Yacht Devices

User Manual

YDVR Converter Software

Software version
1.32

2018

Contents

1. Introduction

This Manual contains information on how to install, configure and operate the YDVR Converter software application (hereinafter *converter* or *program*). This program allows you to convert data from Voyage Recorder .DAT files to other file formats, including GPX, CSV (spreadsheet), ODT (open document text), XML (see page 7) and CAN (new binary log format, files of this format may be played by Voyage Recorder to physical CAN network).

Figure 1. Voyage Recorder

The Voyage Recorder is a hardware device intended for storing data from the onboard network of the vessel on a MicroSD memory card. The onboard network of a typical cruise yacht has data about the position, course, speed, depth, water temperature, log, wind speed and direction, and AIS data of nearby vessels. Digital data from the engine, fuel and water tanks, battery level, etc. may also be available. The Voyage Recorder writes all network data to the memory card. It does not analyze the data, leaving that work for this software application.

The new model of Voyager Recorder (YDVR-04, Q2/2018) also supports audio recording from a VHF line-out or microphone amplifier, that allows reconstructing of your sailings in all details. You can see your track, tracks of other vessels (with AIS) and hear VHF conversations or weather forecasts received at specific point or time.

Voyage Recorder is compatible with a wide range of boat networks built on the NMEA 2000 base, including Raymarine SeaTalk NG, Simrad SimNet, Furuno CAN, and Garmin NMEA 2000. More details about the Voyage Recorder are available on the www.yachtd.com website.

2. Program installation

YDVR Converter is supplied free of charge and runs on Microsoft Windows (x86 and x64 versions of operating system), Linux (x64 only) and Mac OS X (OS X 10.7 or later, Intel x64 only).

The program does not require any formal installation. It can be copied from the archive to the computer's hard disk or to a removable USB flash drive. The program archive contains appropriate subfolders with an executable application corresponding to Windows, Linux, and OS X.

The program's archive contains a "Test" folder with examples of Voyage Recorder .DAT files. You may use them to learn how to use the program.

Special notes:

After copying the "YDVRConv" file in Linux, you will need to set the executable file attribute.

Max OS X folder contains the *YDVRConv.DMG* file. You may open it in Finder and drag the YDVRConv application from it to Applications.

On very old Microsoft Windows versions, the program may require installation of Microsoft Visual C++ 2010 Redistributable Package which contains the MSVCRT.DLL file:

- Download for 32-bit operation systems:
  http://www.microsoft.com/en-us/download/details.aspx?id=5555

- Download for 64-bit operation systems:
  http://www.microsoft.com/en-us/download/details.aspx?id=14632

3. Using the program

The program is a wizard. The wizard's first step shows general info about the product. Look through the text and click the "Next" button. In the second step, it is necessary to add Voyage Recorder files (with .DAT extension) to the program's source files list using the "Add files…" button. It is possible to open several files. The files are sorted automatically by the time of the last Voyage Recorder record in the file. The local time zone of your PC is used. "Add folders…" button allows to add a files from a selected folder and all nested subfolders (subfolder's depth is limited to one).
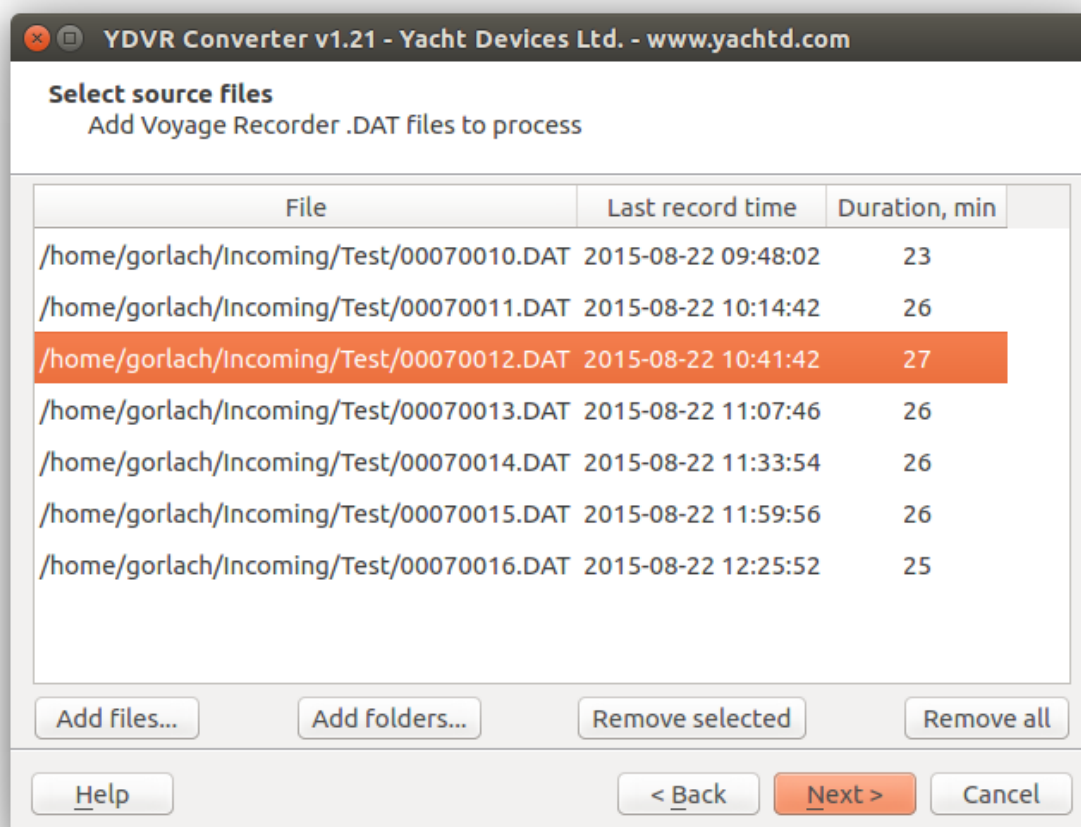

Figure 2. Second step

There are examples of Voyage Recorder .DAT files in the "Test" folder of the program's archive. You can use them to get acquainted with the program.

To remove files from the source files list, you can select them and delete from the list using the "Remove selected" button.

In the third step, you should select the type of output file (see Figure 3).
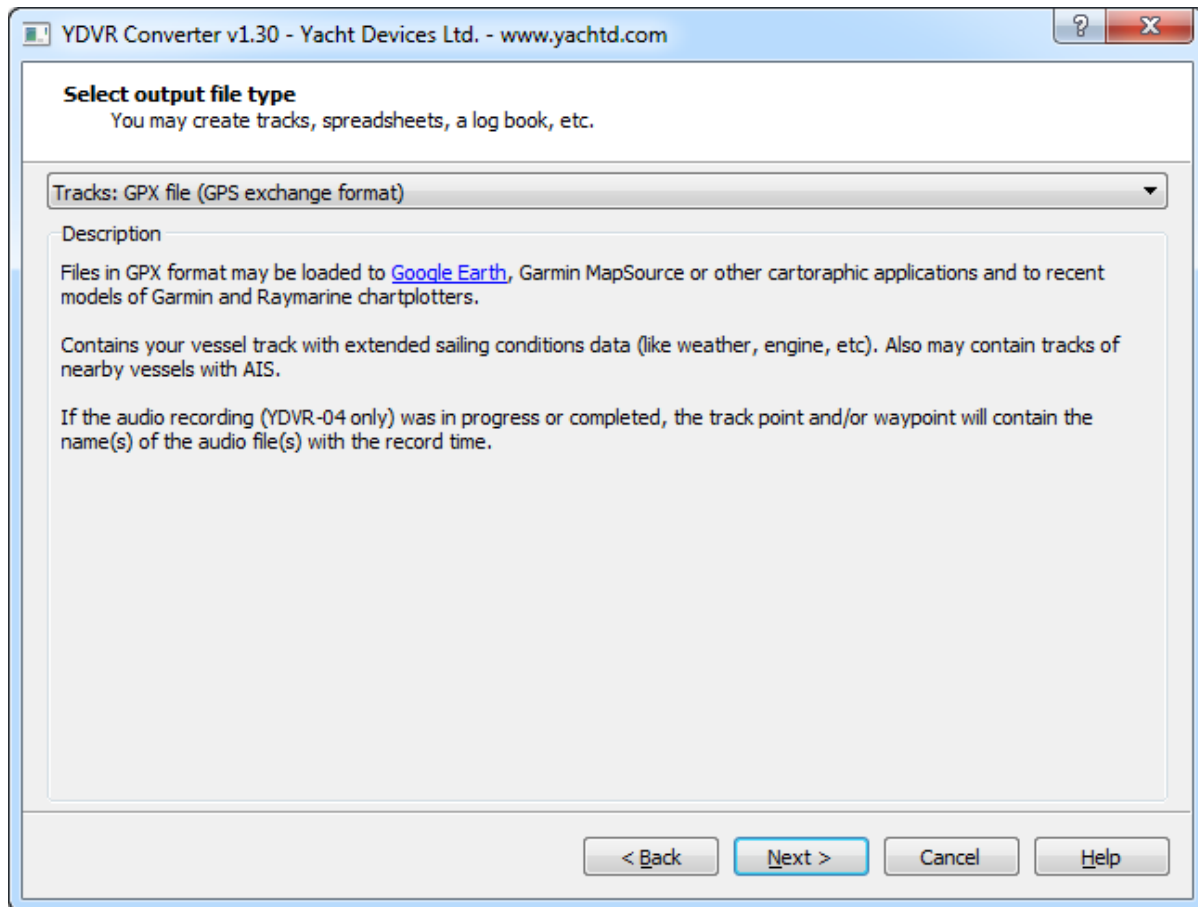
Figure 3. Output file types

1. GPX (GPS exchange format). These files can be opened in cartographic applications like Google Earth or Garmin MapSource and uploaded to newer models of Raymarine and Garmin chart plotters. A file in GPX format contains your vessel track with extended sailing conditions data (like weather, engine status, etc.). It may also contain the tracks of nearby vessels with AIS. If the audio recording was in progress or completed, the track point and/or waypoint will contain the name(s) of the audio file(s) with the record time.

