Project Documentation | Getting Started Guide for Automotive and Industrial Radar Sensors

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1 Contents

Additional technical support for automotive and industrial sensors: support@smartmicro.de

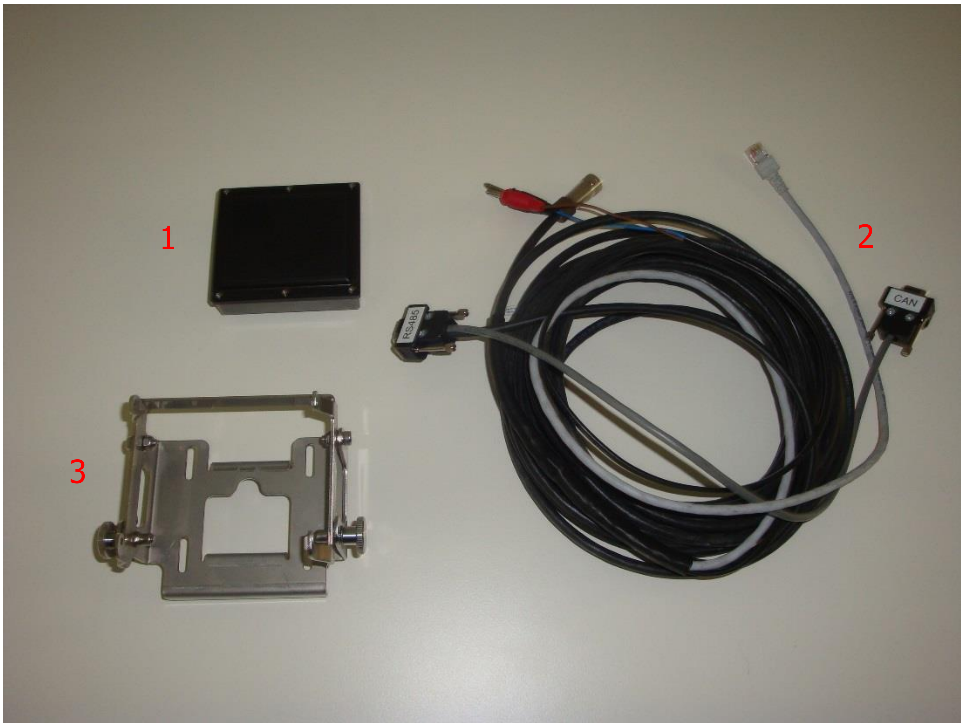
2 Reference Documents

No.	Document	SVN-ID	Notes
[1]	UMRR_Automotive_Type_132_Data_Sheet.pdf		
[2]	UMRR_Automotive_Type_146_Data_Sheet.pdf		
[3]	Datasheet_DR3.pdf		
[4]	Detailed_Feature_List_DR3.pdf		
[5]	CustomerInterface		

