NAME

mbnavlist – List navigation data in swath sonar data files.

VERSION

Version 5.0

SYNOPSIS

mbnavlist [**–B***yr/mo/da/hr/mn/sc* **–D***decimate* **–E***yr/mo/da/hr/mn/sc* **–F***format* **–G***delimeter* **–H** **–I***file* **–K***kind* **–L***lonflip* **–N***navchannel* **–O***output_format* **–R***west/east/south/north* **–S***speed* **–T***timegap* **–V** **–Z***segment*]

DESCRIPTION

mbnavlist prints the specified contents of navigation records in a swath sonar data file to stdout. By default, **mbnavlist** produces ASCII files in spreadsheet style, with data columns separated by tabs. Alternatively, other column delimiters can be used (**–G** option), or the output can be binary, with each field represented as a double precision float (**–A** option). The output stream can be decimated using the **–D** option. The output of **mbnavlist** can be piped to plotting and data analysis programs. The option **–O***output_format* can be used to control the data types that are sent to stdout.

By default, **mbnavlist** extracts navigation from the data record type listed as the "navigation source" for a particular data format. Swath data formats may contain synchronous navigation (navigation is included in survey data records), asynchronous navigation (navigation comes in records separate from and at different times than the survey data records), or both (survey records contain merged navigation while the original asynchronous navigation is preserved in separate navigation records). Some data formats provide for multiple navigation sources, so that there are more than one channel of asynchronous data records. In this case one channel is always designated as the primary or active navigation channel. The **–N** option allows the user to specify that **mbnavlist** outputs navigation from the primary asynchronous navigation (**–N***0*) or from one of three auxiliary navigation channels (**–N***1*, **–N***2*, or **–N***3*). If the data format only uses asynchronous navigation, then the default navigation source will already be the primary asynchronous navigation and **–N** need not be used. If **–N** is used but the data file does not contain asynchronous navigation or the specified auxiliary navigation channels, then **mbnavlist** will output nothing. To determine if a datafile contains asynchronous navigation and/or auxiliary navigation, run **mbinfo** using its **–N** option to get counts of all data record types in the file.

Just to make things more complicated, many data formats formats pass heading and attitude data in records separate from position, and often with different timestamps and sampling rates. If, for instance, the attitude data are sampled at 10 Hz but position is only sampled at 1 Hz, extracting roll using **mbnavlist** will, by default, either output roll values only at the sonar ping times (if the navigation source is the survey data) or at the position record times (if the navigation source is the asynchronous position data, but not at the attitude data times. Moreover, the attitude data will be interpolated onto the times of sonar pings or position fixes. In order to extract the full attitude data stream, the **–K***kind* option may be used, where *kind* is the identifier for the record type to be used as the trigger for output. Any desired values not contained in the selected record will be interpolated onto the times of the selected record. In order to identify the records available in a particular data file, use **mbinfo** with the **–N** option. This will show if a data file contains records of type MB_DATA_ATTITUDE, which has a record type identifier of 18, A list of the record type identifiers used within **MB-System** is given below, although not all of the record types have time stamps or can be used to define **mbnavlist** output. For example, requesting **mbnavlist** output associated with comment records will yield nonuseful results.

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OPTIONS

−A

Causes the output to be binary (native double precision floating point) rather than ASCII. Some output options cannot be represented as single binary floats (e.g. time strings and longitude or latitude broken into degrees and minutes. These values are output as multiple fields as appropriate. Default: ASCII output with fields separated by tabs.

−B *yr/mo/da/hr/mn/sc*

This option sets the starting time for data allowed in the input data. The **−E** option sets the ending time for data. If the starting time is before the ending time, then any data with a time stamp before the starting time or after the ending time is ignored. If instead the starting time is after the ending time, then any data between the ending and starting time will be ignored. This scheme allows time windowing both inside and outside a specified interval. Default: *yr/mo/da/hr/mn/sc* = 1962/2/21/10/30/0.

−D *decimate*

Sets the decimation of the output data. By default (i.e. *decimate*=1), every available data record is output. If *decimate*>1, then only every "*decimate*"th record will be output. Default: *decimate*=1.