2. CSV (comma-separated values). These files can be opened in Microsoft Excel, LibreOffice Calc or in other spreadsheet applications. You can process data to get wind roses, speed diagrams, depth graphs, etc. If the audio recording was in progress or completed, the output file will contain the column with a name(s) of the audio file(s) with the record time.

3. Log books in .ODT (open document text) format. You may open these files with Microsoft Word, LibreOffice Write or other text processors. You may also create your own templates (see 4.3 and Appendix B).

4. .XML format of OpenSkipper application. OpenSkipper can re-play NMEA 2000 recordings on virtual gauges and have a log viewer, which can decode NMEA 2000 messages. OpenSkipper is open source application for Windows, you can download it http://openskipper.org

5. CanBoat / Signal K .LOG format. This is raw NMEA 2000 data as well. Marine electronics specialists can use CanBoat analyzer to convert NMEA 2000 data to human readable format. You can learn more about Signal K and CanBoat at http://signalk.org/ and https://github.com/canboat
6. CAN log (see 5.4 also) is an open format of binary logs, intended to store CAN messages at network layer and independent of application-layer protocols like NMEA 2000 or J1939. Voyage Recorder can "play" files of CAN format to physical CAN bus. CAN logs may be processed with free CAN Log Viewer application (format is described in application's Manual): http://www.yachtd.com/products/can_view.html
7. NMEA 2000 Devices List (CSV file format). List of all NMEA 2000 devices with a model and manufacturer names, serial number, address of the device on NMEA 2000 network (and a previous addresses if the address has changed during a recording), list of actually transmitted PGNs (with a number of sent messages of each type) and other data.

Click Next to configure an output file on the fourth wizard step (see Figure 4).

Figure 4. Fourth step, configuring of output file

GPX files in essence are a succession of GPS points; the CSV file and logbook are a set of records. The program will analyze the NMEA 2000 message flow to generate points or records with the interval specified in this step of the wizard. The smaller the selected value, the larger the size of the output file will be. Interval values can not be configured for OpenSkipper, CanBoat / Signal K and CAN log output files.

You may also specify the time range of data processing on this page for the following reasons:

- to align log book records to some round values, e.g. to 00 minutes;
- to skip GPS initialization time, because many chart plotters transmit invalid date/time during this initialization.

The preferred units defined in this settings page may be overridden by XML schema definition or in the logbook template file.

For most types of output files, an additional page with settings is shown before you are able to review the settings and run a conversion job. These settings are described in the next chapter.

4. Conversion settings

This chapter describes specific settings for different output file types.

4.1 GPX settings

Output file data represent a succession of geographical points that form the vessel's track. The points are generated in equal time intervals. Additional data on voyage conditions (e.g. wind speed or sea depth) are linked to the points in the text form as a comment or note or as an XML attribute, depending on the chosen XML schema.
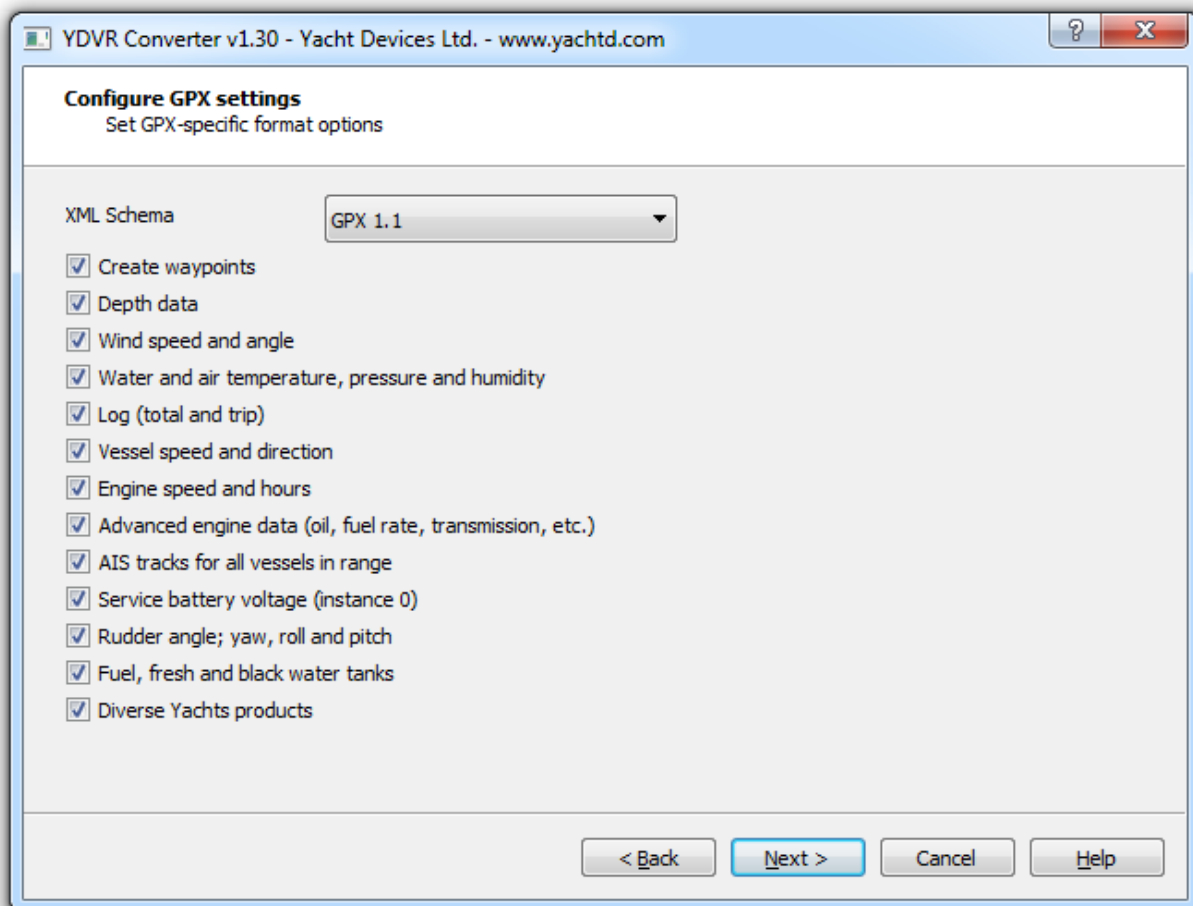
Figure 5. GPX format settings

XML Schema

You can select one of the following four options for GPX output files:

1) GPX 1.1. This is the most widely supported GPX file format. All additional sailing conditions data is saved as text notes for each points. The depth is additionally saved in <ele> XML attribute.
2) Yacht Devices. This is our own extension of the GPX format, and all additional data is saved as XML attributes.
3) Garmin V3. This format contains water depth and temperature information as an XML attribute in accordance with Garmin specifications. If this file is opened in Garmin software or on a Garmin device, the data will be interpreted correctly. All other additional data are saved as text notes.
4) Raymarine. This format contains water depth and temperature information as an XML attribute in accordance with Raymarine specifications. If this file is opened in Raymarine software or on a Raymarine device, the data will be interpreted correctly. All other additional data are saved as text notes.

Create waypoints

The program creates records of additional data on sailing conditions (including names of associated audio files) in the form of text comments on track points. However, not all of the programs are capable of displaying comments on the track points. You may enable this setting to create an additional waypoint for each vessel's track point, as most programs are capable of displaying comments on waypoints.

Depth information

Add depth to additional data, taking into account the sensor offset. The program calculates maximum (MAX) and minimum (MIN) depths for the interval between points.

Wind speed and angle

Add the following to additional data:

- TWS: True wind speed
- TWD: True wind direction (relative to the True North)
- TWA: True wind angle (relative to centerline of the vessel)
- AWS: Apparent wind speed
- AWA: Apparent wind angle (relative to centerline of the vessel)

A vessel's anemometer measures Apparent Wind Speed. Historically in marine applications, the True Wind Speed is calculated not relative to the ground, but relative to the water. Equipment aboard the vessel calculates the True Wind Speed with data acquired from the magnetic compass and log.

The program calculates median value (MED), arithmetic mean (average, AVG), maximum (MAX), and minimum (MIN) values for the intervals between points.

Because of the action of waves (roll and pitch), indices like Apparent Wind Angle (AWA) can vary greatly. That is why an instant value calculated for a particular point cannot be considered reliable for determining wind direction. We recommend that you use MED or AVG.

Water and air temperature, atmospheric pressure

Add this data (and inside and outside air humidity if available) to additional data. Since 1.27 version also turns on inside (saloon) temperature, fridge and freezer temperature. The program calculates maximum (MAX) and minimum (MIN) values for the interval between points. Note, that atmospheric pressure is always displayed in mbar (equal to hPa), unit settings for pressure are used for engine's data (boost pressure, oil pressure, etc.) only.

Log (total and trip)

Add total and trip log data to additional data.

Vessel speed and direction

Add heading data from the magnetic compass (recalculated to true degrees), speed through water (STW) from the log, speed over ground (SOG) and course over ground (COG) to additional data. The program calculates maximum (MAX) and minimum (MIN) values for the interval between points.

Engine speed and hours

Add motor hours engine revolutions per minute data (RPM) to additional data. The program calculates maximum (MAX) and minimum (MIN) values for the interval between points. Two engines are supported.

Advanced engine data

The following data supported: engine load, fuel rate, boost pressure, exhaust gas temperature, temperature and pressure for coolant, engine oil, transmission oil. . The program calculates maximum (MAX) and minimum (MIN) values for the interval between points. Two engines are supported.

AIS tracks for all vessels in range

Create tracks for vessels with AIS in range. Tracks are named with vessel names, and if there is no name — by its MMSI number. Note that your vessel's track is saved as "My Vessel Track". You will also get an additional track of your vessel generated using AIS data, and it will be named using your MMSI or vessel's name.

If the points/record interval for your track (see the previous chapter) is smaller than 15 seconds, all AIS points will be added to the AIS tracks (up to six points per minute for a vessel). This can cause the output file to be huge and some programs may have difficulty displaying it.