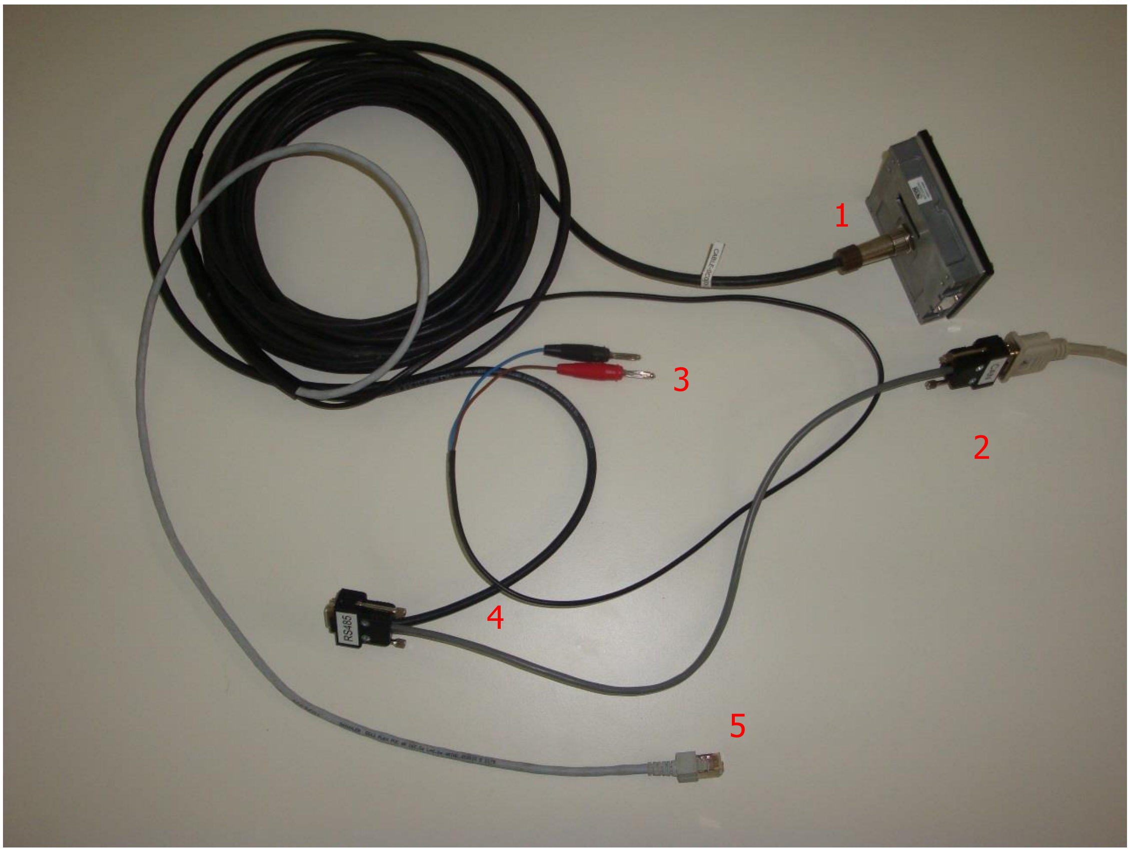
Table 1: Reference documents

3 Getting Started

3.1 Hardware UMRR-11 T132



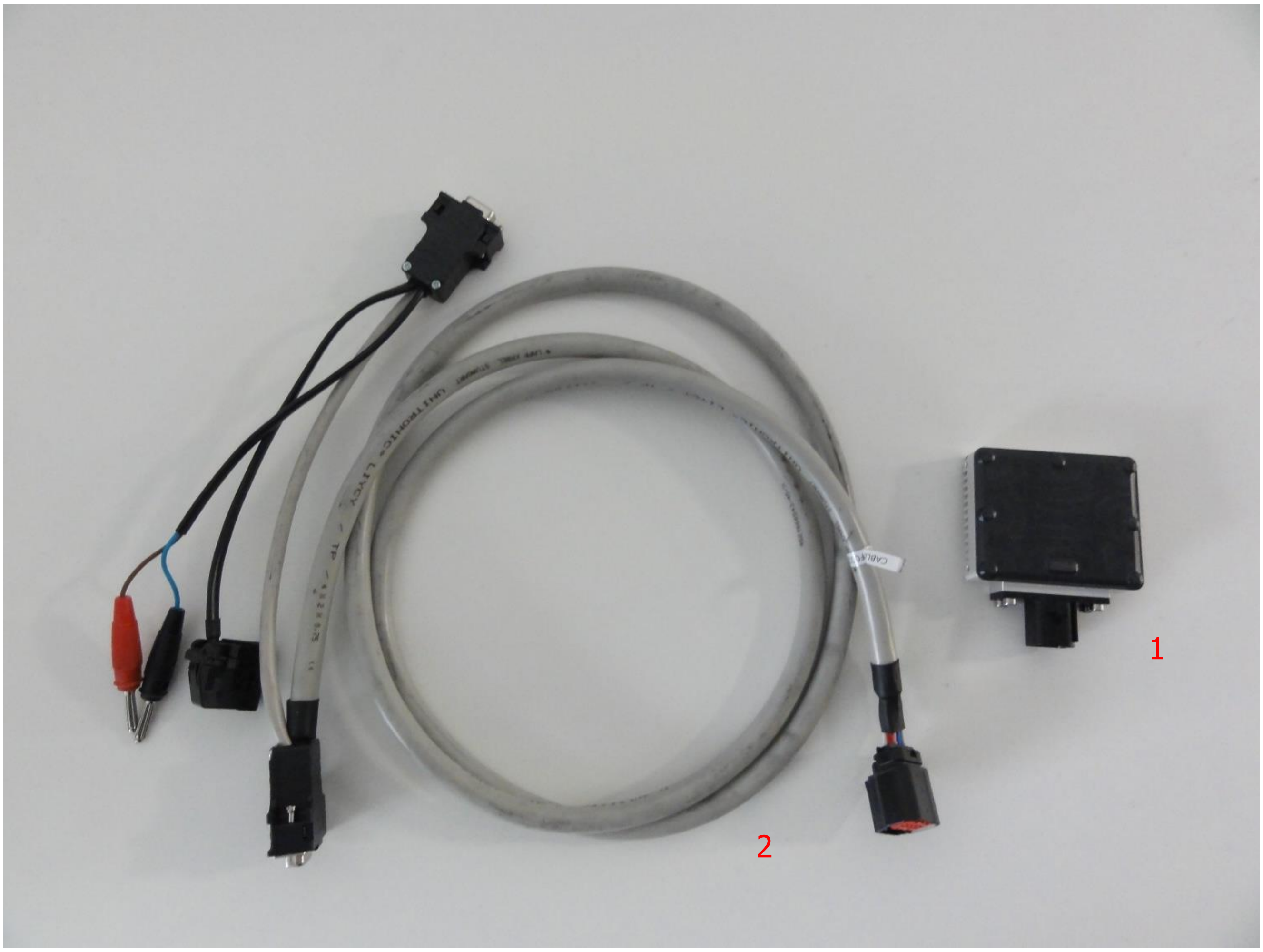
Picture 1: UMRR-11 Type 132 (1) with CABLE-0C0200 (2) and BRACKET-030400 (3, optional, different models available)



