



SOFTWARE
myoRESEARCH®3.10

NORAXON™
MOVEMENT • DATA • PEOPLE



myoVIDEO™ VIDEO CAPTURE SOFTWARE USER GUIDE



SOFTWARE

myoVIDEO™ MODULE

© Copyright, 2015, Noraxon U.S.A. Inc.

No part of this document may be copied, photographed, reproduced, translated, or reduced to any electronic medium or machine-readable form without the prior written consent of Noraxon U.S.A. Inc.

Noraxon is a registered trademark of Noraxon U.S.A. Inc. All rights reserved. All other company and product names contained herein may be trademarks or registered trademarks of their respective companies and are sole property of their respected owners.



Table of Contents

Section 1: Introduction	5
Brief Description	5
Section 2: Set-Up	5
Software Installation	5
Hardware Setup	6
Camera Device Configuration Settings	7
Hardware Sync for video – LED Video Sync Light	9
Hardware Profiles	10
Software Setup	11
Software Licensing	12
MyoMOTION	13
Section 3: Software Navigation Overview	14
The Main Navigation Bar	14
Main Operation and Instruction Bar	14
Tool Bar	14
Local Menu Element Controls	15
Section 4: Home Tab	15
Introduction	15
Select a Module	16
Select or Create a Subject	16
Select or Create a Configuration	17
Right Side Tool Bar	17
Actions	17
Configurations	17
Section 5: Create a New myoVIDEO Measurement Configuration	18
Introduction	18
Create or Edit Measurement Configuration	19
Tool Bar Functions	20
Section 6: Measure Menu	21
Introduction	21
Actions	21
New Markers	22
Screen Layouts	23
Start a video recording	26
Section 7: Database Tab	28
Introduction	28
1 & 2 – List sections	28
3 – Local List Functions	28
4 - Right Tool Bar Menu	32
Choose actions	32
New Subject	33
Import Records	34
Export Records	36



SOFTWARE

myoVIDEO™ MODULE

Select Projects	38
Section 8: Viewer Tab	39
Introduction.....	39
1) Device register card system.....	41
3) Time Line	42
4) Video control/replay and POI Analysis	44
5. Video and animation window section	46
4) Right Tool Bar Options	47
Video Analysis	48
3 Marker Angle/Chain	49
4 Marker Angle/Chain	54
Arrow Drawing Tool	55
Label Drawing Tool	55
Distance Drawing Tool	56
Forceplate (Force Vector Overlay).....	59
Show Force Value.....	62
Force Scale	62
Crosshair Tool.....	63
Trajectory Tool.....	63
Auto Tracking of Markers	64
D) Camera Settings in myoVIDEO	65
E) Tracking	66
Auto Tracking of Trajectory.....	67
Two Video Camera Recording.....	68
Two Video Record Comparison	69
Video Options	70
View Settings.....	71
Marker Menu (optional)	72
Edit Menu (optional)	72
Signal Bars	72
Section 9: Report Tab	73
Introduction.....	73
Video Report.....	73
Report Elements	74
Automatic EMG and Signal Analysis	76
Report Tool Bar Options	78
Output Options.....	79
View Options.....	80
Analysis Options	80
How to use the Compare feature	81
APPENDICES.....	82
Appendix A: Test Force Vector Overlay	82



Section 1: Introduction

Brief Description

The myoVIDEO™ software module is a video recording and analysis tool that is a part of the myoRESEARCH®3 (MR3.10) software platform. It can be used alone to capture and assess video data, or as part of a multi-device protocol, in conjunction with other software and hardware systems, such as the myoMUSCLE™ EMG software module and related hardware.

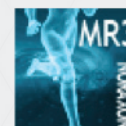
The myoRESEARCH software suite is fully integrated, therefore all software modules share basic menu operations which are detailed below.

Section 2: Set-Up

Software Installation

Before you launch the MR3.10 software platform: please connect all hardware devices that you plan to use with the MR3.10 software to your computer.

1. Insert the installation USB Flash Drive or use the MR3.10 download file and start the installation with **Noraxon.mr.3.x.x.exe** (x is the latest version release number).
2. Follow the steps in the Installation Wizard menu and click Finish to close the Installation Wizard window. A new Icon will appear on your desktop:
3. Double click on the icon to start the MR3.10 software.
 - The first screen will prompt an Activation dialog box.



Note: the MR3.10 software platform can be started 30 times in “Demonstration Mode” without an Activation code. In Demonstration Mode, users will have access to all modules and all functions. Once MR3.10 is activated, only purchased modules will be functional.

To activate enter your license ID, press **Activate** and again press **Activate by Internet**. If no internet connection is available please contact your local distributor or Noraxon customer support at support@noraxon.com.



SOFTWARE

myoVIDEO™ MODULE

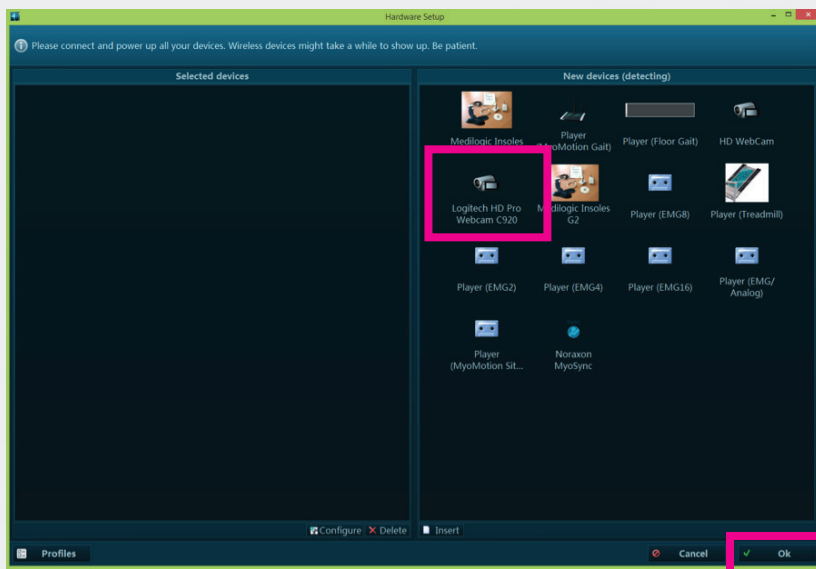
Hardware Setup

Before the MR3.10 software can take and store measurements, you must configure the installed software through the Hardware and a Software setup menu. Follow these steps:

1. Connect all your measurement devices to the PC by using a USB cable. Power them on.
2. Click on the **Hardware Setup button** located in the Right Tool bar:

The Hardware menu is split into two sections:

- Selected devices (left screen)
- New devices (detecting)



Select the Hardware System or Device you plan to use (for this example, the **Logitech HD Pro Webcam c920** is selected).

Each Device has a specific **Device Configuration** menu which is detailed below. Typically, the configuration is preset to settings suitable or required for normal recording. Experienced Users may choose to fine tune their configuration and hardware settings.

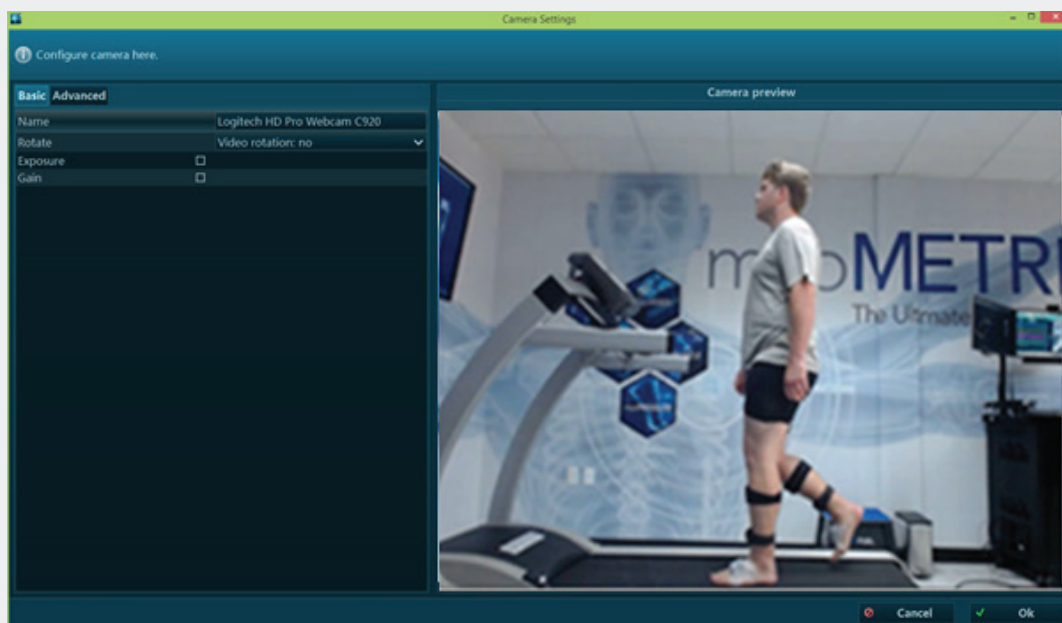
When finished with the Insert Device routine, go back to the Home Screen by clicking **OK**.



Camera Device Configuration Settings

From the hardware set-up menu, you can configure the camera settings to perform in any light conditions. There are both basic and advanced options.

Basic settings:



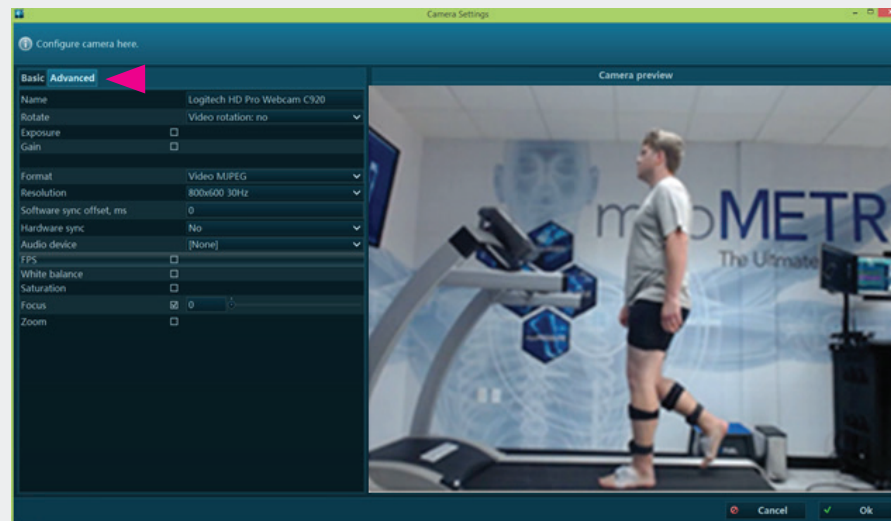
Name	The camera name can be changed to anything you wish.
Rotate	If the camera position is rotated from landscape to portrait orientation, the video can be rotated clockwise or counter clock wise to match.
Exposure	The exposure (shutter time) needs to be set to lower values when auto tracking of markers are used (see below).
Gain	This setting increases or decreases the overall light sensitivity.