For an interval between 15 seconds and minute, the AIS track will have the same point rate as your vessel's track. For an interval up to 5 minutes, the minimum time between AIS points is 2 minutes. And for large intervals the minimum time between AIS points is 5 minutes.

Service battery voltage

Add service battery (or battery with identifier of 0) voltage to additional data. If there are no messages on the battery voltage, the program will try to retrieve this data from service messages of Raymarine equipment. The program calculates maximum (MAX) and minimum (MIN) values for the interval between points.

Rudder angle; yaw, roll and pitch

Add rudder angle (two rudders are supported), vessel's yaw, pitch and roll degrees. For yaw and roll the circle starts from starboard direction, for the pitch from the up direction.

Fuel, fresh and black water tanks

Fluid level in the tanks. Two tanks (with instance 0 and 1) of each type are supported. For CSV output file format the values are in percent.

Diverse Yachts products

Diverse Yachts products, Hybrid Loadcell Amplifier (HLA) and new CAN Load Amplifier (CLA), can provide data about the loading of backstay, boom vang, mainsheets and other parts of standing and running rigging. Fifty different data types are available in total. All these data types are supported.

4.2 CSV settings

Each row of the CSV file will contain a record with time, coordinates and additional sailing data. Values are separated by semicolon or by comma.
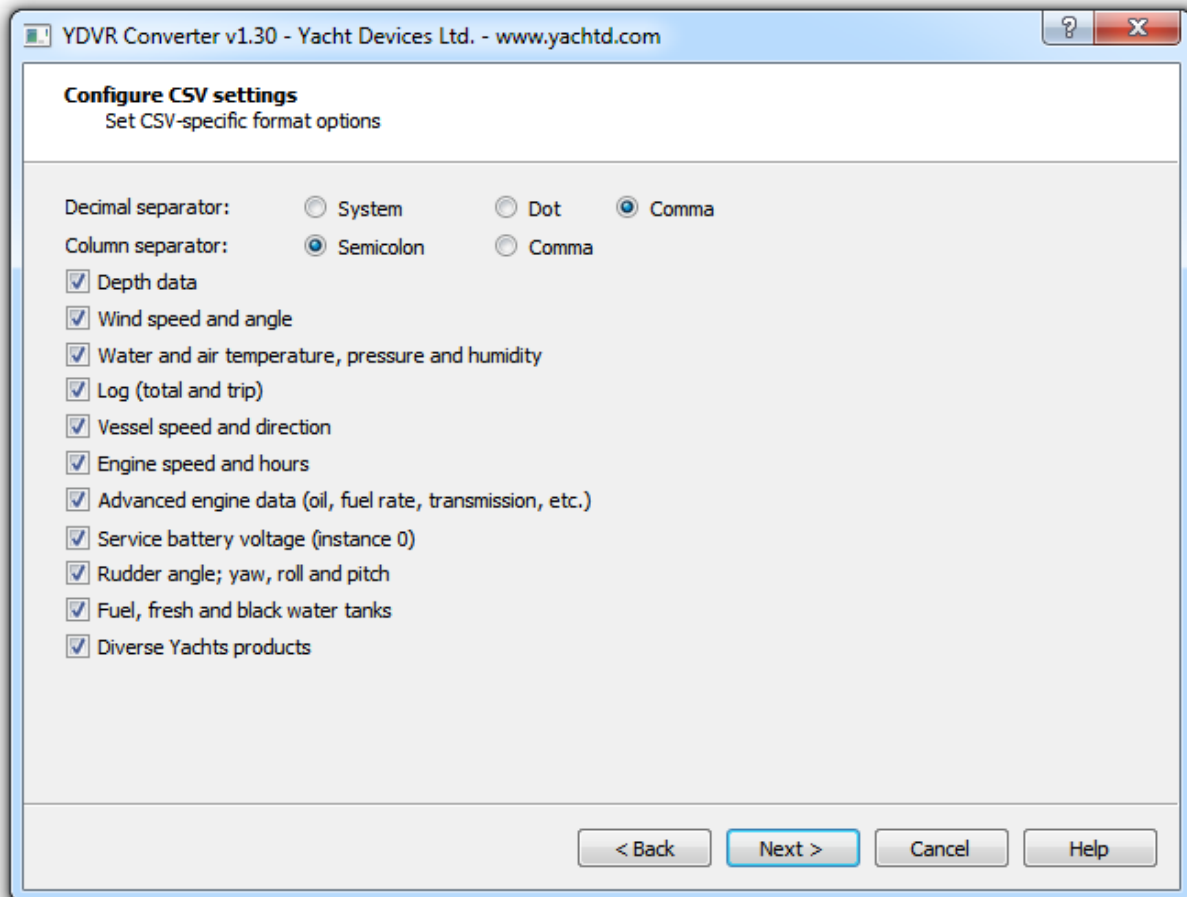
Figure 6. CSV format settings

The type of decimal separator may depend on your operating system's settings (dot or comma), or you can choose it.

All other settings are equal to GPS settings (see 4.1), except that CSV format does not have the "Create waypoints" and "AIS tracks for all vessels in range" options.

4.3 Logbook settings

The logbook is a printable and editable multi-page document in ODT (open document text) format that may be opened using most text processors like Microsoft Word or LibreOffice Write.

The logbook is generated by template. The template is also an ODT document. It contains special record macros (see Appendix B) which are replaced with values by the program. For example, H0 and M0 are the hour and minute of the first record, X1 and W1 are degrees of latitude and longitude of the second record.

A template may contain up to 20 records (the number of records is counted by the number of hour macros), the last letter in a record macro indicates the number of records and uses base 20 (e.g., hour macros: H0...H9, HA-HK). When all records in the template are filled with values, the program calculates the totals like, the day's run (distance between first and last record positions, XCRUN macro), and fills total macros with the calculated values. After that, this data is appended to the output file and a new template is started with filling of page numbers (XXPN macro, the initial value is one and increased with every substitution) and a header macro like XDATE, which contains the full date of the first record in the template.
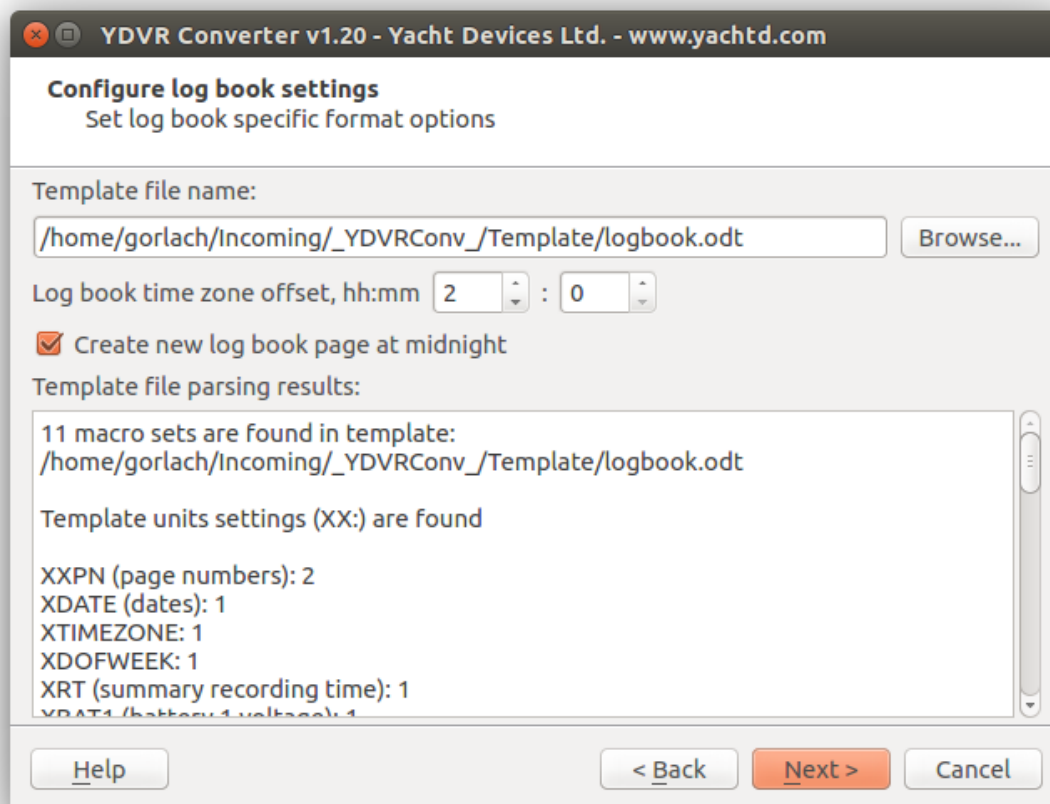
Figure 7. Logbook settings

—15—

A template file may contain one or more document pages. All macros except hour are optional (hour macros are used to count the number of records on the page).

On the settings page, you may specify the time zone for logbook records. Time zone may be printed in the template with the XTIMEZONE macro.

You may also specify to start a new template at midnight. Regardless of this and regardless of the number of document pages in the template, total macros are calculated once for the template. This calculation may be incorrect in some cases, because the day's sailing may be printed over a great number of templates, and every template contains its own "Day's run" record. The real Day's run should be calculated across several templates, but the totals shown on each template are calculated only inside the bounds of the given template. This behavior may change in future program versions.

In the template parsing results area, you may check the macros of your template. The main problem with template creation is that text processors like to insert hidden tags between macros characters, and the program is unable to find these.

