
A=Autonomous	E=Dead reckoning mode
D=Differential	M=Manual input mode
P=Precise	S=Simulator mode
R=Real time Kinematic	

e: Total number of satellites in use, 00-99

f: HDOP

g: Antenna altitude, m, re: mean-sea-level(geoid)

h: Geoidal separation, m

i: Age of differential data

j: Differential reference station ID

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>
a

a: Heading, degree true

LRI Long Range Interrogation

The long-range interrogation of the AIS is accomplished through the use of two sentences. The pair of interrogation sentences, a LRI-sentence followed by a LRF-sentence, provides the information needed by an AIS to determine if it must construct and provide the reply sentences (LRF, LR1, LR2, and LR3).

$--LRI, x, a, xxxxxxxxx, xxxxxxxxx, llll.ll, a, yyyyy.yy, a,
a b c d e f
llll.ll, a, yyyyy.yy, a *hh<CR><LF>
g h

a: Sequence number, 0 to 9

b: Control flag

c: MMSI of requester

d: MMSI of destination

e: Latitude-N/S (north-east co-ordinate)note)

f: Longitude-E/W (north-east co-ordinate) note)

g: Latitude-N/S (south-west co-ordinate) note)

h: Longitude-E/W (south-west co-ordinate) note)

Note) The geographic region being interrogated is a rectangular area defined by the L/L of the north east and south west corners.

LRF Long Range Function

This sentence is used in both long-range interrogation requests and long-range interrogation replies. The LRF-sentence is the second sentence of the long-range interrogation request pair, LRI and LRF.

The LRF-sentence is also the first sentence of the long-range interrogation reply. The minimum reply consists of a LRF-sentence followed by a LR1-sentence. The LR2-sentence and/or the LR3-sentence follow the LR1-sentence, if information provided in these sentences.

$--LRF, x, xxxxxxxxx, c--c, c--c, c--c *hh<CR><LF>
a b c d e

a: Sequence number, 0 to 9

b: MMIS of requester

c: Name of requester, 1 to 20 character string

d: Function request, 1 to 26 characters

A=Ship's: name, callsign, and IMO number
B=Date and time of message composition
C=Position
E=COG(Course over ground)
F=SOG(Speed over ground)
I=ETA(Destination and Estimated Time of Arrival)
O=Draught
P=Ship/Cargo
U=Ship's: length, breadth, type
W=Persons on board

e: Function reply status

LR1 Long Range Reply with destination for function request "A"

The LR1-sentence identifies the destination for the reply and contains the information requested by the "A" function identification character (See the LRF-sentence).

$--LR1, x, xxxxxxxxx, xxxxxxxxx, c--c, c--c, xxxxxxxx *hh<CR><LF>
a b c d e f

a: Sequence number, 0 to 9
b: MMIS of responder
c: MMIS of requester (reply destination)
d: Ship's name, 1 to 20 characters
e: Call Sign, 1 to 7 characters
f: IMO number, 9 digit number

LR2 Long Range Reply for function requests "B, C, E and F"

The LR2-sentence contains the information requested by the "B, C, E and F" function identification characters (See the LRF-sentence).

$--LR2, x, xxxxxxxxx, xxxxxxxxx, hhmmss.ss, llll.ll, a,
a b c d e
yyyyy.yy, a, x.x, T, x.x, N *hh<CR><LF>
f g h

a: Sequence number, 0 to 9
b: MMIS of responder
c: Date: ddmmyyyy, 8 digits
d: UTC time of position
e: Latitude, N/S (position co-ordinate, to 1 min.)
f: Longitude, E/W (position co-ordinate, to 1 min.)
g: Course over ground true, value to nearest degree
h: Speed over ground, value to 0.1 knot

LR3 Long Range Reply for function requests "I, O, P, U and W"

The LR3-sentence contains the information requested by the "I, O, P, U, and W" function identification characters (See the LRF-sentence).

$--LR3, x, xxxxxxxxx, c--c, xxxxxx, hhmmss.ss, x.x, cc,
a b c d e f g
x.x, x.x, x.x, x.x *hh<CR><LF>
h i j k

a: Sequence number, 0 to 9
b: MMIS of responder
c: Voyage destination, 1 to 20 characters
d: ETA Date: ddmmyy
e: ETA Time, value to nearest second
f: Draught, value to 0.1 meter
g: Ship/Cargo
h: Ship length, value to nearest meter
i: Ships breadth, value to nearest meter
j: Ship type
k: Persons, 0 to 8191

OSD Own ship data

Heading, course, speed, set and drift summary.

$--OSD, x.x, A, x.x, a, x.x, a, x.x, x.x, a *hh<CR><LF>
a b c d e f g h i

a: Heading, degrees true
b: Heading status A=data valid, V=data invalid
c: Vessel course, degrees true
d: Course reference, B/M/W/R/P
B=bottom tracking log M=manually entered
W=water referenced R=radar tracking (of fixed target)
P=positioning system ground reference
e: Vessel speed
f: Speed reference, B/M/W/R/P
g: Vessel set, degrees true
h: Vessel drift(speed)
i: Speed unit (km/h, Knots, miles/h)

RMC Recommended minimum specific GNSS data

Time, date, position, course and speed data provided by a GNSS navigation receiver.