SOFTWARE myoVIDEO™ MODULE

Camera Device Configuration Advanced Settings:

The Advanced tab expands the setup and allows for more detailed adjustments.



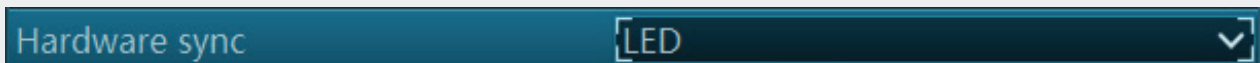
Format	The video compression format can be selected here. We recommend standard Video MJPEG.
Resolution	The screen resolution can be changed in any other format between VGA and full HD. It is recommended to go with a good compromise between resolution vs file size
Software Sync	This offset correction switch may be needed in case there is a video delay between cameras and associated devices like EMG. Typically 312 to 156 ms for 1500 and 3000 Hz, respectively.
Hardware Sync	Hardware sync should be turned on when using multiple camera or multi-device setups. It requires the myoSYNC and Video Sync Light systems.

Audio Device	For Audio recording within video recording select a microphone, usually the camera build-in mic.
FPS	The Frames Per Second switch can be used to force the maximum frame rate. This option can only be used for certain camera types like the Logitech c920 or DV video camcorders.
White balance	Corrects the color cast, so that objects which appear white in person are rendered white in the video.
Saturation	Adjusts intensity of color in the video.
Focus	The default automatic focus can be set to manual values. Auto focus should be turned off once focus is established.
Zoom	This function allows for a digital zoom of the selected video picture. Zoom is software based and only crops original frame to create the effect of zoom.

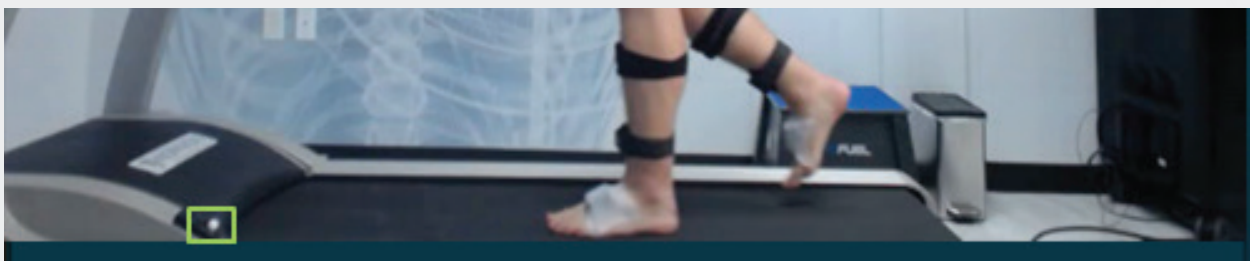


Hardware Sync for video – LED Video Sync Light

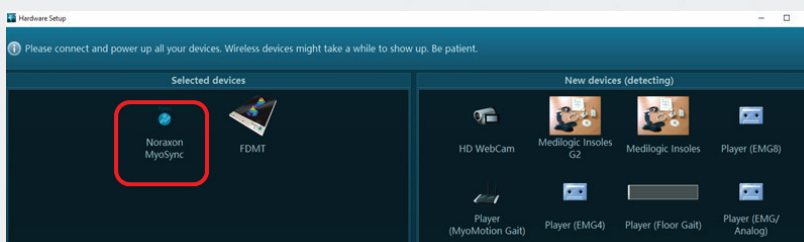
myoVIDEO supports Noraxon's myoSYNC master sync concept needed to synchronize hardware components within multi-device setups. The Video cameras are synchronized via LED Video Sync Light.



When selected, a small green calibration square is visible in the video and needs to be moved over the LED light globe of the myoSYNC system.



You can move the square around and also change its size. It is recommended to position the square so that it fully surrounds the light globe plus some background as shown above. If syncing, make sure that myoSYNC hardware is also selected in the hardware profile section "Selected Devices"



The software is now ready to use the devices for your measurements. At any time you can repeat or modify your device selection by going back to the hardware setup menu.



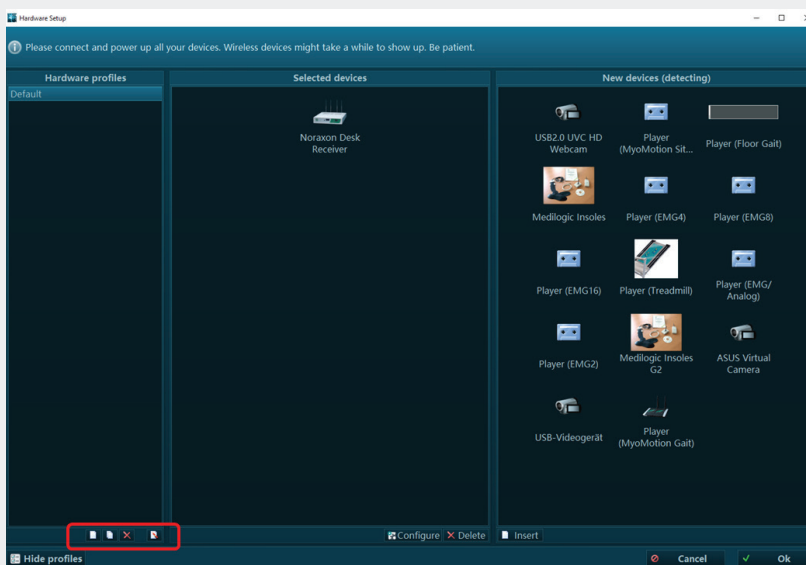
SOFTWARE myoVIDEO™ MODULE

Hardware Profiles

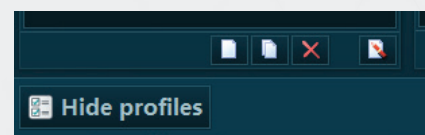
It is possible to save various hardware profiles. This allows the user to have specific hardware setups and device configurations saved. This is especially useful if more EMG and biomechanical sensors are combined in certain constellations or special multi-device setups.

To create Hardware Profiles click on the Profiles button in lower left corner of **Hardware setup screen**.

A new column **Hardware profiles** will appear:



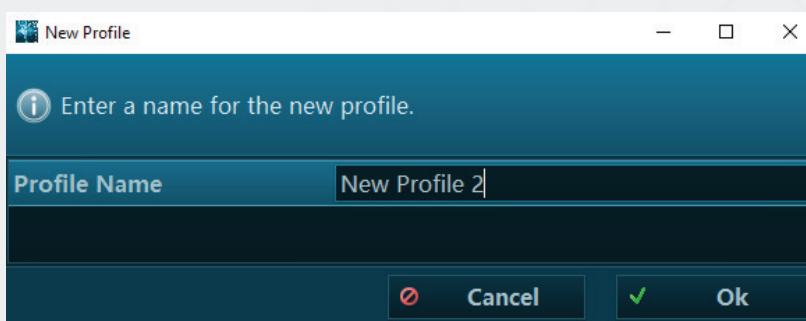
Below the list section four buttons will be presented:



Functions from left to right button:

- Create a new item (Profile)
- Copy a selected item (Profile)
- Delete marked item(s)
- Rename marked item

When the new item button is pressed a sub dialog is presented:

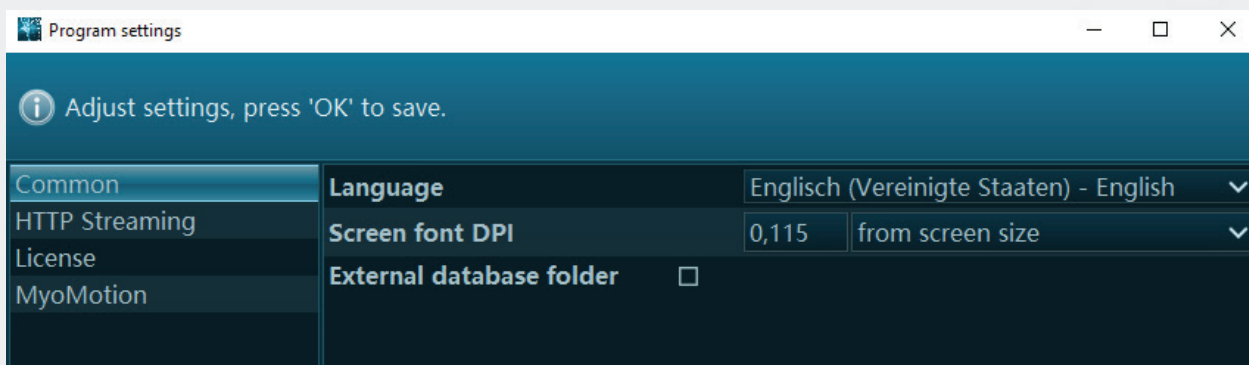
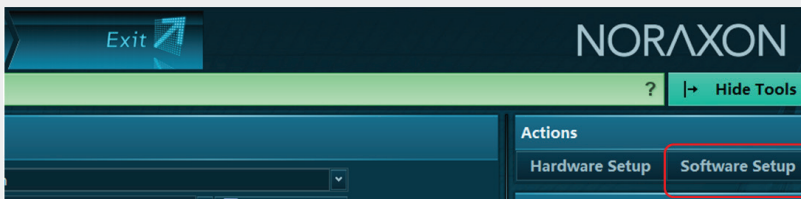


Enter a Profile Name and confirm it with OK.