In this case, you may rename template file extensions to .ZIP and edit "contents.xml" file inside archive with a simple text editor like Windows Notepad. In Figure 8, you may see a correctly inserted H1 macro (highlighted in editor).
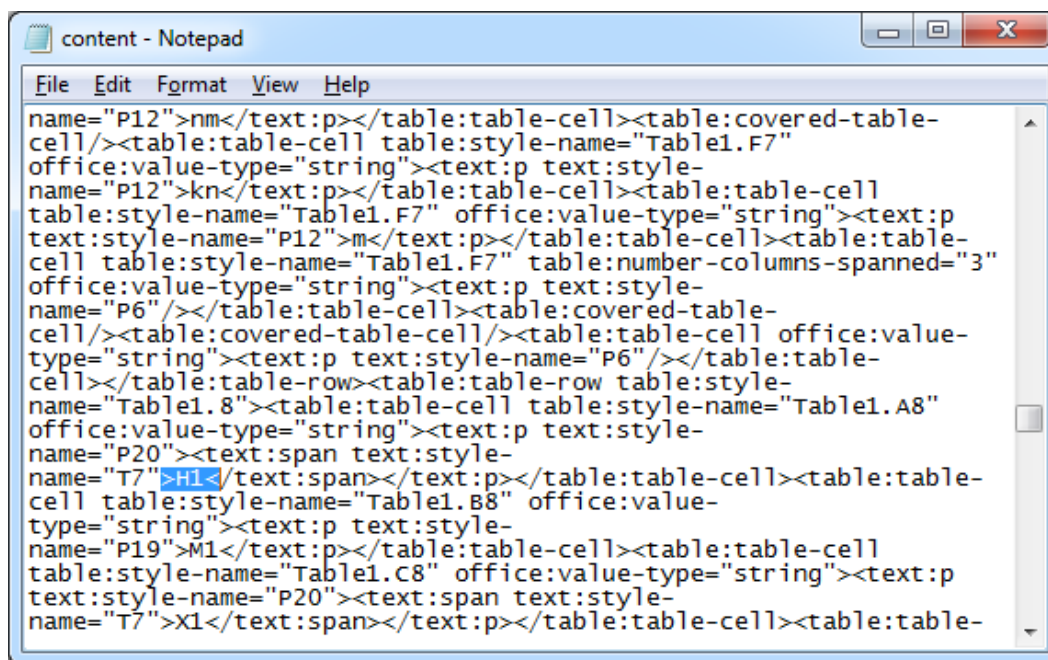
Figure 8. Content.xml file in Notepad

The special macro XX:KFN is always replaced by an empty value. KFN letters vary and indicate unit settings for the template. The first letter may be K or M (knots or meters per second for speed), the second F or M (feet or meters for depth), the third N or K (nautical miles or kilometers for distance).

See the full list of macros in Appendix B.

5. Examples of work with output files

This chapter contains real examples of work with the program's output files.

5.1 GPX file in Google Earth

Google Earth is a free cartographic program available for Microsoft Windows, Linux, and Mac OS X. It has some nuances in its handling of GPX, but it illustrates work with GPX files well.

This picture is a Google Earth screenshot with a GPX file loaded. The file is saved with all the settings from the test data in the "Test\Bornholm" folder of the program archive. On the left, you can see the list of waypoints (only for your vessel) and tracks (of yours and other AIS vessels). Clicking on the vessel's name in the list will open information about the vessel (vessel "BBS SURF" in this case).
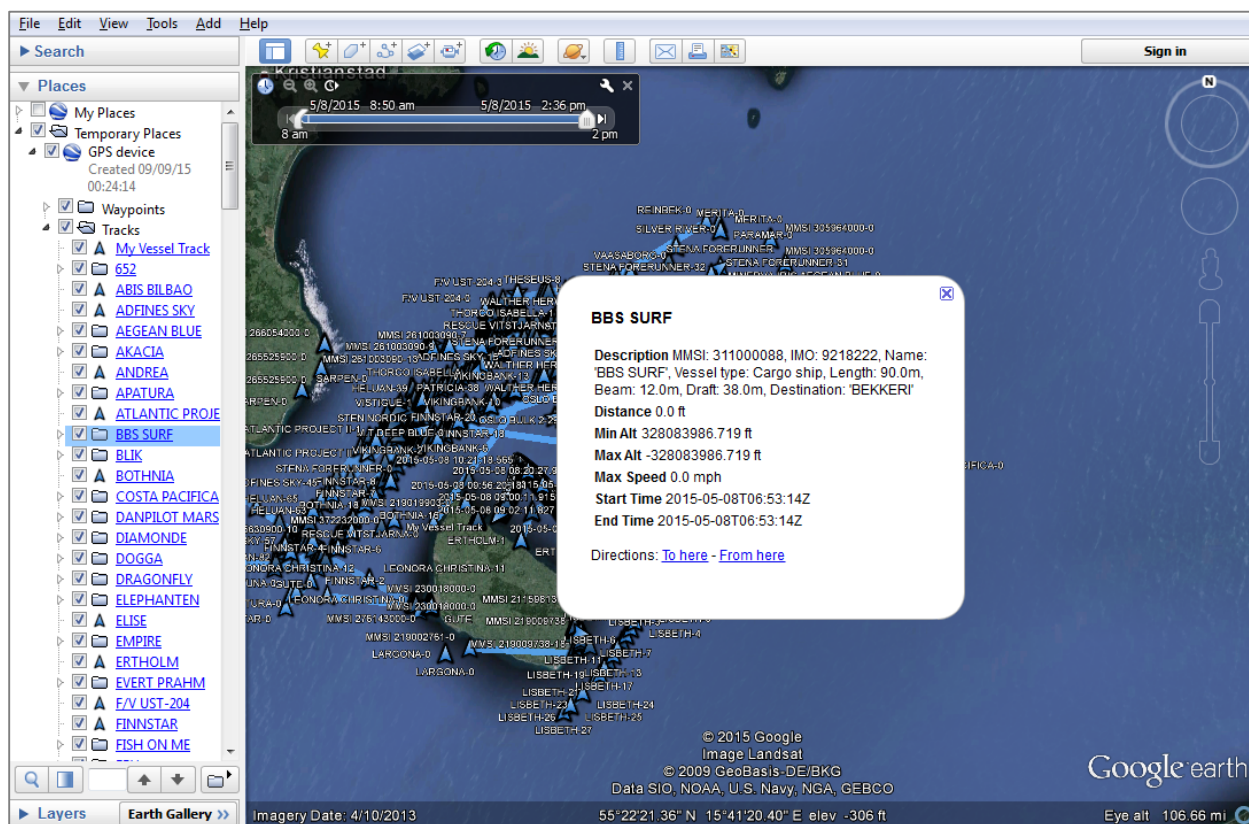
Figure 9. Viewing AIS vessel data

Click the checkbox beside the Tracks folder to hide all tracks. Find the folder with the name "My Vessel Track" in the list of tracks and click on it to show only your vessel's track. Note that in the list there are two elements with the name "My Vessel Track" (that is a feature of Google Earth). You should select the one that has the folder sign.

Using a time scale, you can simulate the movement of your vessel, and by clicking on a point, you can display coordinates, headings, and the speed calculated by Google Earth.
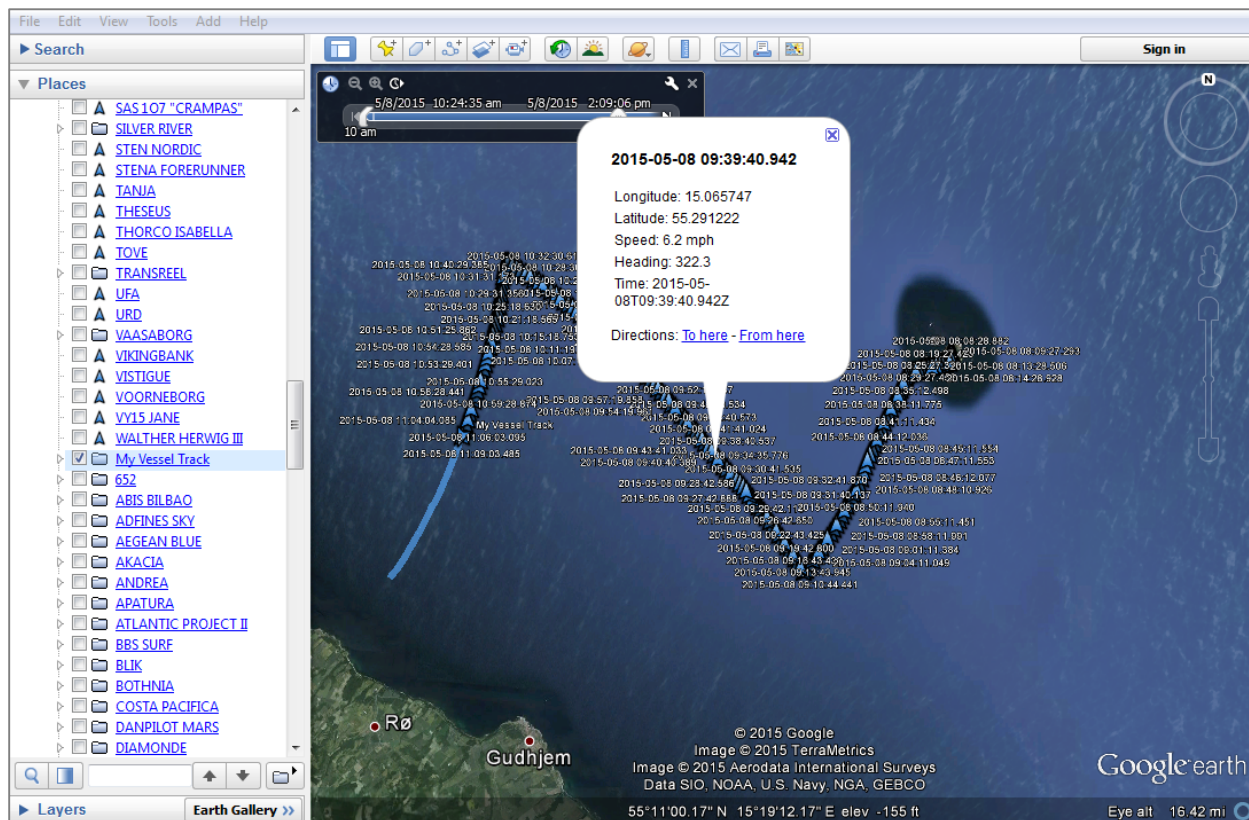
Figure 10. Viewing data calculated by Google Earth

Google Earth cannot display comments on track points, so to view additional sailing data, you should make sure that the group "Waypoints" is turned on. Click on a waypoint (marked with the flag sign), and additional data for the trip will be displayed (see Figure 3 on the next page). Click on a track point (marked with the triangle sign), and data generated by Google Earth will be displayed (see Figure 10).