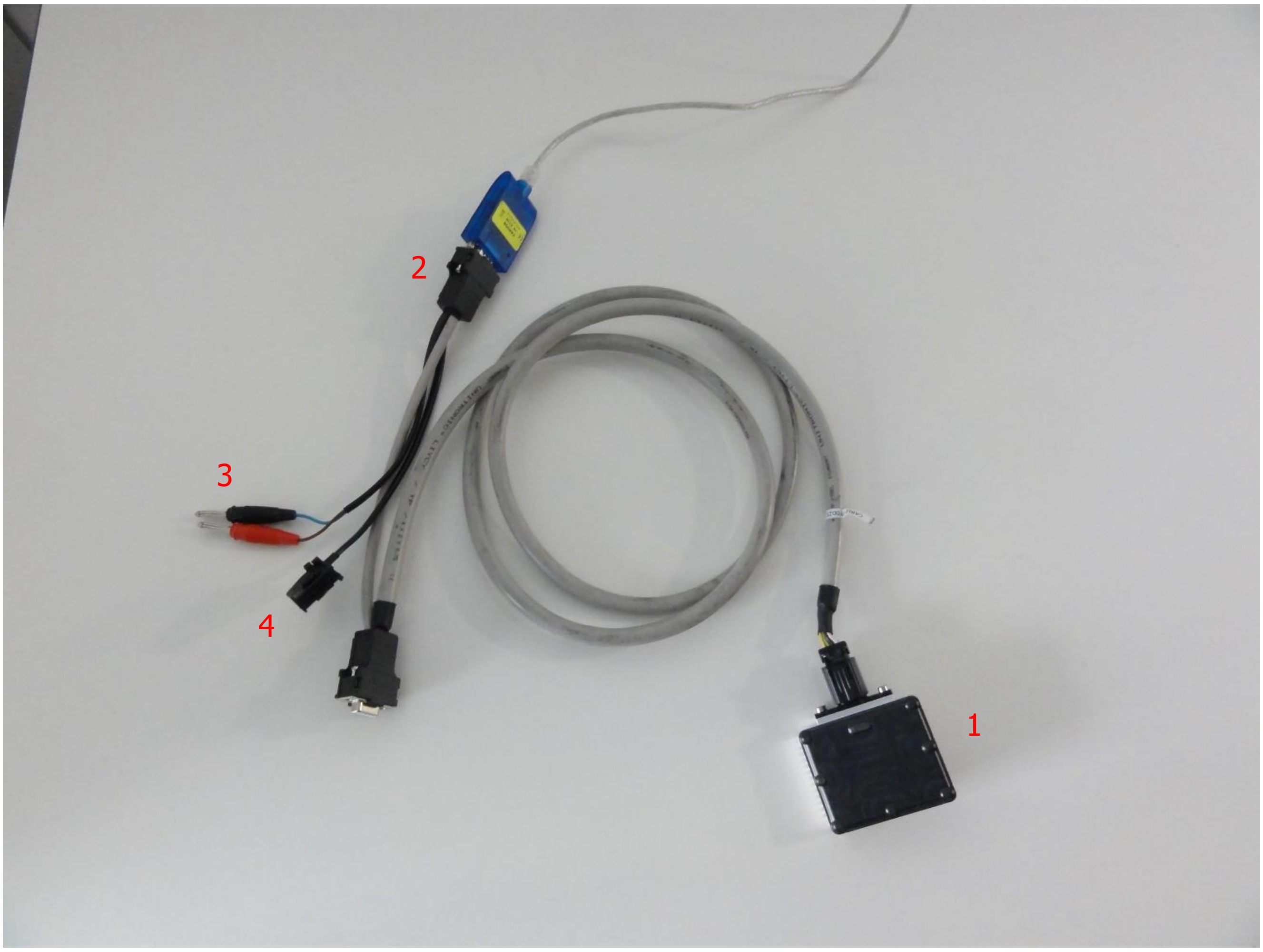
Picture 2: Connecting UMRR-11 Type 132 to the cable

The sensor has to be connected with a bayonet connector to the cable (1) as seen in Picture 2. Afterwards, the connection to the CAN interface is established by the DSUB9-connector labeled "CAN" (2). The banana plugs (3) are used to supply power to the sensor, red for supply voltage, black for electrical ground (GND). The recommended supply voltage is noted within the datasheet [1]. The "RS485" connector (4) is currently not supported for automotive applications. Finally, the RJ45 connector (5) can be used to stream out intermediate data from the signal processing chain through Ethernet, which will not be covered in this document.