Software Setup

In the Software setup you can access general software settings as well as some module specific functions:



Language allows you to change the language. The default language is the language of your installed Windows Operating system. **There are four languages currently supported by MR3.10: English, German, Chinese, and Japanese.**

Screen font DPI allows you to change the font dots per inch (DPI). 3 options are available:

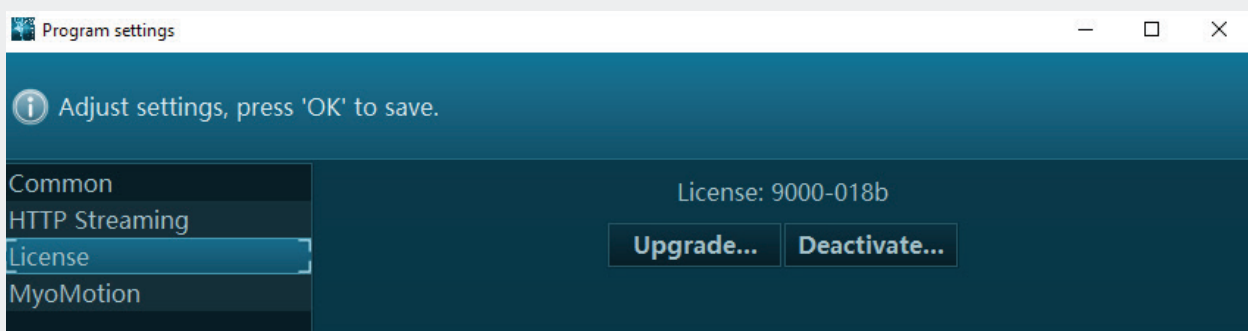
From screen size	Recommended setting. The resolution is scaled in proportion to screen size and auto scales if MR3.10 is moved to a window or if the screen size temporarily changes (i.e. when connected to a lower resolution LCD screen projector).
Fixed	This option allows you to manually select a font resolution in DPI.
From System	This option checks the general font size of operating systems and will also use it for MR3.10.



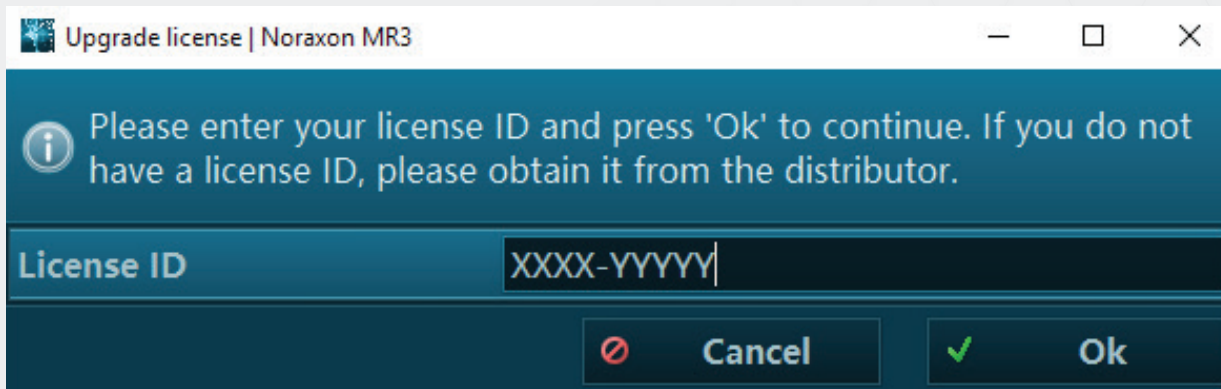
SOFTWARE myoVIDEO™ MODULE

Software Licensing

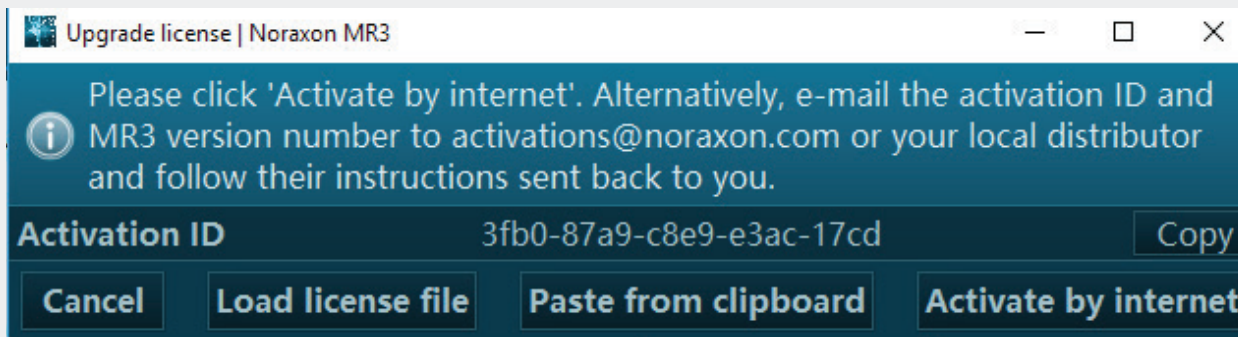
The myoRESEARCH Software Platform and each purchased module within it is protected by a license agreement. If you wish to upgrade your existing license with a new module (e.g. if a myoMUSCLE-only license needs to be upgraded to also include the myoVIDEO module), click **Upgrade** and follow the on screen instructions.



Your license ID will be pre-filled by the initial activation when installing the software. If you need to change it, enter your new license and hit "ok."



Click on OK to continue.



Several options are available now to activate your software.

The easiest way is to connect the PC to internet and use **Activate by internet** option. Alternatively, if you are unable to activate by internet, you may request activation via e-mail by contacting support@noraxon.com and providing them with you activation ID. They will either provide you with a text file or a large activation code. If you receive an activation code, copy it to your clipboard and select **Paste from clipboard** to load it into MR3.10. If you received an activation file, select **Load activation file** and choose the file provided to you.

MyoMOTION

This section is only operational for the MyoMotion 3D inertial sensor system. Ignore it in case of using EMG only.

NOTE: All 3 of the following functions are meant to be used by inertial sensor specialists only! They require a deeper knowledge of inertial sensor technology and kinematic application techniques. Please contact Noraxon support before using these features.



Note: the latter two angles are heavily influenced by sensor fixation techniques and temporary soft tissue motions with a given activity.

Magnetometer control	when checked, the right tool bar menu of the measurement screen will receive a new button: Magnetometer On/Off. It allows you to manually control the magnetometers of all inertial sensors.
Magnetometer table	when checked, a table will be shown in right tool bar of myoMOTION measurement screen. These data show the magnetometer vector magnitude and dip angle with their delta values related to the given overall weighted mean value.
Secondary knee angle	this option allows you to switch the knee joint from 1D (Flexion – Extension) when unchecked, to 3D (plus rotation and varus/valgus) when checked.



SOFTWARE myoVIDEO™ MODULE

Section 3: Software Navigation Overview

The Main Navigation Bar

On top of the software screen there is a software **navigation bar** that visualizes the work flow of a typical recording from the Home screen (start) to Report (analysis):

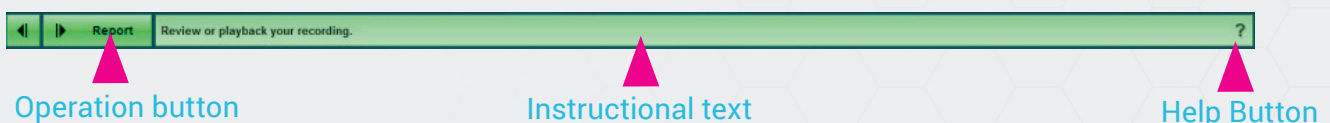


The tab/menu you are currently operating in is highlighted with an orange color and bright background. This navigation bar allows you to directly “jump” into a certain menu if needed.

NOTE: Some menus can only be accessed from the previous one in work flow, i.e. a record can only be viewed (Viewer Tab) if a record was selected in the previous Database Tab.

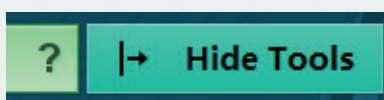
Main Operation and Instruction Bar

Indicated by a green color, this bar appears at the top of the software screen underneath the navigation bar. On the left side of this bar is the main operation button in bright green. MR3.10 is designed so that by pressing this button you automatically operate the next logical step in the work flow. Please read the short instructional text to the right of the operation button to learn which steps or options are available or necessary to continue to the next step.



The question mark “?” to the left of the tool bar is the **Help** button. When this button is pressed, a pop-up dialogue box will appear with information about the currently displayed tab in the software.

Tool Bar

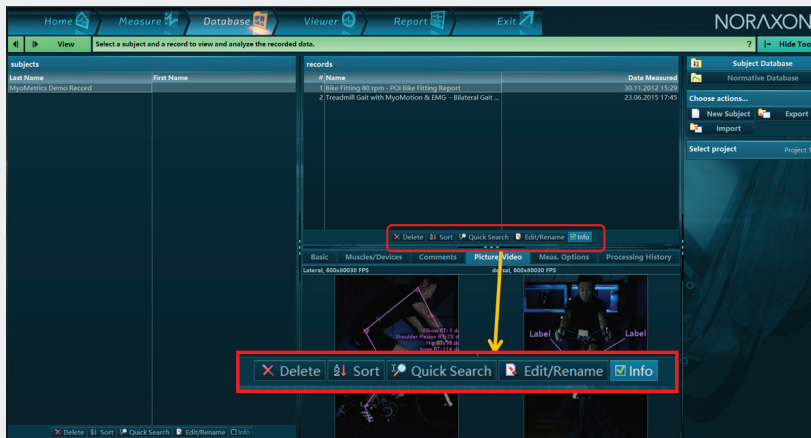


MR3.10 offers a set of optional tools to adjust or fine tune certain selections, operate menu specific options, or apply optional processing steps to your records. At any time the Tool Bar (located on the right side of the screen) can be opened or closed with the **Hide Tools** or **Show Tools** button on the right side of the green instruction bar.