If you want to see additional sailing data only, you can hide the track points using a time scale. If you want only to see data calculated by Google Earth, you may turn off the display of the "Waypoints" folder.

Note that for any additional data, the first value is always a momentary value at a given point. Because of wave action (roll and pitch), the information is not always accurate for

data such as AWA (Apparent Wind Angle) or heading. To measure the wind, you should use median value (MED) or the average value (AVG).

Note that for sectors, the values move clockwise, and the MIN value may be arithmetically greater than the MAX value. E.g. MIN=350 and MAX=20 for TWD means that wind changed in the 30-degree sector from 350 to 20, and MIN=20 and MAX=350 means that wind changed from 20 to 350 in the 330-degree sector.
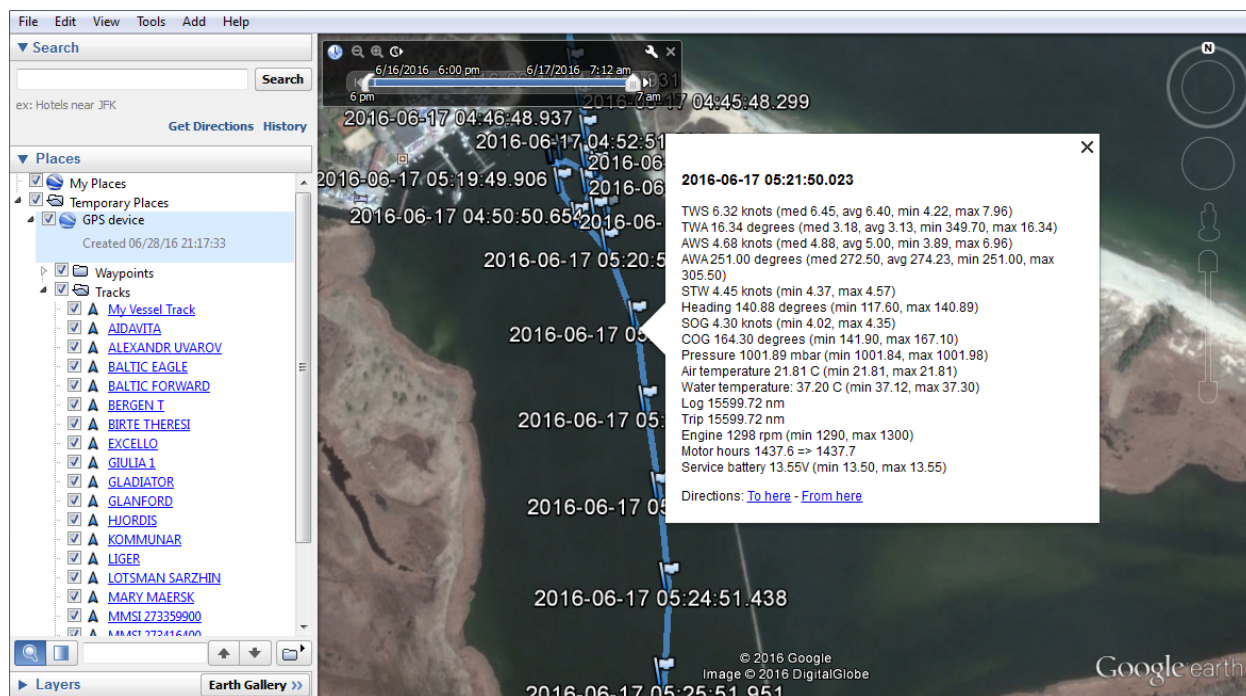
Figure 11. Browsing of additional sailing data

Playing with the test data supplied with the program, you might note that the direction of true wind was changing on tacks. This is caused by an anemometer calibration error on the test vessel.

5.2 CSV file in spreadsheet

LibreOffice is a free office package available for Microsoft Windows, Linux, and Mac OS X. The file Bornholm.csv, which is used in this example, is in the "Test" folder of the program's archive. You can also generate it yourself using data from the "Test\Bornholm" folder.

After you open the file in Calc from the LibreOffice, you will see the text import wizard. You should specify that a semicolon is used as separator, text encoding is ASCII, and that the first column format is "Date (YMD)".
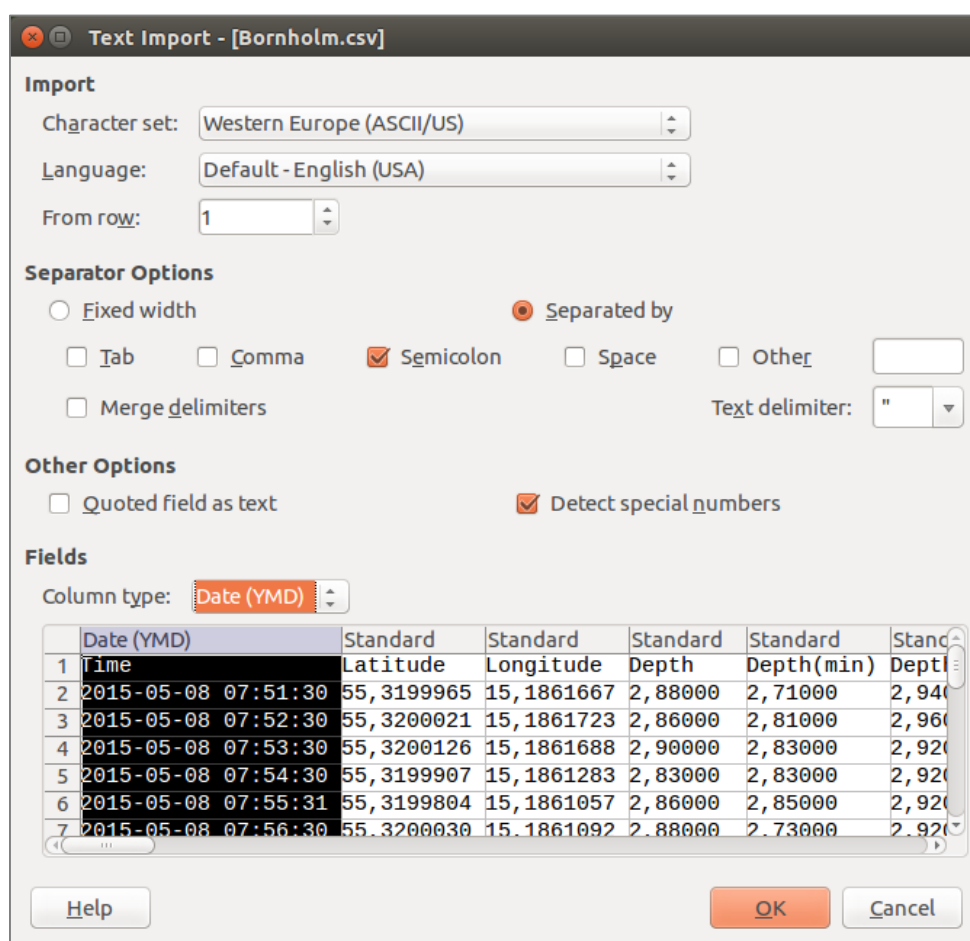
Figure. 12. Text import wizard of LibreOffice Calc

Latitude/longitude is presented with seven digits after the decimal and other values with five digits after decimal. In the Bornholm.csv file, commas are used as the decimal separating character. If your computer uses a dot as a separating character, all numerical values will be interpreted by LibreOffice Calc as text.

If this is the case, you can create Bornholm.csv on your computer on your own. When you save a CSV file, the program may use a decimal separator that is set in your operating system's settings or specified on settings page (see 4.2).

Time	Latitude	Longitude	Depth	Depth(min)	Depth(max)	TWS	TWS(med)	TWS(avg)	TWS(min)	TWS(max)	TWA	TWA(med)
05/08/15 07:51 AM	55.3199965	15.1861667	2.88	2.71	2.94	9.7581	9.66091	9.14118	3.47948	14.73434	324.254	257.25805
05/08/15 07:52 AM	55.3200021	15.1861723	2.86	2.81	2.96	10.74946	9.15551	9.02934	5.48164	12.24622	298.78603	260.7932
05/08/15 07:53 AM	55.3200126	15.1861688	2.9	2.83	2.92	9.95248	9.85529	9.52313	3.98488	12.84881	180.01761	257.21508
05/08/15 07:54 AM	55.3199907	15.1861283	2.83	2.83	2.92	6.57019	7.26998	7.37255	2.58531	11.35205	357.46264	262.46051
05/08/15 07:55 AM	55.3199804	15.1861057	2.86	2.85	2.92	11.76026	7.07559	7.64649	5.77322	11.85745	274.28063	262.28289
05/08/15 07:56 AM	55.320003	15.1861092	2.88	2.73	2.92	8.16415	9.95248	9.59027	4.27646	12.75162	188.37706	260.27181
05/08/15 07:57 AM	55.3199785	15.1860854	2.88	2.83	2.94	8.66955	8.35853	8.21712	4.97624	11.35205	232.22552	257.93987
05/08/15 07:58 AM	55.319984	15.1861201	2.88	2.85	2.94	10.16631	9.05832	8.80539	5.67603	10.84665	219.77515	259.1173
05/08/15 07:59 AM	55.3199851	15.1861255	2.92	2.85	2.94	9.46652	9.66091	9.65026	6.86177	11.76026	287.19509	262.15684
05/08/15 08:00 AM	55.3200132	15.1861412	2.92	2.88	2.96	7.87257	8.45572	7.67459	1.38013	12.14903	205.54861	258.59877
05/08/15 08:01 AM	55.3200035	15.1861169	2.92	2.85	2.96	6.27862	9.85529	9.38528	4.37365	12.14903	190.57722	255.07508
05/08/15 08:02 AM	55.3200108	15.1860884	2.94	2.79	2.96	10.16631	9.66091	9.63721	6.66739	12.55724	239.4276	259.56707
05/08/15 08:03 AM	55.3200254	15.1860866	2.88	2.83	2.94	8.16415	8.66955	8.61549	4.56803	11.95464	229.09717	260.95363
05/08/15 08:04 AM	55.3200728	15.1861154	2.85	2.81	2.94	9.56371	9.56371	9.77758	6.473	13.5486	279.51173	253.02103
05/08/15 08:05 AM	55.3200098	15.1861226	2.88	2.85	2.98	10.45788	9.7581	9.86506	7.26998	12.46004	284.14696	255.84284
05/08/15 08:06 AM	55.3198976	15.1860849	3.76	2.77	3.84	10.18841	8.06695	9.08427	4.97624	16.95293	217.69215	252.80617
05/08/15 08:07 AM	55.3197435	15.186023	5.3	3.63	5.3	11.71091	10.55508	10.33901	6.80676	12.45054	309.82662	256.61634
05/08/15 08:08 AM	55.3187906	15.1860217	4.87	4.68	7.83	13.52313	12.76029	12.60547	9.47075	14.9197	305.6087	286.01802
05/08/15 08:09 AM	55.3176921	15.1852505	20.1	3.97	20.66	10.41371	11.81061	12.20634	7.76645	20.2995	303.0448	247.21107
05/08/15 08:10 AM	55.3173807	15.1834219	32.85	21.03	32.85	12.08785	12.70045	12.88788	9.21567	18.64233	196.06477	222.79983
05/08/15 08:11 AM	55.3171815	15.1816659	39.31	32.85	39.31	11.77807	13.05512	13.16792	10.77959	17.23944	206.85803	223.12231
05/08/15 08:12 AM	55.3169469	15.180095	43.93	39.43	43.93	13.75559	13.37974	13.36038	9.68213	17.9856	253.33491	223.41248