$--RMC, hhmmss.ss, A, llll.ll, a, yyyyy.yy, a, x.x,
a b c d e
x.x, xxxxxx, x.x, a, a *hh<CR><LF>
f g h i

a: UTC of position fix
b: Status (A=data valid, V=navigation receiver warning)
c: Latitude, N/S
d: Longitude, E/W
e: Speed over ground, knots
f: Course over ground, degrees true
g: Date: dd/mm/yy
h: Magnetic variation, degrees, E/W
i: Mode indicator

A=Autonomous mode	M=Manual input mode
D=Differential mode	S=Simulator mode
E=dead reckoning mode	N=Data not valid

ROT Rate of turn

Rate of turn and direction of turn.

$--ROT, x.x, A *hh<CR><LF>
a b

a: Rate of turn, deg./min, "-"=bow turns to port
b: Status (A=data valid, V=data invalid)

SSD Ship Static Data

This sentence is used to enter static parameters into a shipboard AIS.

$--SSD, c--c, c--c, xxx, xxx, xx, xx, c, aa *hh<CR><LF>
a b c d e f g h

a: Ship's Call Sign, 1 to 7 characters

b: Ship's name, 1 to 20 characters

c: Pos. ref., "A", distance from bow, 0 to 511 meters

d: Pos. ref., "B", distance from stern, 0 to 511 meters

e: Pos. ref., "C", distance from port beam, 0 to 63 meters

f: Pos. ref., "D", distance from starboard beam, 0 to 63 meters

g: DTE indicator flag

0=Keyboard and display are a standard configuration,
and communication is supported.
1= Keyboard and display are either unknown or unable to support communication.

h: Source identifier

TXT Text transmission

For the transmission of short text messages. Longer text messages may be transmitted by using multiple sentences.

$--TXT, xx, xx, xx, c--c *hh<CR><LF>
a b c d

a: Total number of messages, 01 to 99

b: Message number, 01 to 99

c: Text identifier

d: Text message

VBW Dual ground/water speed

Water-referenced and ground-referenced speed data.

$--VBW, x.x, x.x, A, x.x, x.x, A, x.x, A, x.x, A *hh<CR><LF>
a b c d e f g h i j

a: Longitudinal water speed, knots
b: Transverse water speed, knots
c: Status: water speed (A=data valid, V=data invalid)
d: Longitudinal ground speed, knots
e: Transverse ground speed, knots
f: Status: ground speed (A=data valid, V=data invalid)
g: Stern transverse water speed, knots
h: Status: stern water speed (A=data valid, V=data invalid)
i: Stern transverse ground speed, knots
j: Status: stern ground speed (A=data valid, V=data invalid)

VDM VHF Data Link Message

This sentence is used to transfer the entire contents of a received AIS message packet, as defined in ITU-R M. 1371 and as received on the VHF Data Link (VDL), using the “6-bit” field type. The structure provides for the transfer of long binary messages by using multiple sentences.

$--VDM, x, x, x, a, s—s, x *hh<CR><LF>
a b c d e f

a: Total number of sentences needed to transfer the message, 1 to 9
b: Sentence number, 1 to 9
c: Sequential message identifier, 0 to 9
d: AIS Channel, “A” or “B”
e: Encapsulated ITU-R M.1371 radio message
f: Number of fill-bits, 0 to 5

VDO VHF Data Link Own-vessel message

This sentence is used to provide the information assembled for broadcast by the AIS. It uses the six-bit field type for encapsulation. The sentence uses the same structure as the VDM sentence formatter.

$--VDO, x, x, x, a, s—s, x *hh<CR><LF>
a b c d e f

a: Total number of sentences needed to transfer the message, 1 to 9

b: Sentence number, 1 to 9

c: Sequential message identifier, 0 to 9

d: AIS Channel, “A” or “B”

e: Encapsulated ITU-R M.1371 radio message

f: Number of fill-bits, 0 to 5

VSD Voyage Static Data

This sentence is used to enter information about a ship’s voyage. This information remains relatively static during the voyage.

$--VSD, x.x, x.x, x.x, c--c, hhmmss.ss, xx, xx, x.x, x.x *hh<CR><LF>
a b c d e f g h i

a: Type of ship and cargo category, 0 to 255

b: Maximum present static draught, 0 to 25.5 meter

c: Persons on-board, 0 to 8191

d: Destination, 1-20 characters

e: Est. UTC of destination arrival

f: Est. day of arrival at destination, 00 to 31 (UTC)

g: Est. month of arrival at destination, 00 to 12 (UTC)

h: Navigational status, 0 to 15
ex) 0=under way using engine
1=at anchor
2=not under command, etc.

i: Regional application flags, 0 to 15

VTG Course over ground and ground speed

The actual course and speed relative to the ground.

$--VTG, x.x, T, x.x, M, x.x, N, x.x, K, a *hh<CR><LF>
a b c d e

a: Curse over ground, degrees true

b: Curse over ground, degrees magnetic

c: Speed over ground, knot

d: Speed over ground, km/m

e: Mode indicator

A=Autonomous mode	M= Manual input mode
D=Differential mode	S= Simulator mode
E=Dead reckoning mode	N=Data not valid