Local Menu Element Controls

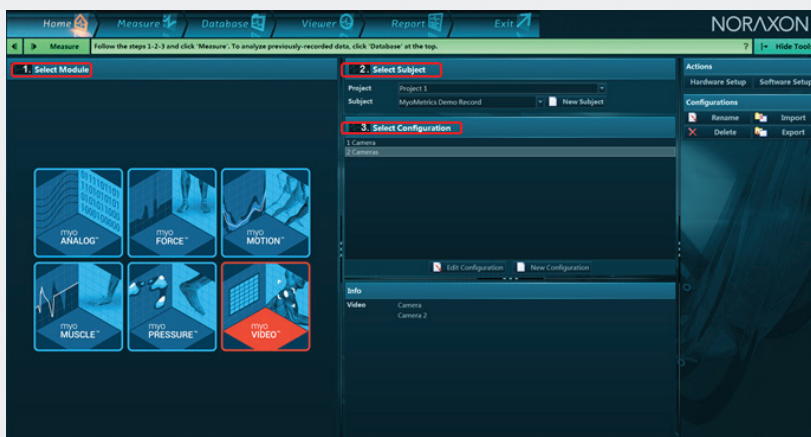
Each menu consists of a set of menu elements, which are equipped with a set of local control tools. You can use these local tools to perform element specific selections and operations as shown for the Database Menu:



Section 4: Home Tab

Introduction

The Home screen menu consists of 3 sub steps that allow you to select a measurement module and select or create a subject and measurement configuration. To do this, simply perform steps 1 through 3 on the Home screen:





SOFTWARE

myoVIDEO™ MODULE

Select a Module

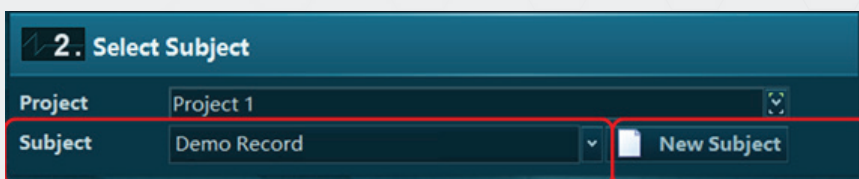
MR3.10 is multi-functional software that can operate numerous sensors and devices. Each of these can function as a stand-alone device or module or be used in combination with each other. Step 1 allows you to select the module you would like to use for the measurement. The Modules include myoMUSCLE, for EMG recording; myoMOTION, for 3D motion analysis; myoPRESSURE, for integrated foot pressure analysis; and myoVIDEO, for 2D motion capture. Modules become available once they are purchased and unlocked by the user.



For this section select myoVIDEO as the measurement module.

Select or Create a Subject

Each record will be saved under the subject. There are an unlimited number of subjects that may be saved to the MR3.10 database. Subjects may be selected from the drop down menu in step 2. Next to the drop down menu is also the button to create a new subject.



Note: Subjects are saved under Projects. A Project may be selected using the down arrow. Projects can be created, renamed, or delete under the Database menu.



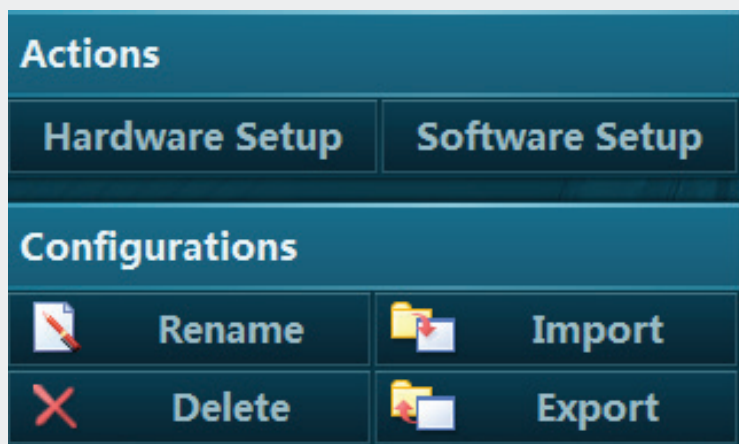
Select or Create a Configuration

Next the user will select, edit, or create a new configuration. Please see the next section for details on Measurement Configurations.

Right Side Tool Bar

Each tab will have different tools available in the tool bar. For the Home tab, the tools are described below.

Actions



This section includes the **Hardware** and the **Software Setup** menus as explained in the previous chapters.

Configurations

Rename	Allows the user to rename the highlighted software configuration.
Delete	This will delete the highlighted configuration.
Import	Use this function to import external configurations to the existing version.
Export	Use this function to export configurations to external locations.



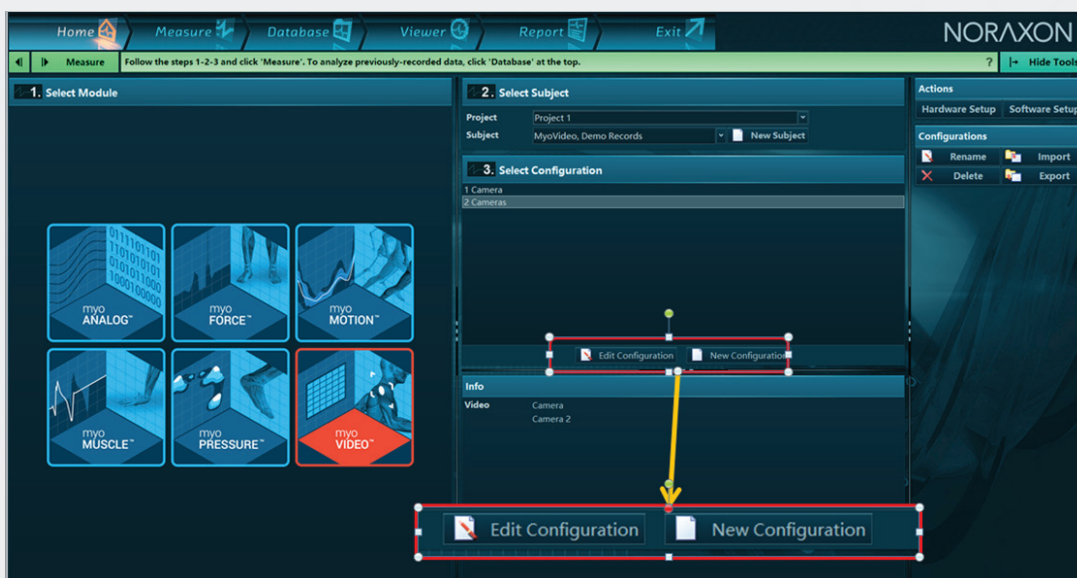
SOFTWARE myoVIDEO™ MODULE

Section 5: Create a New myoVIDEO Measurement Configuration

Introduction

1. Click on the myoVIDEO module icon.
2. Select an existing subject from the database list (use the small pull-down arrow to see full subject list) or create a **New Subject**.
3. Select an existing configuration or click **Edit Configuration** or **New Configuration**.

NOTE: Clicking New Configuration will bring users to the measurement setup menu. New measurement configurations are stored under the selected module under a user defined name and will be listed under the configuration menu.



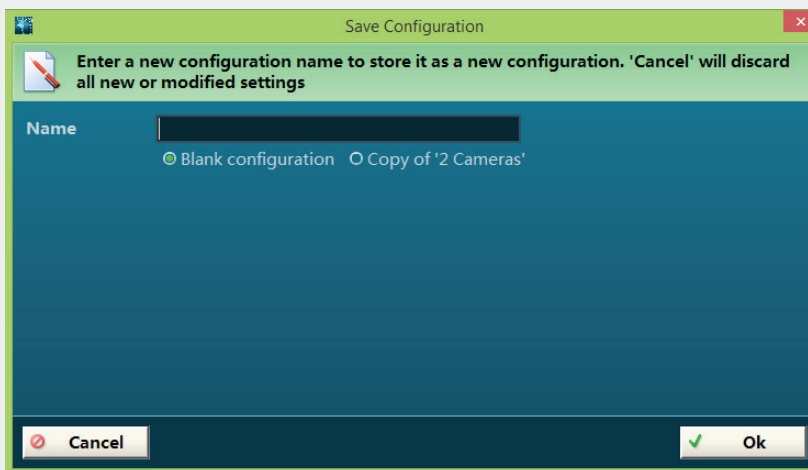
Clicking **Edit Configurations** allows already existing configurations to be modified.

4. Click on the green button once the correct module, subject, and configuration have been chosen.



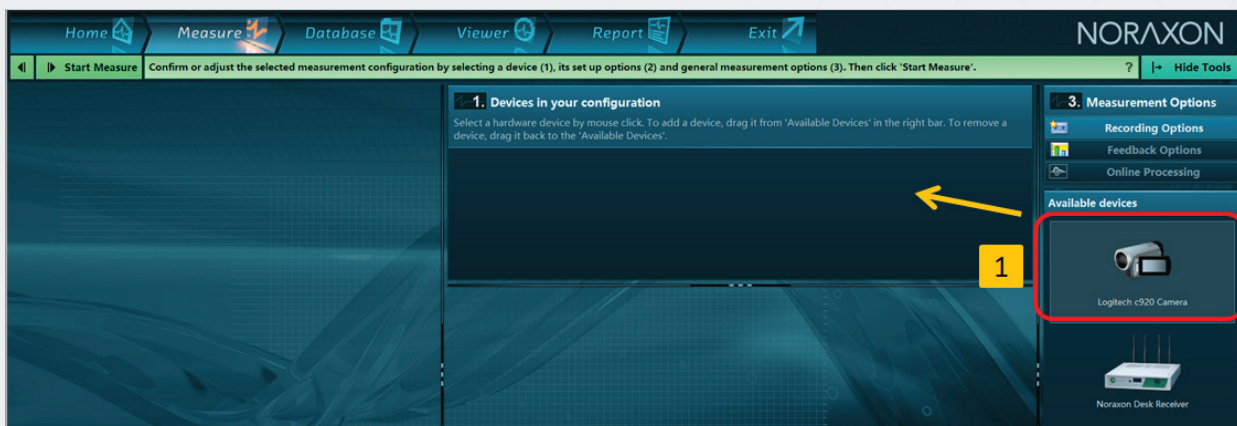
Create or Edit Measurement Configuration

After clicking **New Configuration** a small dialog box will appear prompting you to enter a name for the new measurement configuration:



Enter any suitable name and confirm it with **Ok**.