Figure. 13. The Bornholm.csv file loaded into LibreOffice Calc

If you need to display coordinates using degrees and minutes, you may insert a column (titled "Lat DD MM.mmm" on Figure 14 on next page) and insert the following formula to the C2 cell:

```
=CONCATENATE(TEXT(ROUNDDOWN(B2),"0")," ",TEXT((B2-ROUNDDOWN(B2))*60,"00.000"))
```

It is easy to plot a chart (see Figure 15 on the next page) and create diagrams using imported data, and they can serve as great visual aids when you discuss your journey later.

Cell reference: C3

Formula: `=CONCATENATE(TEXT(ROUNDDOWN(B3),"0")," ",TEXT((B3-ROUNDDOWN(B3))*60,"00.000"))`

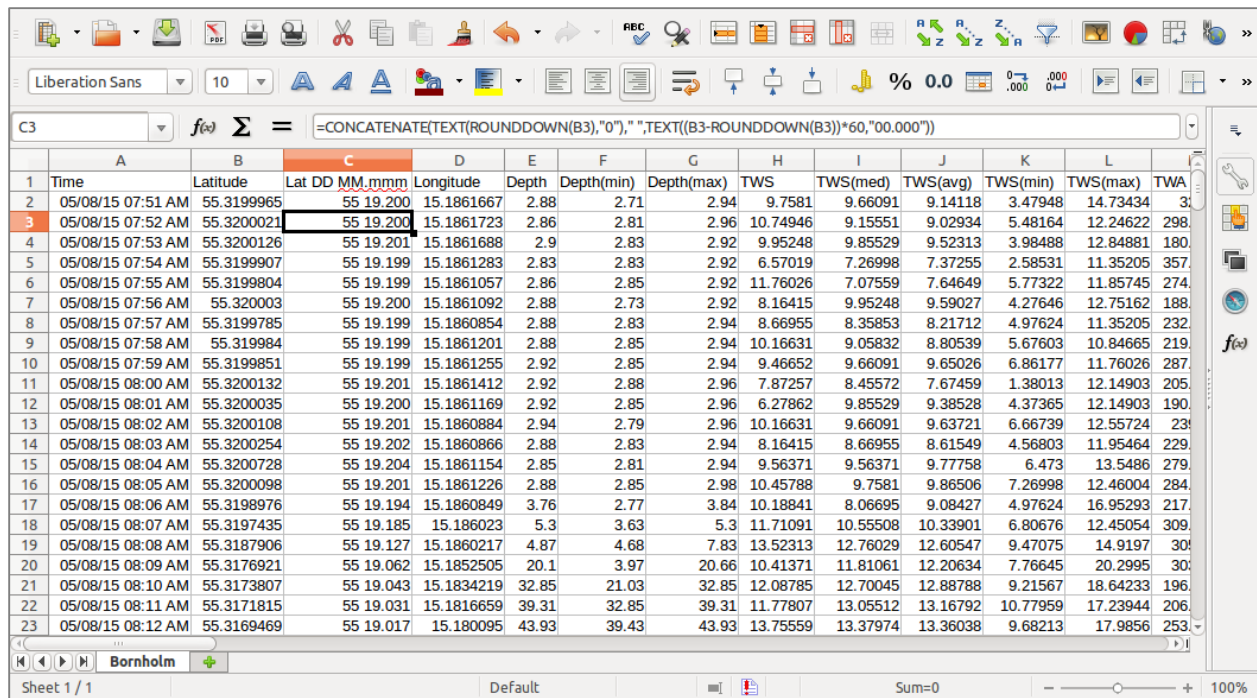|	Time	Latitude	Lat DD MM.mmm	Longitude	Depth	Depth(min)	Depth(max)	TWS	TWS(med)	TWS(avg)	TWS(min)	TWS(max)	TWA
1	Time	Latitude	Lat DD MM.mmm	Longitude	Depth	Depth(min)	Depth(max)	TWS	TWS(med)	TWS(avg)	TWS(min)	TWS(max)	TWA
2	05/08/15 07:51 AM	55.3199965	55 19.200	15.1861667	2.88	2.71	2.94	9.7581	9.66091	9.14118	3.47948	14.73434	3.
3	05/08/15 07:52 AM	55.3200021	55 19.200	15.1861723	2.86	2.81	2.96	10.74946	9.15551	9.02934	5.48164	12.24622	298.
4	05/08/15 07:53 AM	55.3200126	55 19.201	15.1861688	2.9	2.83	2.92	9.95248	9.85529	9.52313	3.98488	12.84881	180.
5	05/08/15 07:54 AM	55.3199907	55 19.199	15.1861283	2.83	2.83	2.92	6.57019	7.26998	7.37255	2.58531	11.35205	357.
6	05/08/15 07:55 AM	55.3199804	55 19.199	15.1861057	2.86	2.85	2.92	11.76026	7.07559	7.64649	5.77322	11.85745	274.
7	05/08/15 07:56 AM	55.320003	55 19.200	15.1861092	2.88	2.73	2.92	8.16415	9.95248	9.59027	4.27646	12.75162	188.
8	05/08/15 07:57 AM	55.3199785	55 19.199	15.1860854	2.88	2.83	2.94	8.66955	8.35853	8.21712	4.97624	11.35205	232.
9	05/08/15 07:58 AM	55.319984	55 19.199	15.1861201	2.88	2.85	2.94	10.16631	9.05832	8.80539	5.67603	10.84665	219.
10	05/08/15 07:59 AM	55.3199851	55 19.199	15.1861255	2.92	2.85	2.94	9.46652	9.66091	9.65026	6.86177	11.76026	287.
11	05/08/15 08:00 AM	55.3200132	55 19.201	15.1861412	2.92	2.88	2.96	7.87257	8.45572	7.67459	1.38013	12.14903	205.
12	05/08/15 08:01 AM	55.3200035	55 19.200	15.1861169	2.92	2.85	2.96	6.27862	9.85529	9.38528	4.37365	12.14903	190.
13	05/08/15 08:02 AM	55.3200108	55 19.201	15.1860884	2.94	2.79	2.96	10.16631	9.66091	9.63721	6.66739	12.55724	23!
14	05/08/15 08:03 AM	55.3200254	55 19.202	15.1860866	2.88	2.83	2.94	8.16415	8.66955	8.61549	4.56803	11.95464	229.
15	05/08/15 08:04 AM	55.3200728	55 19.204	15.1861154	2.85	2.81	2.94	9.56371	9.56371	9.77758	6.473	13.5486	279.
16	05/08/15 08:05 AM	55.3200098	55 19.201	15.1861226	2.88	2.85	2.98	10.45788	9.7581	9.86506	7.26998	12.46004	284.
17	05/08/15 08:06 AM	55.3198976	55 19.194	15.1860849	3.76	2.77	3.84	10.18841	8.06695	9.08427	4.97624	16.95293	217.
18	05/08/15 08:07 AM	55.3197435	55 19.185	15.186023	5.3	3.63	5.3	11.71091	10.55508	10.33901	6.80676	12.45054	309.
19	05/08/15 08:08 AM	55.3187906	55 19.127	15.1860217	4.87	4.68	7.83	13.52313	12.76029	12.60547	9.47075	14.9197	30!
20	05/08/15 08:09 AM	55.3176921	55 19.062	15.1852505	20.1	3.97	20.66	10.41371	11.81061	12.20634	7.76645	20.2995	30:
21	05/08/15 08:10 AM	55.3173807	55 19.043	15.1834219	32.85	21.03	32.85	12.08785	12.70045	12.88788	9.21567	18.64233	196.
22	05/08/15 08:11 AM	55.3171815	55 19.031	15.1816659	39.31	32.85	39.31	11.77807	13.05512	13.16792	10.77959	17.23944	206.
23	05/08/15 08:12 AM	55.3169469	55 19.017	15.180095	43.93	39.43	43.93	13.75559	13.37974	13.36038	9.68213	17.9856	253.