3.2 Hardware UMRR-8F T146



Picture 3: UMRR-8F Type 146 (1) with compatible CABLE-FF0025 (2)



Picture 4: Connecting UMRR-8F Type 146 to the cable

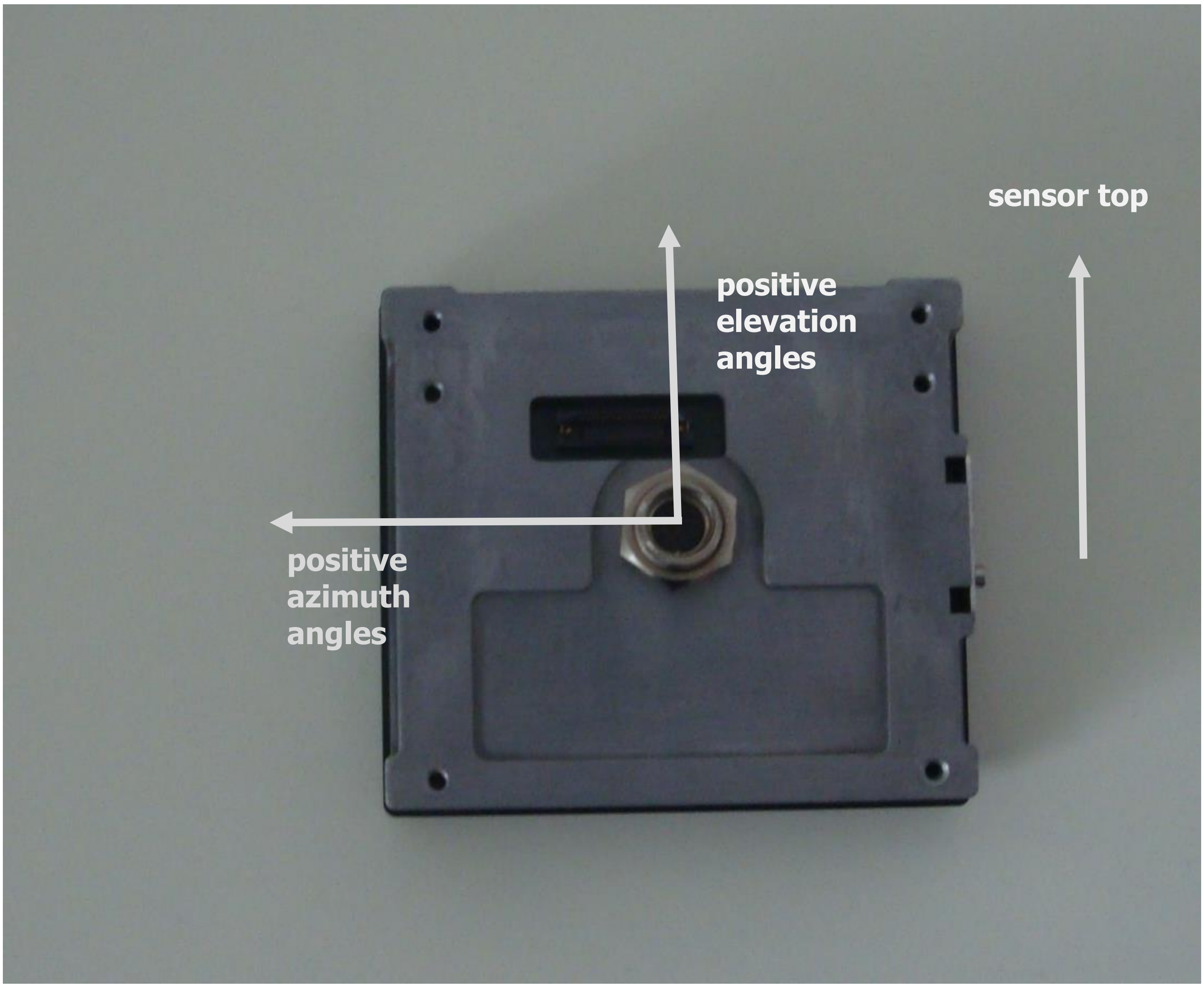
To operate the UMRR-8F Type 146 the sensor has to be connected to the cable as shown in Picture 4, Number 1. The connection to the CAN interface is established by the DSUB9-connector labeled with "CAN" (2). The pining is shown in the datasheet [2]. The banana plugs (3) are used to supply power to the sensor, red for supply voltage, black for electrical ground (GND). The recommended supply voltage is noted within the datasheet [2]. The second CAN connection (4) and the automotive Ethernet connector are currently unused.

3.3 Installation of the sensors

Typically, the automotive/industrial radar sensors should be installed at the same height level as the targets to be detected. Please make sure that the radar beam covers the zone of interest as good as possible by adjusting the azimuth and elevation angle. For installations in a car, a mounting height between 50cm and 80cm over ground with an elevation angle of 0 degree is recommended