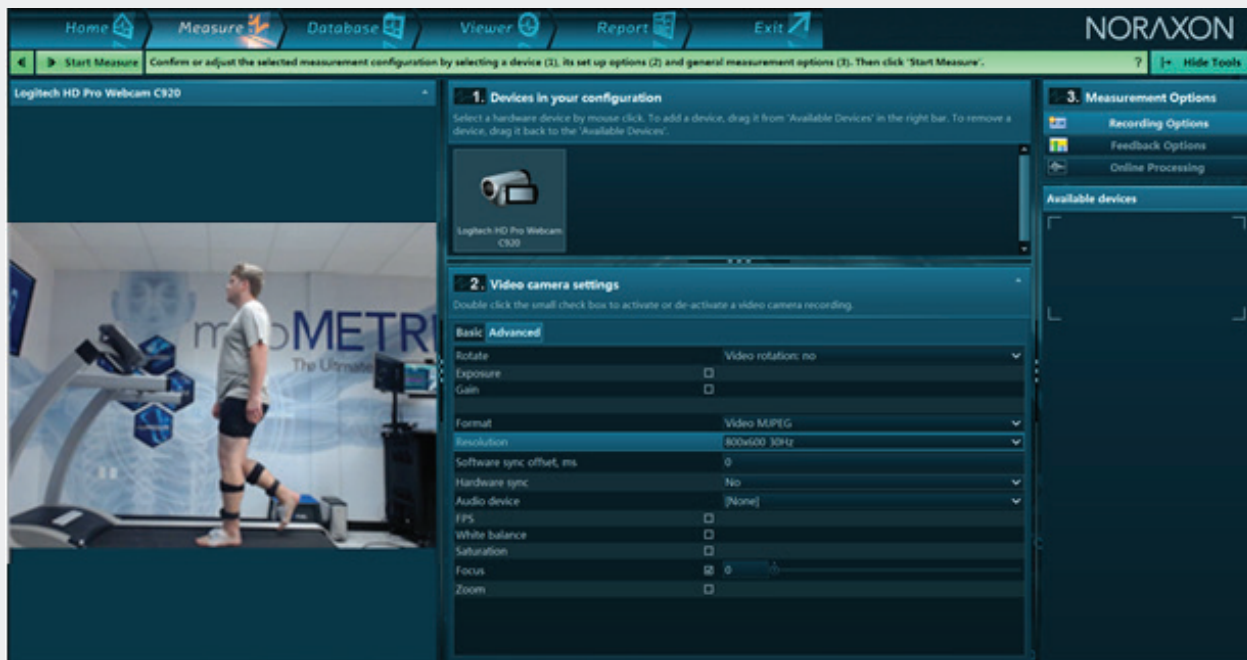
The measurement setup screen will appear:



All measurement/recording devices that were inserted in the initial **Hardware Setup** menu are listed on the right hand side in **Available Devices**. Click on the camera icon (Logitech) and mouse drag it to the section **1. Devices in your configuration**. When done, the camera setup screen already introduced in the hardware setup menu will appear.

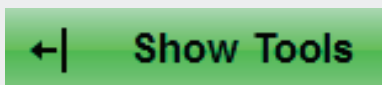


SOFTWARE myoVIDEO™ MODULE

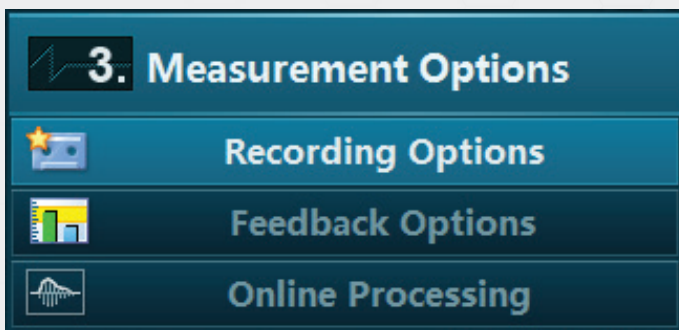


All setting done in the hardware setup menu are taken over here but can be adjusted if needed. For a detailed introduction of camera settings please refer to the hardware setup menu above.

Tool Bar Functions



The “Show Tools” button in the green instruction line opens the Tool Bar (on the far right side), which consists of a set of optional measurement recording functions.



These recording tools are of minor importance for video recordings and meant to be used for multi-device setups, e.g. EMG and Video. Once finished, click on the “Start Measure” button.

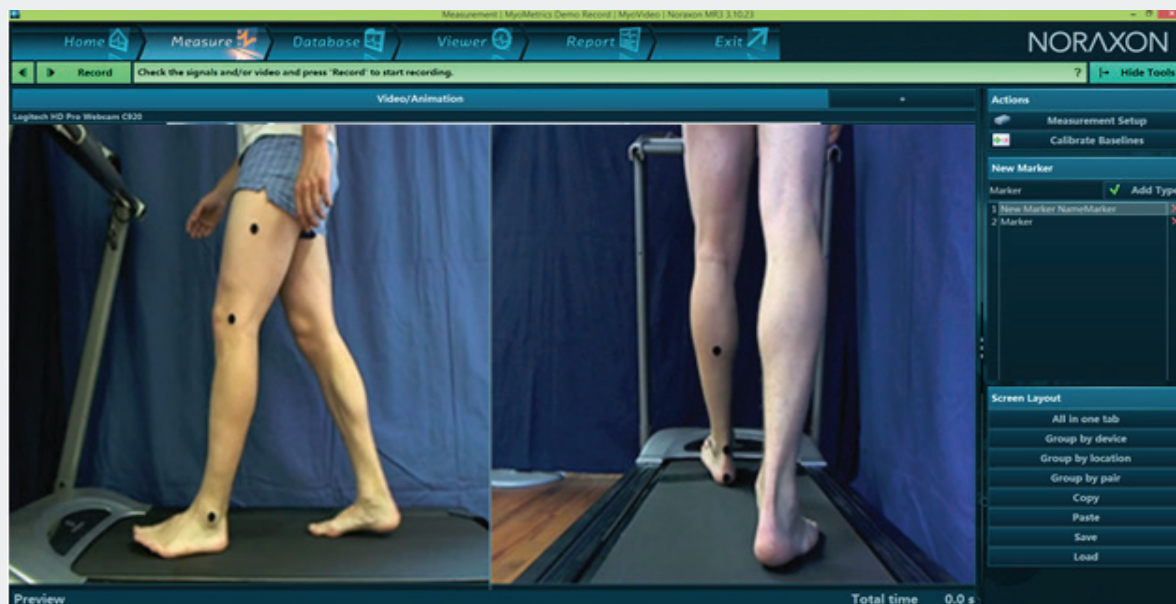




Section 6: Measure Menu

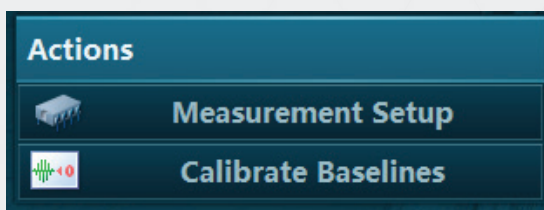
Introduction

Once an existing measurement configuration is selected or a new one is created, press the green Measure button and MR3.10 will continue to the video preview screen:



Show/Hide tools in the green instruction line opens/closes the tool bar with more recording options:

Actions



Measurement Setup	Will bring you back to the measurement setup menu
Calibrate Baselines	For EMG and sensor signals only

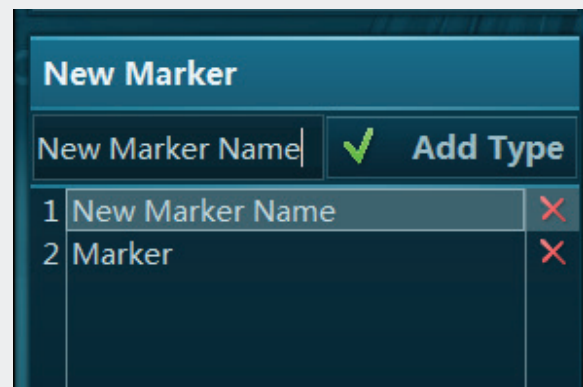


SOFTWARE myoVIDEO™ MODULE

New Markers

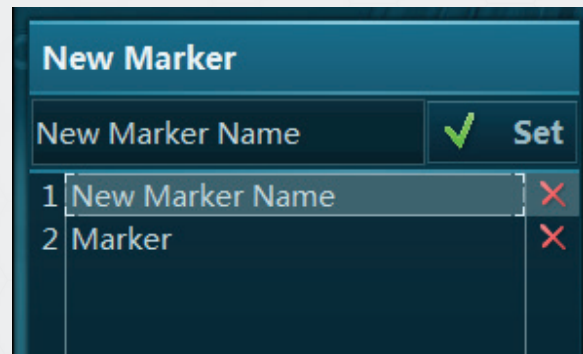
With this menu you can create marker names and manually mark or comment on events in your recording.

The default marker name is **Marker**. If you want to create a new marker name, double click on the Marker name entry box and overwrite the existing one, click the green check mark button, and this new marker name will be inserted to the list of available marker labels:



To use a marker name from the list **double click** on it (don't use the green Add Type button). To delete a marker from the marker label list, click on the red X right side to each marker name.

As soon as you change measurement preview mode to recording mode (by pressing on the green Record button), the Add Type button will change to a **Set** Button:



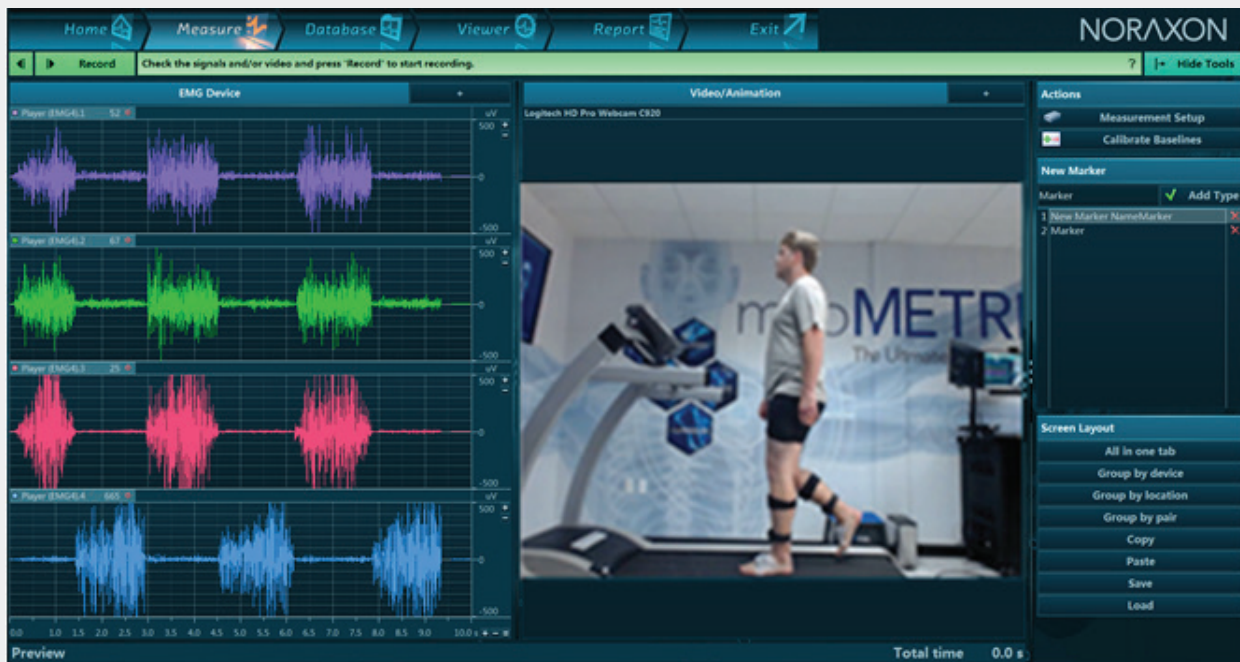
Once recording has started, clicking the **Set** button will place a marker in the record (displayed in the Viewer menu) as well as provide an audio cue. A successfully placed marker is indicated by a short tone. Alternatively, the space bar can be used to place a marker in the recording.