Sheet 1 / 1   Default   Sum=0   100%

Figure. 14. Coordinates displayed in degrees and minutes

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Time	Latitude	Lat DD MM.mmm	Longitude	Depth	Depth(min)	Depth(max)	TWS	TWS(med)	TWS(avg)	TWS(min)	TWS(max)	TWA
2	05/08/15 07:51 AM	55.3199965	55 19.200	15.1861667	2.88	2.71	2.94	9.7581	9.66091	9.14118	3.47948	14.73434	324.254
3	05/08/15 07:52 AM	55.3200021	55 19.200	15.1861723	2.86	2.81	2.96	10.74946	9.15551	9.02934	5.48164	12.24622	298.78603
4	05/08/15 07:53 AM	55.3200126	55 19.201	15.1861688	2.9	2.83	2.92	9.95248	9.85529	9.52313	3.98488	12.84881	180.01761
5	05/08/15 07:54 AM	55.3199907	55 19.199	15.1861283	2.83	2.83	2.92	6.57019	7.26998	7.37255	2.58531	11.35205	357.46264
6	05/08/15 07:55 AM	55.3199804	55 19.199	15.1861057	2.86	2.85	2.92	11.76026	7.07559	7.64649	5.77322	11.85745	27*.28063
7	05/08												37706
8	05/08												22552
9	05/08												77515
10	05/08												19509
11	05/08												54861
12	05/08												57722
13	05/08												9.4276
14	05/08												09717
15	05/08												51173
16	05/08												14696
17	05/08												69215
18	05/08												82662
19	05/08												5.6087
20	05/08												3.0448
21	05/08/15 08:10 AM	55.3173807	55 19.043	15.1834219	32.85	21.03	32.85	12.08785	12.70045	12.88788	9.21567	18.64233	190.06477
22	05/08/15 08:11 AM	55.3171815	55 19.031	15.1816659	39.31	32.85	39.31	11.77807	13.05512	13.16792	10.77959	17.23944	206.85803
23	05/08/15 08:12 AM	55.3169469	55 19.017	15.180095	43.93	39.43	43.93	13.75559	13.37974	13.36038	9.68213	17.9856	253.33491

Chart legend: TWS, TWS(med), TWS(avg), TWS(min), TWS(max)

Chart x-axis: 05/08/15 07:50 AM, 05/08/15 09:02 AM, 05/08/15 10:14 AM, 05/08/15 11:26 AM
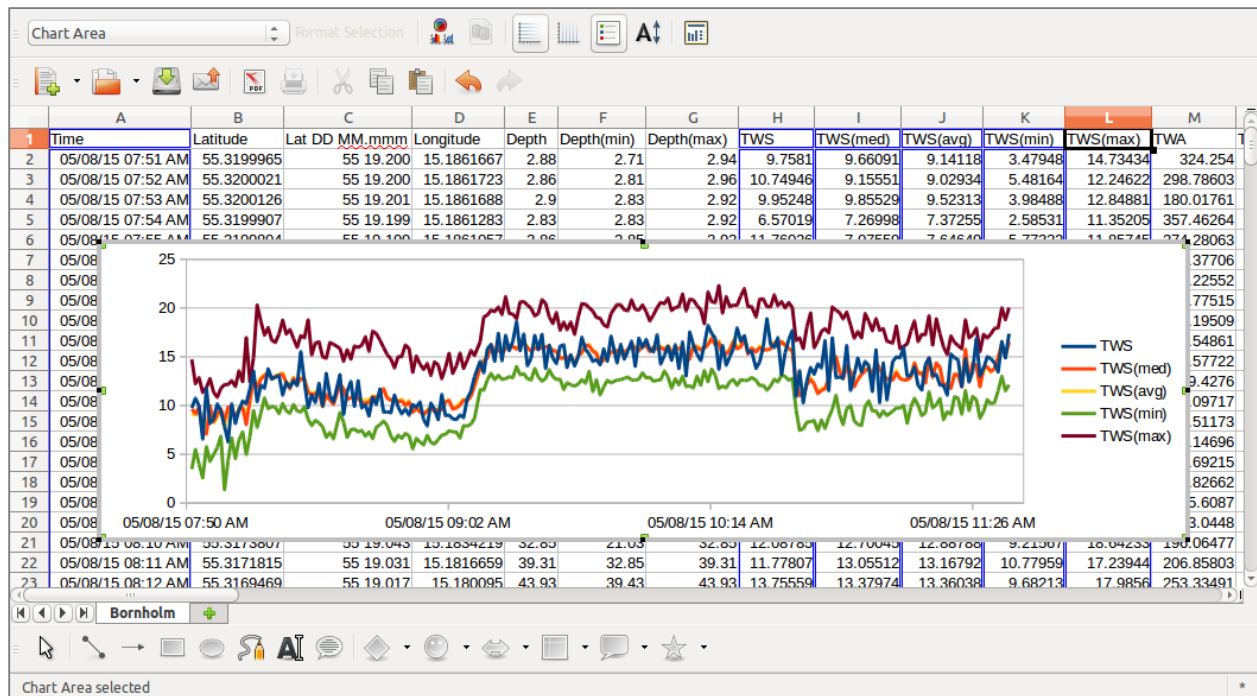
Chart Area selected

Figure 15. Graph with true wind speed (TWS) values

5.3 XML file in OpenSkipper

OpenSkipper is open source software for Microsoft Windows available at http://openskipper.org. You may use it to view NMEA 2000 data of Voyage Recorder files.

Using YDVR Converter, create an OpenSkipper .XML file from the Voyage Recorder .DAT file (you may use files from the "Test" folder of program archive to test). After that, start OpenSkipper and click the "View log…" item under the "File" section of the main window menu and load the .XML file.
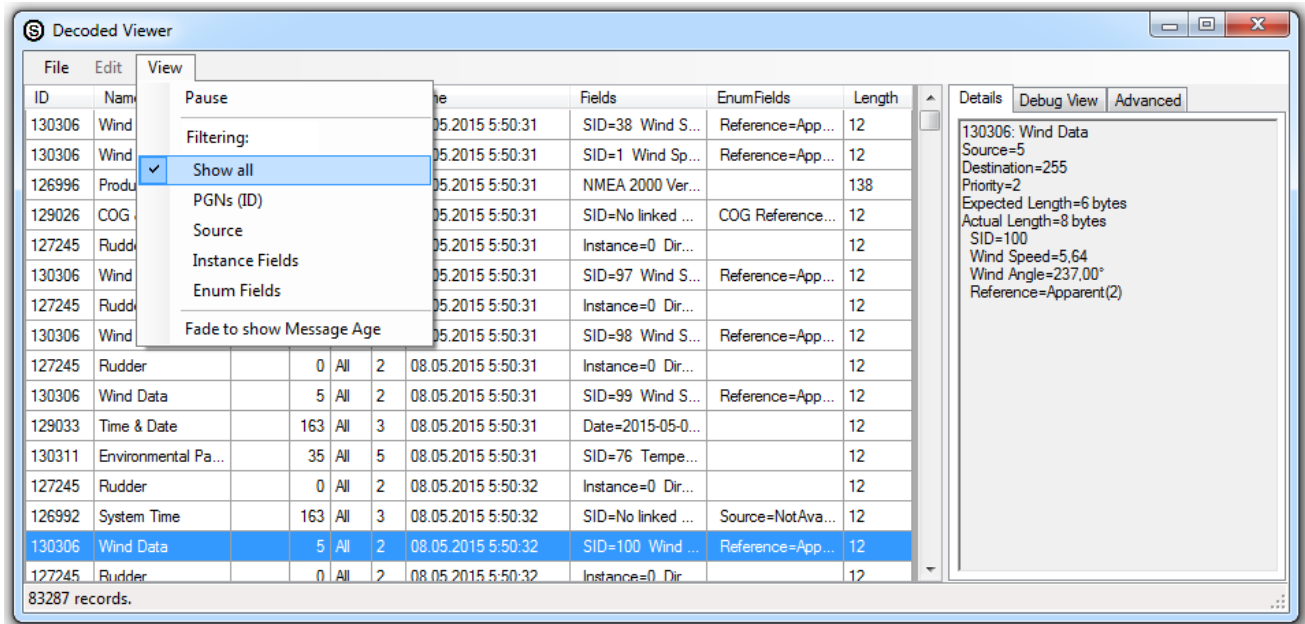

Figure 16. XML file in OpenSkipper

In the "View" menu of the log viewer window, you may click "Show all" to view the messages sequence. You may click on the "Time" column header to sort data in the right order.

5.4 CAN file in CAN Log Viewer

CAN Log Viewer is another free software from Yacht Devices, running on Microsoft Windows, Linux and Mac OS X. This program can "re-play" CAN files in real time on the PC screen. It displays messages at CAN level, have viewers for major NMEA 2000 and J1939 data, displays the list of NMEA 2000 devices and its properties.
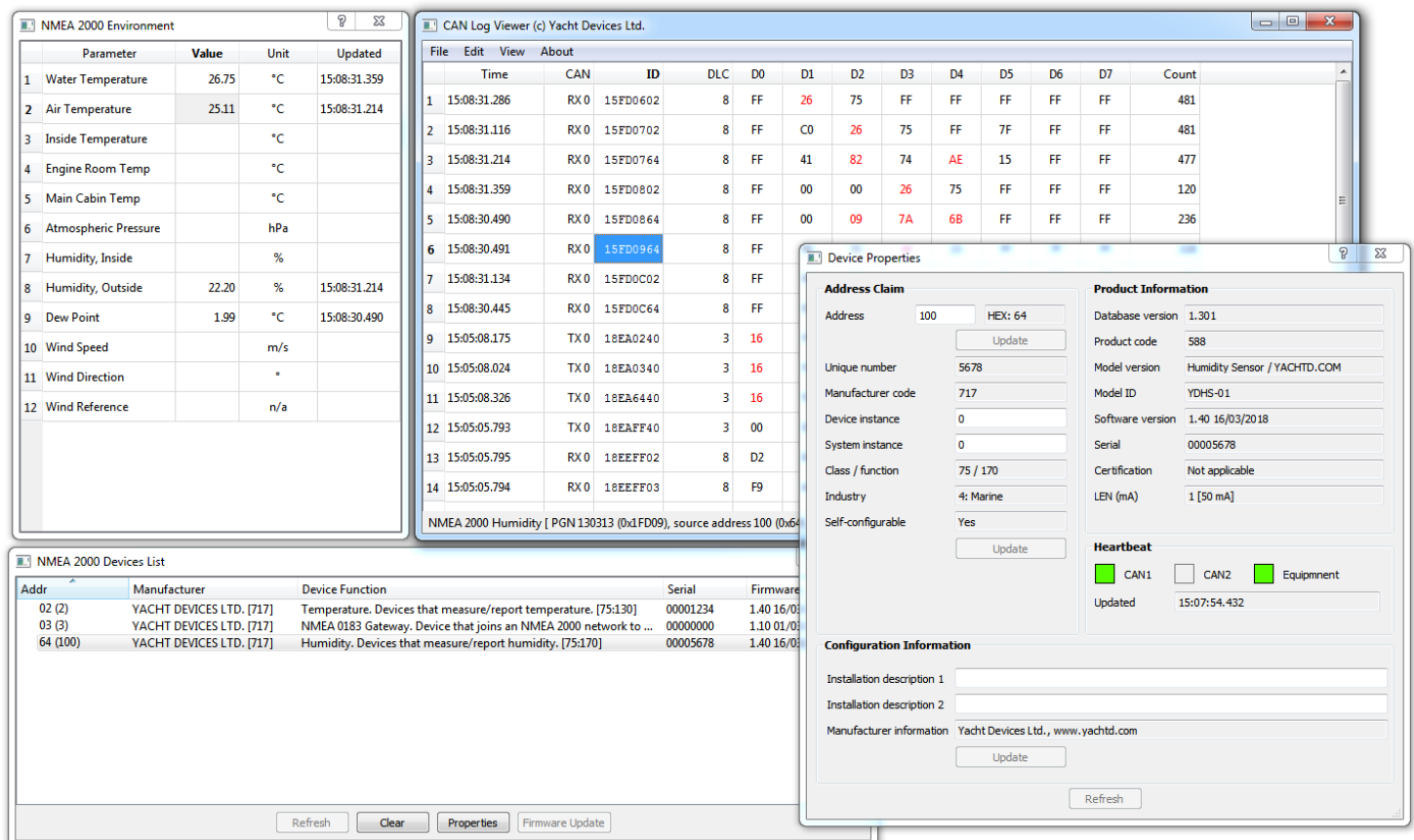