3.3.1 UMRR-11 T132

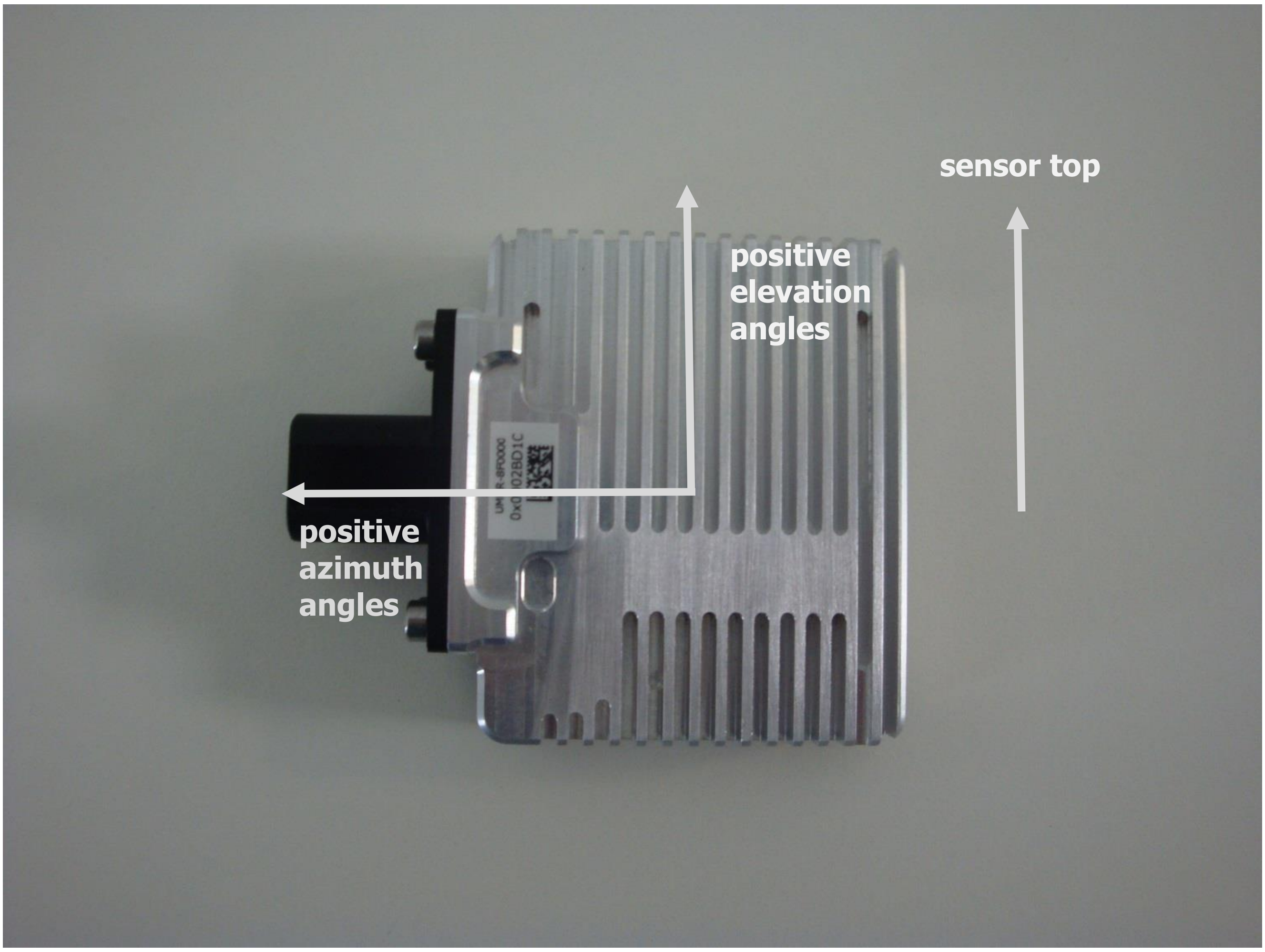
The connector of the UMRR-11 is placed on the back of the sensor above the label. The origin of the coordinate system is in the middle of the sensor (zero axis). The azimuth angle refers to the horizontal axis, whereas the elevation angle refers to the vertical axis as indicated in Picture 5. All values are provided relatively with regard to the mounting position.



Picture 5: Coordinate system relative to UMRR-11 T132

3.3.2 UMRR-8F T146

The connector of the UMRR-8F has to show to the left side (see Picture 6) if you're looking from behind. The origin of the coordinate system is in the middle of the sensor (zero axis). The azimuth angle refers to the horizontal axis, whereas the elevation angle refers to the vertical axis as indicated in Picture 6. All values are provided relatively with regard to the mounting position.



Picture 6: coordinate system relative to UMRR-8F T146 (view from backside in positive x axis direction)

3.4 DriveRecorder3 software

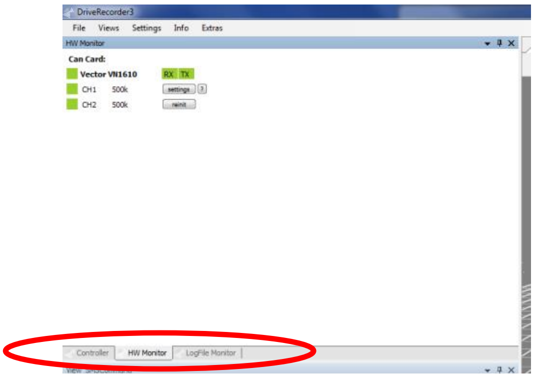
The DriveRecorder3 (DR3) is a smartmicro tool for visualization, recording, replaying and exporting of CAN or Ethernet data. This software can be downloaded on smartmicro's homepage. For using the DR3 an access code is required. When starting the DR3 for the first time after installation, a request code will be generated. Please send this request code to

software-registration@smartmicro.de.