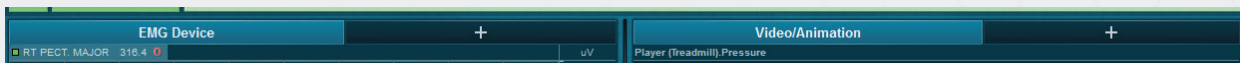
Screen Layouts

For multi-device setups, it may be helpful to use the customizable screen layout system of the Measure menu.

Generally, each device will have its own specific tab:

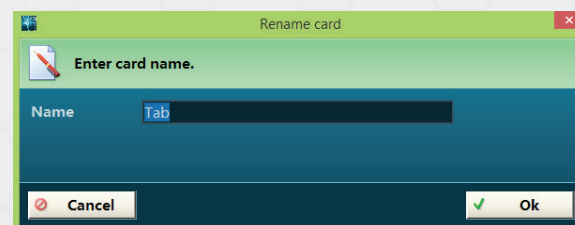


In the above example, pressure data are shown in the **Video/Animation** tab while EMG from the myoMUSCLE Module is shown in the **EMG Device** tab:



Any single signal from any signal tab section can be dragged into the **New User View** tab by using the mouse to click and drag the signal to the '+' tab. For example, the signals from a specific muscle can be moved into a **New User View**.

Once a signal is present, the **New User View** tab will automatically be renamed **Tab**. A right click with the mouse allows the user to rename the view. A **Rename card** dialog box will appear:

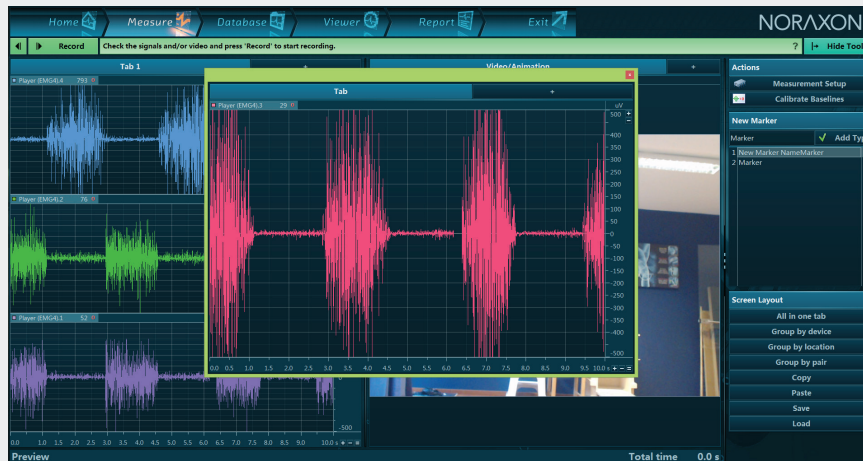




SOFTWARE myoVIDEO™ MODULE

This screen layout system allows the user to create as many signal selections or new user views as needed. A similar system is available for the **Video/Animation** window:

Double clicking on a given signal name moves this signal into a pop-up window:



This and other pop-up signal/animation windows can be resized manually and moved to a second monitor, if one is available.

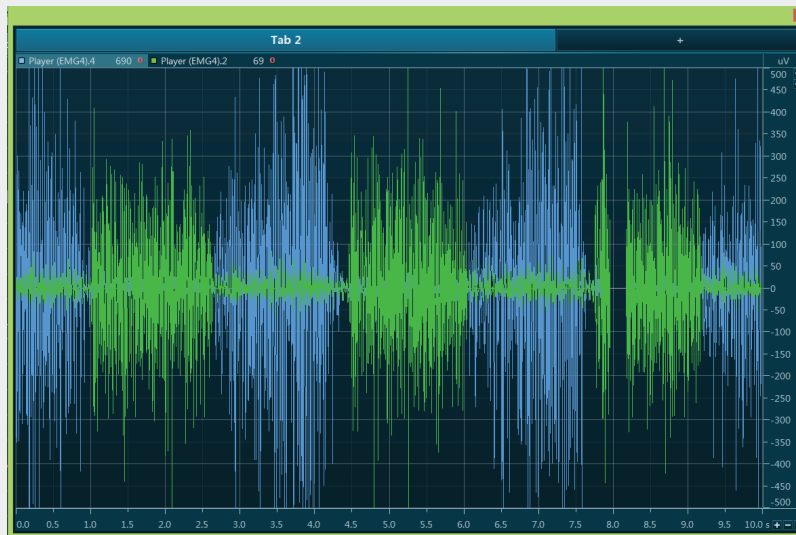
The small red X button in the upper right corner of the window title line will close the pop-up window and move back the signal to its original tab location.

If you hold the CTRL key and double click on a second channel title from the source tab you can insert more channels to the pop-up window. This can also be accomplished by simply clicking and dragging windows into the desired tab:





If you click on a channel name and drag it over another channel, they will be superimposed onto the same graph:



This and other pop-up Signal/Animation windows can be moved to a second monitor, if one is available.

Whenever a certain screen/window layout arrangement is established you can save it in the **Screen Layouts** section of right tool bar

If you want to use a user defined layout double click on its name in this selection list.

Screen Layout
All in one tab
Group by device
Group by location
Group by pair
Copy
Paste
Save
Load

Other options in Screen Layouts are the following:

All in one tab	all signals from one tab will be shown (again) on one shared screen
Group by device	each device and signal category is shown in separated tabs (this is the default)
Delete	will delete a screen layout configuration from the selection box

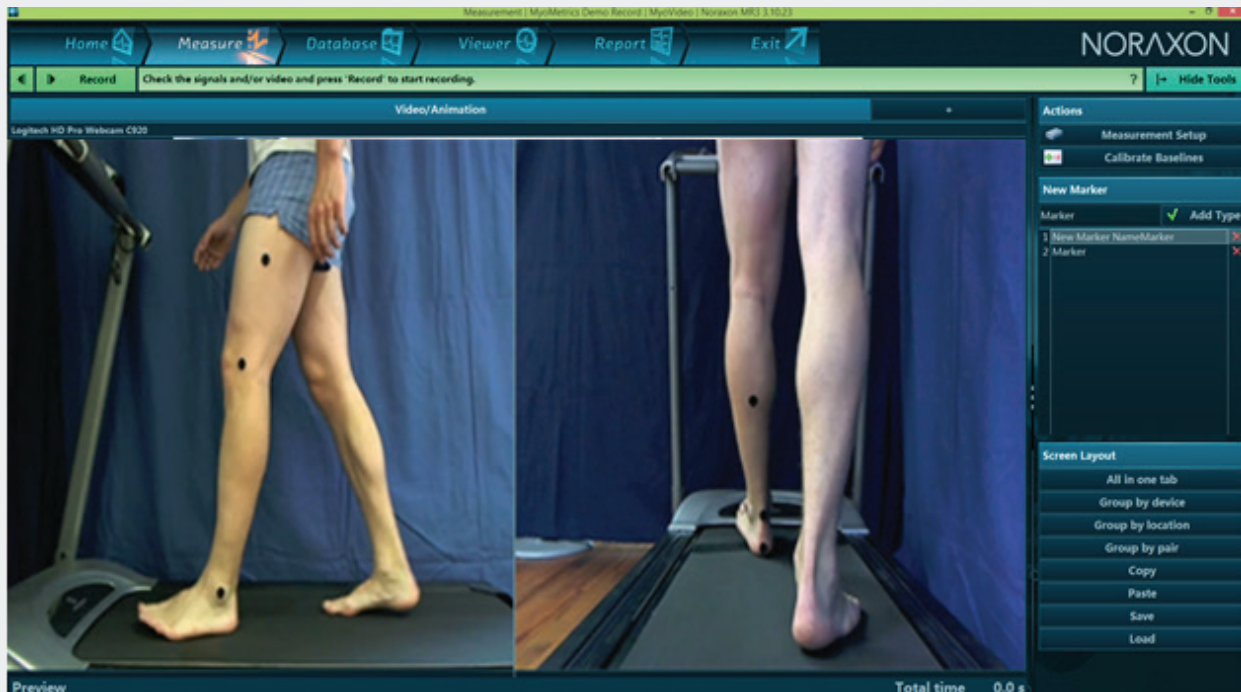
NOTE: The given channel layout used for measurement will later be used in the Viewer menu as well. But all layout and channel arrangement functions are available as well.



SOFTWARE myoVIDEO™ MODULE



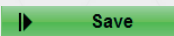
Start a video recording

Video recording can be started with the  **Record** button in the green main operation bar.



A time clock starts running in the lower blue status bar, and the already measured time is indicated on the right side of **Total time**:

Total time 5.3 s

To stop the recording of data press the  **Stop** button. Now you need to decide if you want to repeat this measurement without saving the data (press the  button) or permanently save your data to the patient database. Press the  **Save** button to store the recording to your

database and enter a record name in the **Save Data** box:



Save Data

Please enter name for the new record.

Project

Project 1

Subject

MyoMetrics Demo Record

New Subject

Name

2 Cameras

Discard & measure again

Save & measure again

Save & View

The second line, **Subject**, allows the user to change, create, or confirm the previously selected subject name. The first line **Project** allows you to select another project. After pressing **Ok** the record can be reviewed in the record **Viewer**.

In the lower button line you will find 3 choices to continue:

Discard & measure again	Delete the current recording and goes back to measure.
Save & measure again	Stores the current recording under entered name and goes back to measure. This mode skips the calibration step and allows for continuous recording trials without calibration in between.
Save & View	Stores the current recording and goes back to the Record Viewer.