Figure 17. CAN Log Viewer software

You should convert .DAT files to .CAN format using YDVR Converter to load your data to CAN Log Viewer (select "Open…" item in the "File" menu). CAN Log Viewer can also convert .CAN files back to .DAT format. To pause the playback, select "Pause" in the "File" menu.

6. Voyage Recorder file format (.DAT)

The Voyage Recorder file format is free for any type of legal use. The file format is described in the Voyage Recorder manual.

7. Advanced data filtering

The Application may filter the stream of NMEA 2000 messages using a the 29-bit message identifier before processing. The configuration is stored in the optional *filters.ini* file located in the same folder where the application executable file is. Configuration of filters requires knowledge of the NMEA 2000 standard.

To activate filters, the "filtering mode" should be selected in the INI file:

> *FILTER_MODE=ALLOW*

or

> *FILTER_MODE=BLOCK*

In the first case, YDVR Converter processes matched messages only. In the second case, the application skips matched messages.

Each filter record contains a filter and mask, and you may define up to 100 filters numbered from 1 to 100. The filter's number should be unique.

Zero bit in the filter mask means that the result of comparison of this bit in the message identifier and filter will be ignored. Filter and mask values are hexadecimal. For example, to skip a "Water Depth" message with PGN 0x1F50B and all messages sent from NMEA 2000 address 0x40, you should write the following in the *filters.ini* file:

> *; Activate filters and select the mode*
>
> *FILTER_MODE=BLOCK*
>
> *; Block the message with PGN 0x1F50B*
>
> *FILTER_1=01F50B00*
>
> *MASK_1=01FFFF00*
>
> *; Block all messages from device with 0x40 NMEA 2000 address*
>
> *FILTER_2=00000040*
>
> *MASK_2=000000FF*

Note that *filter.ini* file is reloaded after each conversion, so you don't need to restart the application after making changes in the *filter.ini* file.

The filter mode and the number of loaded filters are shown in the "Final check" wizard step.

8. DAT files repair

Each DAT file contains a service record at the end of the file, which contains the time of the last file's record and duration. Voyage Recorder uses the data from the "System Time" network message (usually sent by the GPS of the chart plotter) to synchronize its internal clock time with the real time. YDVR Converter uses this record to sort multiple files in the list to maintain a track's timeline.

When you turn on a chart plotter or GPS receiver, it starts searching for a satellites. While it has no position fix, it cannot send the correct time to the network, or it may send some default date and time like 2000-01-01 00:00:00. In most cases, your boat is still in the marina at this time and you can ignore these files.

YDVR Converter can handle such situations, and it restores a true timeline even if incorrect data is present at the beginning of the file. But it can handle this situation inside a single file only, it can't use data from other files to restore a timeline in a given file.

For example, you have files 1.DAT, 2.DAT and 3.DAT, where the first two contain incorrect time data or no time data at all. In this case, you can join these files with the following command line:

```
YDVRConv /join 1.DAT 2.DAT 3.DAT OUTPUT.DAT
```

In most cases, YDVR Converter will be able to restore the true timeline in the output file.

Some files may contain trash data due to file system errors. YDVR Converter can detect and ignore broken data, but it takes additional time during processing. Run the program with the following key:

```
YDVRConv /repair
```

and convert the files to OpenSkipper XML format. During the conversion, YDVR Converter will create a repaired file with the suffix R (e.g. 1.R.DAT for 1.DAT) for the all files which needs a repair.

Voyage Recorder firmware up to version 1.20 contains a bug, which may cause an invalid date and time in the file if the vessel contains more than one source of GPS data. To fix this situation, run the program with following key and convert all necessary files to OpenSkipper XML format:

```
YDVRConv /fixdate
```

This key forces the actualization of the file's data record for all files. Files with the suffix R will be created (e.g. 1.R.DAT for 1.DAT). This operation may take a long time.

APPENDIX A. Abbreviations and acronyms

AIS — Automatic identification system

AVG — Average or arithmetic mean

AWA — Apparent wind angle (relative to the vessel's centerline)

AWS — Apparent wind speed

CAN — Controller area network

COG — Course over ground

CSV — Comma Separated Values

GPS — Global positioning system

GPX — GPS exchange file format

MAX — Maximum

MED — Median, the number separating the higher half of a data from the lower half

MIN — Minimum

MMSI — Maritime mobile service identity

NMEA — National Marine Electronics Association

RPM — Revolutions per minute

SOG — Speed over ground

STW — Speed through water

TWA — True wind angle (relative to the vessel's centerline)

TWD — True wind direction (relative to the True North)

TWS — True wind speed

XML — Extensible markup language

YMD — Year, month, day (order in date/time)

APPENDIX B. Logbook macros

Macro	Type*	Description
Hn	Record macro	Hour of record time. This macro used also to count the total number of records on template.
Mn	Record macro	Minute of record time.
Xn	Record macro	Latitude degrees.
Yn	Record macro	Latitude minutes.
YKn	Record macro	Thousandths of a latitude minutes.
Wn	Record macro	Longitude degrees.
Zn	Record macro	Longitude minutes.
ZKn	Record macro	Thousandths of a longitude minutes.
XAUFn	Record macro	Name and length (min:sec) of the first audio file recorded at this time interval. "F" is added if the recording was finished.
XAULn	Record macro	Name and length (min:sec) of the last audio file recorded at this time interval. "F" is added if the recording was finished.
XCOGn	Record macro	COG (see Appendix A for abbreviations), degrees.
XSOGn	Record macro	SOG, degrees.
XSTWn	Record macro	STW, degrees.
XHGn	Record macro	Heading, true degrees.
XRPMn	Record macro	Engine (port in case of dual), revolutions per minute.
XLOGn	Record macro	Total log.
XWAn	Record macro	Apparent wind angle (AWA), degrees.
XWKn	Record macro	Apparent wind speed (AWS).
XWDn	Record macro	True wind direction (TWD), degrees.
XWTn	Record macro	True wind angle (TWA), degrees.
XWSn	Record macro	True wind speed (TWS).
XHPn	Record macro	Atmospheric pressure (mbar / hPa).
XHIn	Record macro	Air relative humidity, inside [saloon, cabin] (%).
XHOn	Record macro	Air relative humidity, outside [the boat] (%).
XXPN	Special macro	Page number, started with 1 and increased on insert.
XX:KFN	Special macro	Units, see 4.3 for details. Replaced by empty string.
XDATE	Header macro	Full date (YYYY-MM-DD) of the first record.
XTIMEZONE	Header macro	Time zone of logbook.
XDOFWEEK	Header macro	Week's day of the first record (e.g, Monday).
XRT	Total macro	Time (HH:MM) of totals calculation.
XBAT1	Total macro	Voltage of service battery at XRT time.
XBAT2	Total macro	Voltage of engine battery (not implemented).
XDLOG	Total macro	Day's log. Log difference between last record and first record on template**.
XDRUN	Total macro	Day's run. Shortest distance between last and first points on template**.
XCRUN	Total macro	Cruise run. Sum of all previous XDRUN values.

Macro	Type*	Description
TFUE	Total macro	The sum of the fuel in tanks. Two tanks are supported (instance 0 and instance 1). If the tank volume data is available, value is in liters otherwise in percent (L or % printed after the value).
TWF1	Total macro	Fresh water in the tank with instance 0. If the tank volume data is available, value is in liters otherwise in percent (L or % printed after the value).
TWF2	Total macro	Fresh water in the tank with instance 1. If the tank volume data is available, value is in liters otherwise in percent (L or % printed after the value).
EMH	Header macro	Engine motor hours at time of the first record on the page, or when the engine was turned on first time in the page's time interval.
ETM	Header macro	Time associated with EMH macro.
TMH	Total macro	Engine motor hours at time of the last record on the page.
DHM	Total macro	Duration of the engine work during a voyage.

* Record macros contain a macro name and record number ("n" in the table above) between zero and twenty using base 20. Up to 20 records on a template are allowed. So valid hour macros (Hn) are: H0..H9, HA..HK. The special, header and total macros contain no record number part.

** This value is calculated using the last record from the previous template with the exception of the first template, where the first record of the template itself is used.