After the registration you can use the DR3 as a full version.
In the DR3 software a help menu is available (check help menu or push F1).
The software supports multiple CAN interfaces, compatible hardware can be found in [3].

3.4.1 Control and status of CAN hardware

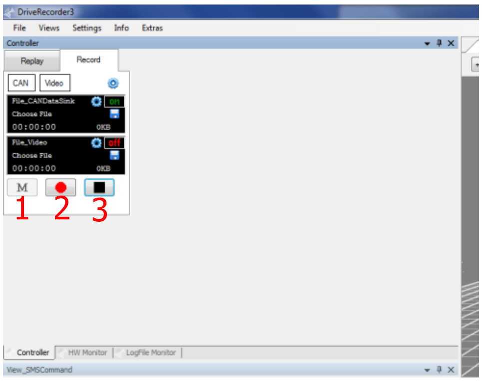
Once everything is connected and the sensor is powered the targets should appear in both TargetDraws as well as in the sensor target list. If not the following items should be checked.



Picture 7: Hardware Monitor

First of all, check the "HW Monitor" (Picture 7). The connection has to be indicated in green.. If this is not the case, for example when the hardware is connected after starting the DR3, a click on the "reinit" will search again for CAN hardware.
This dialogue can be found in the top left sub window; further you need to select the appropriate tab, see Picture 7.

The next item to check is whether the "Controller" is monitoring. For this the "Record" tab has to be active and the "M" button (1) has to be activated, which will grey out that button and activate the "Start Recording" (2) and "Stop Recording/Monitoring" (3) elements, as seen in Picture 8.

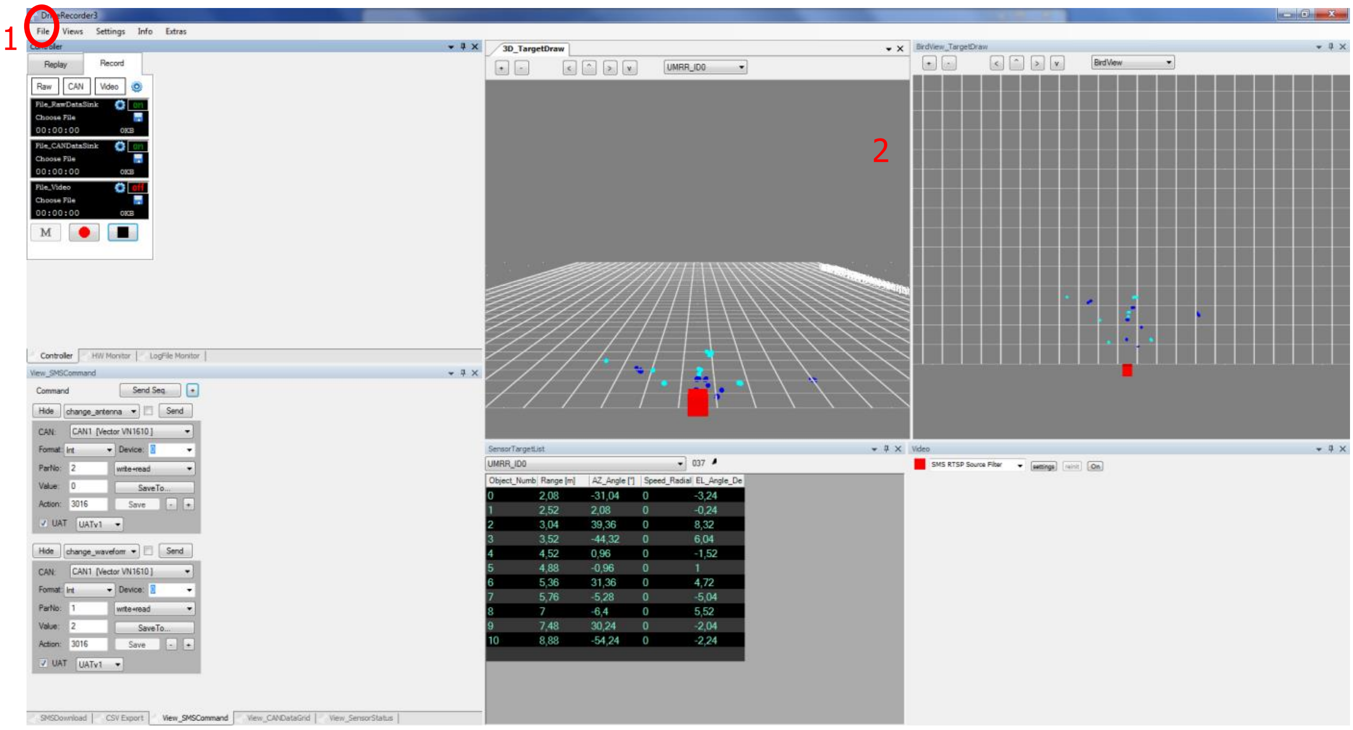


Picture 8: Controller with active monitoring

The CAN raw data (not interpreted data) is displayed in the CANdataGrid. In this window the messages are sorted either by identifier (= identifier mode -> so each message with the same identifier overwrites the old message with this same identifier) or sorted by time (= buffer mode).