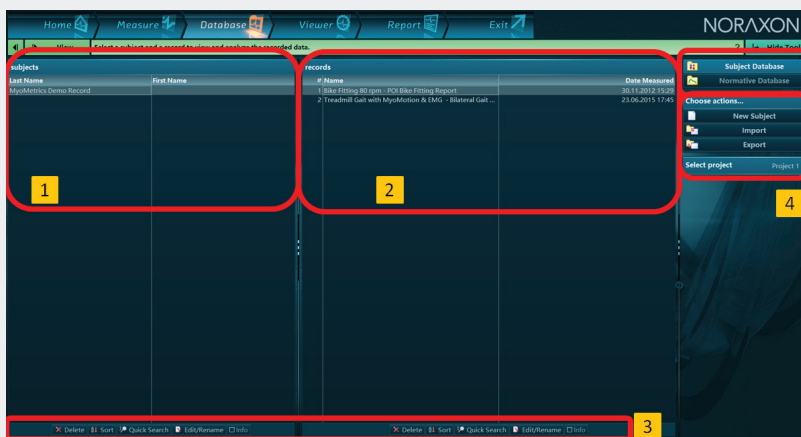


SOFTWARE myoVIDEO™ MODULE

Section 7: Database Tab

Introduction

As indicated by its name the **Database** tab manages all functions around data file management, like selection, editing, exporting and importing.



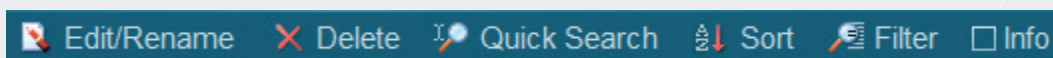
1. Lists Section Subjects
2. Lists Section Records
3. Local List Functions
4. Right Tool Bar Menu

1 & 2 – List sections

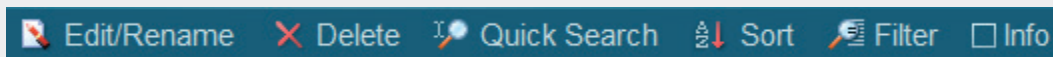
The screen is split into two sections, reflecting the organization of records into **Subjects** (left list section) and **Records** (right list section) stored under a given subject name.

3 – Local List Functions

Below each list you find a set of list functions:



SOFTWARE myoVIDEO™ MODULE



Edit/Rename	Here you can change the subject name and add additional information associated to your subject such as subject properties, comments or pictures
Delete	Here you can delete your subject and all records stored under this subject Note: deleted subject data and records cannot be restored.
Quick Search	If you have a very large database it may be helpful to use a search function to quickly find a certain subject
Sort	This entry allows you to sort your database by first or last name in ascending or descending order
Info	If this button is pressed/box is checked, the subject properties window with Basic info, Subject form, Comments and associated pictures is permanently visible

The info section of subjects contains a set of register cards management associated information around the Basic subject information:

Delete
Sort
Quick Search
Edit/Rename
Info

Basic Info

Subject Form

Comments

Picture

Last Name
First Name
Sex
Date of birth
Weight
Height

MyoPressure-S
Pressure Sole - Demo Records
Male



SOFTWARE myoVIDEO™ MODULE

Double click on any of them to open up a Window mode to view and edit subject properties:

Edit Subject

This menu manages subject demographic data, text comments, and pictures.


Basic Info	Subject Form	Comments	Picture
Last Name First Name Sex Date of birth Weight Height	MyoPressure-S Pressure Sole - Demo Records Male		

Cancel Ok

Basic Info	This tab section contains basic subject information like Name, Sex, Birth date weight and height
Subject Form	This is an expanded list of patient properties and data.
Comments	Here you can enter or edit patient comments. It is possible to use a text clip system and/or paste text from Clipboard
Picture	Here you can enter a subject picture by pasting it from Clipboard or loading a picture file from the Hard disk

SOFTWARE myoVIDEO™ MODULE



A similar set of list functions is available for the records list screen as well. The record **Info**  button shows important record property details:





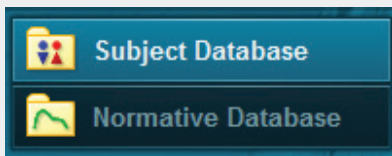
Basic	A summary of basic record properties like file name (editable), size, date, duration etc.
Muscles/Devices	Only for EMG and sensor records, shows a list of selected sensors
Comments	Each record can receive a record specific comment which can be created or reviewed here
Picture/Video	This info tab is very helpful if you have recorded data together with video. The first picture of the video is shown here to help you find and identify a record
Meas. Options	Not activated yet
Processing History	In case any signal processing was applied to your original record, all processing steps are documented here



SOFTWARE myoVIDEO™ MODULE

4 - Right Tool Bar Menu

If you click the  **Show Tools** button on the right side of the green instruction bar, the Database Tool bar will show up. To remove, click .



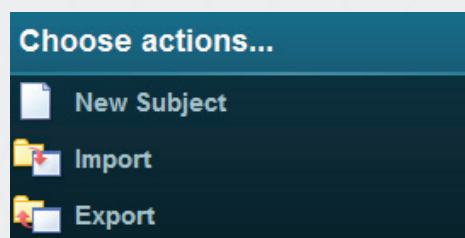
Besides the **Subjects Database** there is another database section called **Normative Database**

It contains all normative data records that were compiled via the “Add to Normative” function within the **Report Menu** (see chapter report).

All database functions described below are also available for normative records.

Note: The normative sample file “Natural floor gait reference curve” is not meant to be used for any medical diagnosis or similar purposes. It only serves as an educational example on how to use or operate normative data.

Choose actions



In the **Choose actions** section you can create a **New Subject** and **Import** or **Export** subjects and records.



New Subject

Here you can create a new subject in your database. When clicked a sub menu similar to the Subject properties / Edit screen opens up:

New Subject

This menu manages subject demographic data, text comments, and pictures.

Basic Info	Subject Form	Comments	Picture
Last Name			
First Name			
Sex	Male		
Date of birth			
Weight			
Height			

Cancel Ok

The minimum information to be entered is the **Last Name**, any other entry is optional. If needed Basic infos, a subject form, comments or picture can be added to the subject information

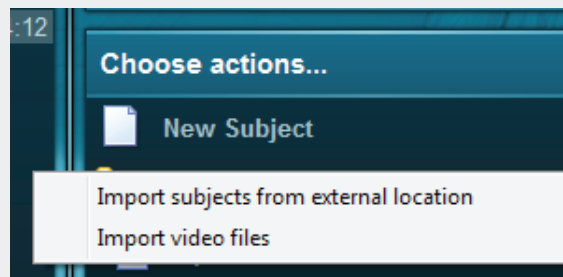


SOFTWARE

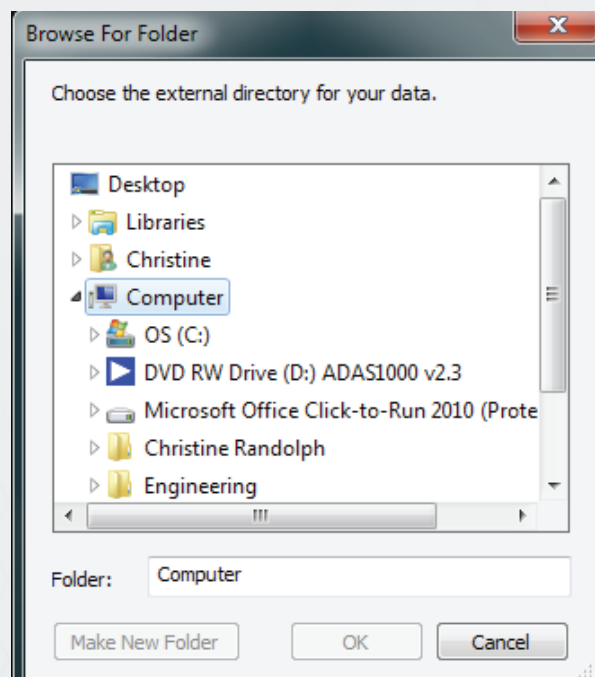
myoVIDEO™ MODULE

Import Records

You can import records from external locations such as a previous version on your PC, backup data from external hard drives or network folders:

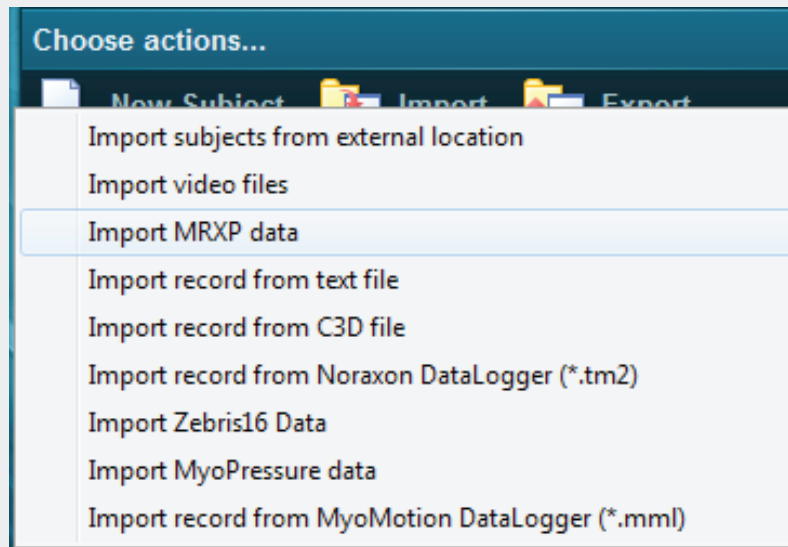


To import myoMUSCLE EMG or multi-device records select **Import**, then **Import subjects from external location** and set a path to the external directory (e.g. a net drive or external hard disk directory).