−E *yr/mo/da/hr/mn/sc*

This option sets the ending time for data allowed in the input data. The **−B** option sets the starting time for data. If the starting time is before the ending time, then any data with a time stamp before the starting time or after the ending time is ignored. If instead the starting time is after the ending time, then any data between the ending and starting time will be ignored. This scheme allows time windowing both inside and outside a specified interval. Default: *yr/mo/da/hr/mn/sc* = 2062/2/21/10/30/0.

−F *format*

Sets the format for the input swath sonar data using **MBIO** integer format identifiers. This program uses the **MBIO** library and will read any swath sonar format supported by **MBIO**. A list of the swath sonar data formats currently supported by **MBIO** and their identifier values is given in the **MBIO** manual page. Default: *format* = 11.

−G *delimiter*

Sets the character(s) used to separate output fields when ascii columns are output. Default: tabs are used as delimiters.

−H

This "help" flag cause the program to print out a description of its operation and then exit immediately.

−I *file*

Sets the input filename. If *format* > 0 (set with the **−F** option) then the swath sonar data contained in *file* is read and processed. If *format* < 0, then *file* is assumed to be an ascii file containing a list of the input swath sonar data files to be processed and their formats. The program will read the data in each one of these files. In the *file* file, each data file should be followed by a data format identifier, e.g.:

    datafile1 11
    datafile2 24

This program uses the **MBIO** library and will read or write any swath sonar format supported by **MBIO**. A list of the swath sonar data formats currently supported by **MBIO** and their identifier values is given in the **MBIO** manual page. Default: *file* = "datalist.mb-1".

−K *kind*

This option sets the type of data record used as the trigger for output. By default, data are output when the record type listed as the "navigation source" for a particular data format is encountered. The **−K** option causes output to be keyed to data records of type *kind*, where *kind* may be integer values such as:

MB_DATA_DATA	1	/* general survey data */
MB_DATA_CALIBRATE	4	/* Hydrosweep DS */
MB_DATA_MEAN_VELOCITY	5	/* Hydrosweep DS */
MB_DATA_VELOCITY_PROFILE	6	/* general */
MB_DATA_NAV	12	/* Simrad, Reson 7k */
MB_DATA_HEADING	17	/* Simrad, Hypack */
MB_DATA_ATTITUDE	18	/* Simrad, Hypack, Reson 7k */
MB_DATA_SSV	19	/* Simrad */
MB_DATA_NAV1	28	/* ancillary nav system 1 */
MB_DATA_NAV2	29	/* ancillary nav system 2 */
MB_DATA_NAV3	30	/* ancillary nav system 3 */
MB_DATA_MOTION	32	/* Reson 7k */
MB_DATA_SIDESCAN2	37	/* Reson 7k, XTF */
MB_DATA_SIDESCAN3	38	/* Reson 7k, XTF */
MB_DATA_ROLL	40	/* Reson 7k */
MB_DATA_PITCH	41	/* Reson 7k */
MB_DATA_NMEA_RMC	48	/* NMEA */
MB_DATA_NMEA_DBT	49	/* NMEA */
MB_DATA_NMEA_DPT	50	/* NMEA */
MB_DATA_NMEA_ZDA	51	/* NMEA */
MB_DATA_NMEA_GLL	52	/* NMEA */
MB_DATA_NMEA_GGA	53	/* NMEA */
MB_DATA_ATTITUDE1	55	/* ancillary attitude system 1 */
MB_DATA_ATTITUDE2	56	/* ancillary attitude system 2 */
MB_DATA_ATTITUDE3	57	/* ancillary attitude system 3 */

For example, using **−K***18* will cause **mbnavlist** to output at the times of attitude data records. One consequence will be that any roll, pitch, or heave values specified with the **−O** option will be output without modification, whereas other values (e.g. position) will be interpolated onto the time of the attitude record. This option supercedes the **−N** option.

−L *lonflip*
Sets the range of the longitude values returned. If *lonflip*=−1 then the longitude values will be in the range from −360 to 0 degrees. If *lonflip*=0 then the longitude values will be in the range from −180 to 180 degrees. If *lonflip*=1 then the longitude values will be in the range from 0 to 360 degrees. Default: *lonflip* = 0.