3.4.2 DriveRecorder3

The DR3 allows to record any CAN data on the connected channels and is able to interpret the CAN packages directly. It also allows the export of target data to a CSV-file for later analysis. More information can be found in [3,4]



Picture 9: Main window of DR3, UMRR-8F Type 146 desktop

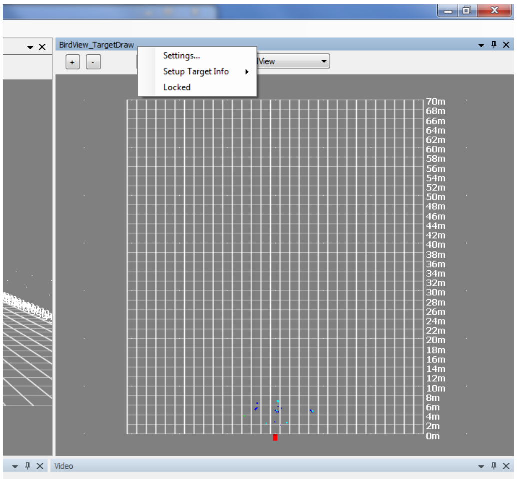
3.4.3 Using Desktop files

The behavior of the DR3 is mainly controlled by the so called "desktops", which store the configuration within a *.dsk file. There are three DR3 desktops delivered within the installation of the software, one for UMRR-8F Type 146 and two for the UMRR-11 Type 132. To load the appropriate desktop, open the "File" menu (1) and click on the entry "Load Desktop". This opens a dialogue pointing to the installation directory of DR3, where the individual desktop files are stored. When using UMRR-8F Type 146 the desktop "std_desktop_T146.dsk" should be used. When using the UMRR-11 Type 132 in long range mode the desktop "std_desktop_T132_ACC.dsk" should be used, for the medium/short range mode "std_desktop_T132_AEB.dsk", respectively.

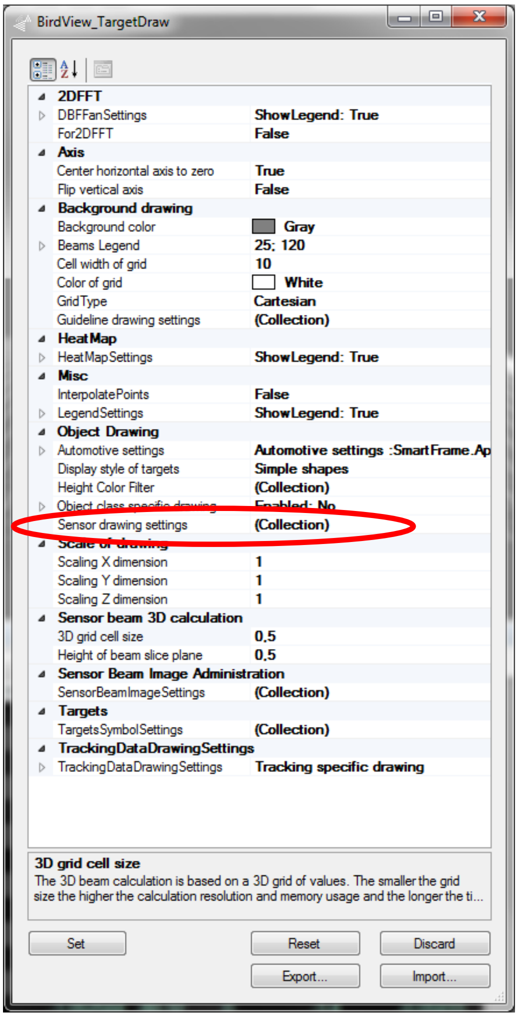
3.4.4 Desktop configuration

The DR3 is highly configurable to the extent, that only a minor subset of the configuration will be presented in this document.

The most important settings for visualizing the raw targets transmitted via CAN are in the two TargetDraw sub windows (mark 2 in Picture 9) in the top right of the main window. All in all, both views are configured with the same settings, just the perspectives are different. One difference though is the option of speed vectors in the bird view perspective. This means, that each raw target will be plotted with a vector pointing to (or away) from the sensor, depending on the direction of movement of the target, the length of the vector being scaled to the radial speed value. In order to (de)activate this option, the settings dialogue of the TargetDraw has to be opened by right clicking on the title bar of the sub window and selecting the "Settings" entry, as shown in the following picture.