−N *navchannel*
Sets **mbnavlist** to look for navigation in navigation records rather than the record type listed as the "navigation source" for a particular data format. Swath data formats may contain synchronous navigation (navigation is included in survey data records), asynchronous navigation (navigation comes in records separate from and at different times than the survey data records), or both (survey records contain merged navigation while the original asynchronous navigation is preserved in separate navigation records). Some data formats provide for multiple navigation sources, so that there are more than one channel of asynchronous data records. In this case one channel is always designated as the primary or active navigation channel. The **−N** option allows the user to specify that **mbnavlist** outputs navigation from the primary asynchronous navigation (**−N***0*) or from one of three auxiliary navigation channels (**−N***1*, **−N***2*, or **−N***3*). If **−N** is used but the data file does not contain asynchronous navigation or the specified auxiliary navigation channels, then **mbnavlist** will output nothing. To determine if a datafile contains asynchronous navigation and/or auxiliary navigation, run **mbinfo** using its **−N** option to get counts of all data record types in the file. This option is superceded by the **−K** option.

−O *output_format*
Determines the form of the output. *Output_format* is a string composed of one or more of the following characters:

c for sonar depth (meters)
H for heading (degrees)
h for course made good (degrees)
J for a time string (yyyy jd hh mm ss.ssssss)
where jd is the julian day of the year
j for a time string (yyyy jd dm ss.ssssss)
where jd is the julian day of the year
and dm is the minute of the day
L for cumulative along-track distance (km)
l for cumulative along-track distance (m)
M for unix time in decimal seconds since 1/1/70 00:00:00
m for time in decimal seconds since first record
N for ping count
P for pitch in degrees
p for draft in meters
R for roll in degrees
r for heave in meters
S for speed (km/hr)
s for speed made good (km/hr)
T for a time string (yyyy/mm/dd/hh/mm/ss)
t for a time string (yyyy mm dd hh mm ss)
U for unix time in integer seconds since 1/1/70 00:00:00
u for time in integer seconds since first record
V for ping interval (decimal seconds)
X for longitude (decimal degrees)
x for longitude (degrees + decimal minutes + E/W)
Y for latitude (decimal degrees)
y for latitude (degrees + decimal minutes + N/S)

Default *output_format* = **tMXYHs** (time, unix time, latitude, longitude, heading, speed).

–R *west/east/south/north*
Sets the longitude and latitude bounds within which swath sonar data will be read. Only the data which lies within these bounds will be read. Default: *west*=–360, east=*360*, *south*=–90, *north*=90.

–S *speed*
Sets the minimum speed in km/hr (5.5 kts ~ 10 km/hr) allowed in the input data; pings associated with a smaller ship speed will not be copied. Default: *speed* = 0.

–T *timegap*
Sets the maximum time gap in minutes between adjacent pings allowed before the data is considered to have a gap. Default: *timegap* = 1.

–V Normally, **mbnavlist** works "silently" without outputting anything to the stderr stream. If the **–V** flag is given, then **mbnavlist** works in a "verbose" mode and outputs the program version being used and all error status messages.

–Z *segment*
Causes the ascii output of different input swath files (e.g. when a datalist is specified with the **–I** option) to be separated by lines with *segment*. If *segment* is a single character, then the output is a multiple segment file of the sort accepted by the **GMT** program **psxy**. This option only works with ascii output, and is thus disabled when the **–A** option is specified. The most common usage is **–Z**I>**.**

EXAMPLES

Suppose one wishes to obtain a navigation list from a Simrad EM300 data file in the MBARI format (MBIO id 57) called mbari_1998_107_msn.mb57. To obtain a listing with time in unix second forms followed by longitude and latitude, the following will suffice:

mbnavlist –F57 –i mbari_1998_107_msn.mb57 –OMXY | more

The output will be as follows:

```
889125106.792000   –155.898471   19.979325
889125108.148000   –155.898586   19.979400
889125109.496000   –155.898738   19.979454
889125110.852000   –155.898876   19.979504
889125112.207000   –155.899020   19.979544
889125113.571000   –155.899204   19.979591
889125114.921000   –155.899479   19.979485
.....
```

MB-SYSTEM DATA RECORD TYPES

This list gives the data record types and numerical identifiers used within **MB-System**. Users can specify that **mbnavlist** output be keyed to the time stamps of particular record types by using the **–K***kind* option where *kind* corresponds to the desired record type identifier from this table.

MB_DATA_KINDS	54	
MB_DATA_NONE	0	
MB_DATA_DATA	1	general survey data
MB_DATA_COMMENT	2	general comment
MB_DATA_HEADER	3	general header
MB_DATA_CALIBRATE	4	Hydrosweep DS
MB_DATA_MEAN_VELOCITY	5	Hydrosweep DS
MB_DATA_VELOCITY_PROFILE	6	general
MB_DATA_STANDBY	7	Hydrosweep DS
MB_DATA_NAV_SOURCE	8	Hydrosweep DS
MB_DATA_PARAMETER	9	general
MB_DATA_START	10	Simrad
MB_DATA_STOP	11	Simrad
MB_DATA_NAV	12	Simrad, Reson 7k
MB_DATA_RUN_PARAMETER	13	Simrad
MB_DATA_CLOCK	14	Simrad
MB_DATA_TIDE	15	Simrad, Reson 7k
MB_DATA_HEIGHT	16	Simrad
MB_DATA_HEADING	17	Simrad, Hypack
MB_DATA_ATTITUDE	18	Simrad, Hypack, Reson 7k
MB_DATA_SSV	19	Simrad
MB_DATA_ANGLE	20	HSMD
MB_DATA_EVENT	21	HSMD
MB_DATA_HISTORY	22	GSF
MB_DATA_SUMMARY	23	GSF
MB_DATA_PROCESSING_PARAMETERS	24	GSF
MB_DATA_SENSOR_PARAMETERS	25	GSF
MB_DATA_NAVIGATION_ERROR	26	GSF
MB_DATA_RAW_LINE	27	uninterpretable line for ascii formats
MB_DATA_NAV1	28	ancillary nav system 1
MB_DATA_NAV2	29	ancillary nav system 2
MB_DATA_NAV3	30	ancillary nav system 3
MB_DATA_TILT	31	Simrad
MB_DATA_MOTION	32	Reson 7k
MB_DATA_CTD	33	Reson 7k

MB_DATA_SUBBOTTOM_MCS	34	Reson 7k
MB_DATA_SUBBOTTOM_CNTRBEAM	35	Simrad
MB_DATA_SUBBOTTOM_SUBBOTTOM	36	Reson 7k, XTF
MB_DATA_SIDESCAN2	37	Reson 7k, XTF
MB_DATA_SIDESCAN3	38	Reson 7k, XTF
MB_DATA_IMAGE	39	Reson 7k
MB_DATA_ROLL	40	Reson 7k
MB_DATA_PITCH	41	Reson 7k
MB_DATA_ABSORPTIONLOSS	42	Reson 7k
MB_DATA_SPREADINGLOSS	43	Reson 7k
MB_DATA_INSTALLATION	44	Reson 7k
MB_DATA_WATER_COLUMN	45	Simrad
MB_DATA_STATUS	46	Simrad, XTF
MB_DATA_DVL	47	JSTAR
MB_DATA_NMEA_RMC	48	NMEA
MB_DATA_NMEA_DBT	49	NMEA
MB_DATA_NMEA_DPT	50	NMEA
MB_DATA_NMEA_ZDA	51	NMEA
MB_DATA_NMEA_GLL	52	NMEA
MB_DATA_NMEA_GGA	53	NMEA
MB_DATA_SURVEY_LINE	54	Reson 7k
MB_DATA_ATTITUDE1	55	ancillary attitude system 1
MB_DATA_ATTITUDE2	56	ancillary attitude system 2
MB_DATA_ATTITUDE3	57	ancillary attitude system 3

SEE ALSO

mbsystem(1), **mbinfo**(1)

BUGS

mbnavlist is not able to list all of the navigation information available in some swath data formats.