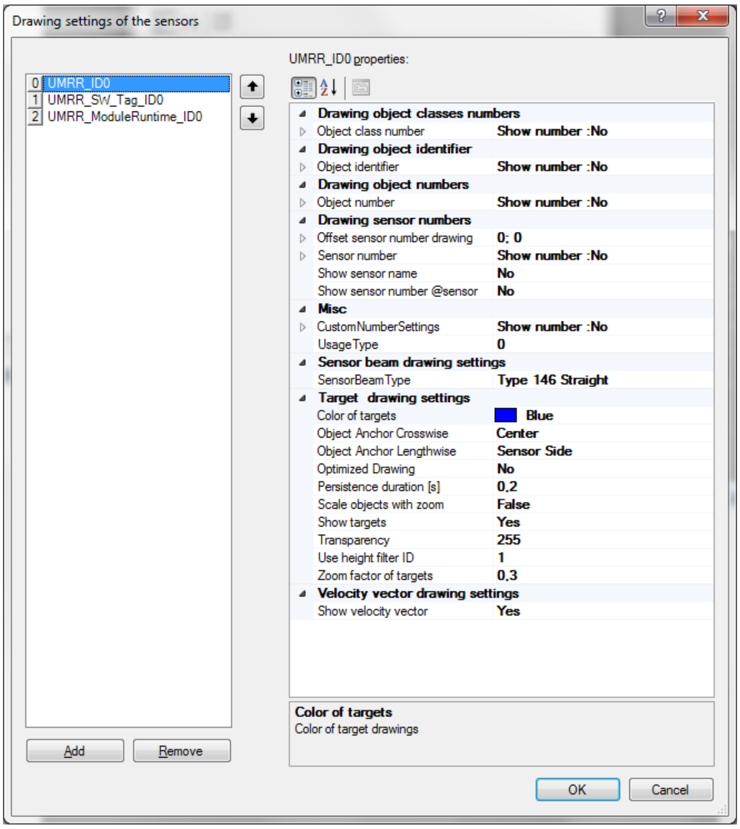


Picture 10: opening TargetDraw settings



1

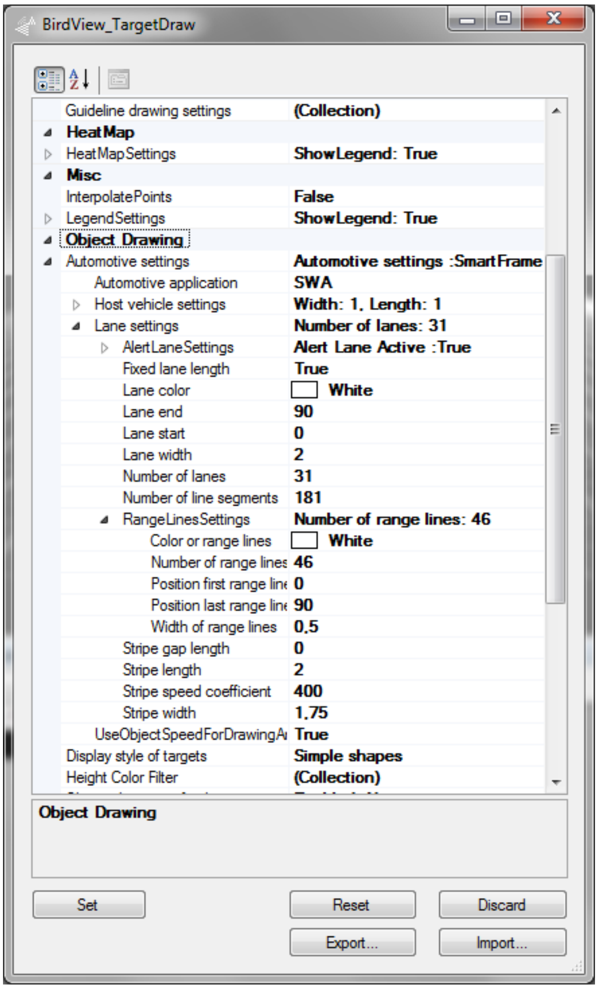
Picture 11: TargetDraw settings



Picture 12: Sensor Drawing Settings

Afterwards a click on the field "Sensor drawing settings" (1 in Picture 11) should make a button appear next to "Collection", which, once clicked, opens the dialogue shown in Picture 12. At the bottom there is the option to turn the velocity vector on (or off).

Another noticeable option within the TargetDraw is the configuration of reference lanes. For a general purpose, the desktops are preconfigured to have grid-like references to easily estimate the target position. Depending on the application, other settings might be more appropriate, for example broader lanes for street reference or finer / sparser range lines to not clutter the visualization. This can be achieved by expanding the "Automotive settings" and the entry "Lane settings" thereafter, see also Picture 13. There the number of lanes, their width and reference range lines can be configured. Additionally, those settings might be ex- and imported with the buttons at the bottom of the dialogue, so saving different settings for different applications or scenarios is possible. This is true for every configuration dialogue within DR3.



Picture 13: Automotive settings

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5 Contact

Address:

smart microwave sensors GmbH
In den Waashainen 1
38108 Braunschweig
Germany

Phone / Fax numbers:

Phone: +49-531-39023-0
Fax: +49-531-39023-599

Web / Email address:

Web: www.smartmicro.de
Email: info@smartmicro.de

Technical support for industrial and automotive sensors: support@smartmicro.de