Other import options include:



Import video file	Externally recorded video files in avi format can be imported
Import MRXP data	Import of records from the former MyoResearch XP version
Import record from text file	Imports Ascii or txt formatted records. Attention, only MR3.10s ascii data or similar arrangements are supported (see export file to ascii)
Import of C3D file	C3D format used by most Motion capture companies is supported and allows for import of kinematic, force and EMG data recorded there
Import record from Noraxon Datalogger (*.tm2)	Data logged files from the Telemetry G2 and Telemetry DTS belt receiver can be imported here
Import Zebris16 Data	Imports pressure data recorded with Zebris old 16Bit systems (FDM, FDMT)
Import MyoPressure data	Data recorded with the MyoPressure Software from Zebris can be imported here
Import record from MyoMotion Datalogger (*.mml)	Imports data recorded with MyoMotion inertial sensor data logger



SOFTWARE

myoVIDEO™ MODULE

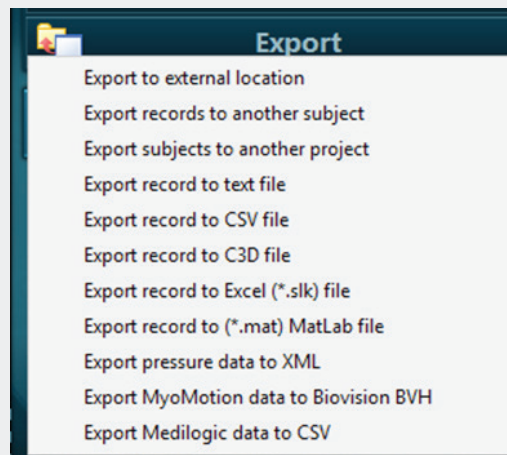
Export Records

You can export MR3.10 records in their native format to: an **External location** on your PC or to another Subject or Project within your running version:

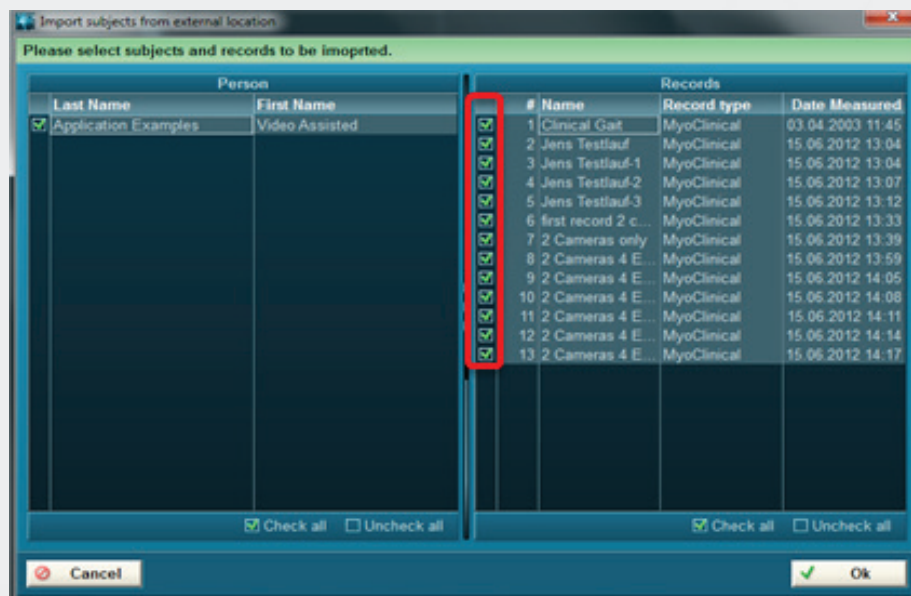
Export to external location	Exports your chosen subject from MR3.10 to another location outside of MR3.10
Export records to another subject	Allows you to copy a record from one subject directory to another inside your myoMUSCLE version
Export subjects to another project	Allows you to copy a record from one project directory to another project directory inside your MR3.10 version

Other supported export formats are listed in this table:

Export record to text file	Numerical Data (signals) can be exported to ascii compatible format
Export to CSV file	Numerical data can be exported to Excel compatible CSV format
Export record to C3D file	Numerical Data (signals) can be exported to C3D format
Export record to Excel (.slk) file	Numerical Data (signals) can be exported to excel compatible SLK format
Export record to MatLab file	Numerical Data (signals) can be exported to Matlab format
Export pressure data to XML	Export of pressure data to XML (access to all single cell data of each step)
Export MyoMotion data to Biovision BHV	Export of MyoMotion data (full body required) to BHV
Export Medilogic data to CSV	Export of Medilogic foot print data to CSV



The following menu dialog allows you to select subjects and records:



Just use the check or uncheck controls to select the desired subjects and records shown in the list and click .



SOFTWARE myoVIDEO™ MODULE

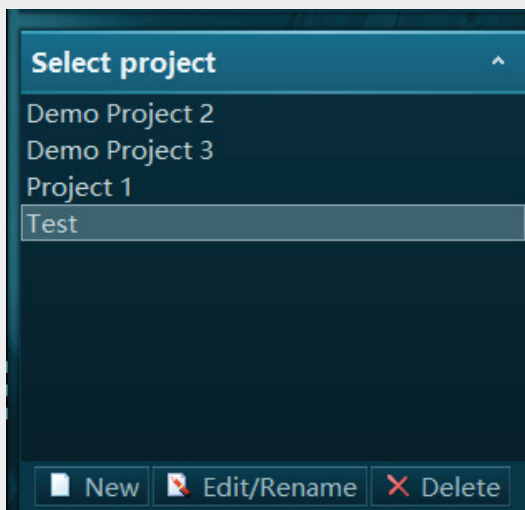
Attention: Don't use the Windows Explorer to move or send MR3 data files directly from their data directory on hard disk: you will lose important index files and data may become unreadable. To copy data always use the **Export/to external location** function of the database/right tool bar!

Select Projects

MR3.10's database system is organized in hierarchy levels:

- Projects
- Subjects
- Records

Projects is the highest database level. Projects can include an unlimited number of Subjects, which can include an unlimited number of records.



The drop down arrow to the right of the project name allows you to switch to another project. If you want to create a new project, or rename or delete an existing project, click on **More**.

New	creates a new project
Edit/Rename	renames a project
Delete	deletes all project data, subjects inside a project with all recordings

Attention: Carefully use the Delete function. Projects that are deleted cannot be restored



Section 8: Viewer Tab



Introduction

Each successfully stored recording will automatically be loaded to the record **Viewer**. Data will be presented in the same channel layout scheme that was used for recording. The main goal of the Viewer menu is to inspect the quality and details of a record, apply signal processing, place markers (for analysis period definition) and prepare the record for further analysis (=> Report).

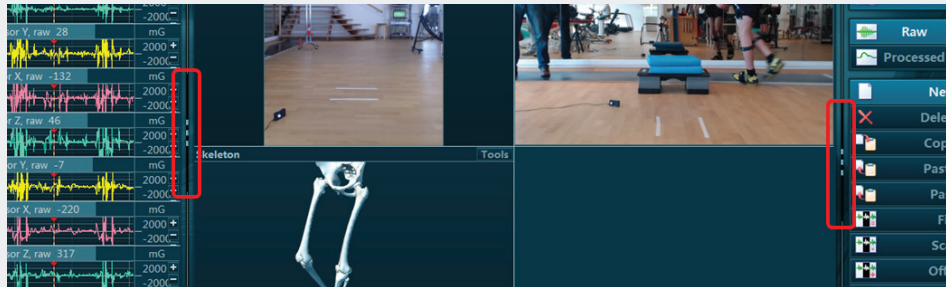
Dependent on the multi-device setup used in measurement the record viewer will show curves and elements from all selected modules:



A very important display tool of the Viewer menu are the splitter lines that separate the screens sections within the viewer screen:

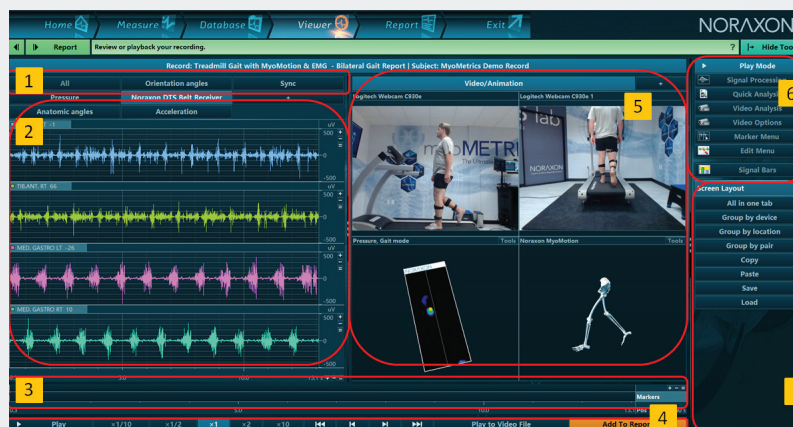


SOFTWARE myoVIDEO™ MODULE



These lines can be drag with left pressed mouse button and allow to resize the given screen element.

As an overview the following menu elements are potentially available



Channels and view functions:

1. Register Tab system to separate/sort devices
2. Channel and View Functions
3. Time line
4. Video control/replay and POI Analysis
5. Video and animation windows
6. Tool bar menus
7. Screen layout section

Note: In the example above a raw EMG record is shown. With multi-device setups the record **Viewer** can show signals from all measured devices plus video, pressure and motion animation avatars, dependent on which Device tab (1) is selected. The addition of multi-device modules also adds functions to the right side tool bar, e.g. myoVIDEO based video recording adds two more sub menus; Video analysis and Video Options.



1) Device register card system

By default the measurement signals of all connected devices are grouped by the given device. Click on the desired Device tab to see the measurement signals. Per mouse drag to the channel name or tab name signals/tabs can be moved into other tabs or new tabs.

The Viewer menu presents all recorded data exactly in the same screen layout arrangements as they were measured. Because of the multi-device nature of MR3.10, numerous signal, animation video and biofeedback screens can occur which require a sophisticated screen element management. As described in the measurement menu/section screen layouts, in the case of multi-device setups each device will be shown in its own tab section.

The following channel display, zoom and overlay functions are available:

- Local X and Y axis +/-, = buttons allow for zooming operations of amplitude and time
 - Double click on channel name maximizes a channel to a pop-up window
 - CTRL – Double click adds a second or third (...) channel to the pop-up window
 - Pop-Up windows can be moved to a second monitor
 - Left mouse drag of the channel name to another signal creates an overlay of both signals
 - Any amount of signals can be mouse dragged to a new tab
 - Any given screen layout arrangement can be stored as a configuration available in the right tool bar
- (See the Measurement chapter for more detailed descriptions and examples)

Mouse based channel view functions:

Left mouse button

Double click on signal screen places a marker

Click and hold left mouse button marks an area (for zooming, for period definition in report)

While dragging an interval with left mouse button, three small fly-out windows will appear indicating the time point of interval begin and end (lower values) and duration (upper value):





SOFTWARE

myoVIDEO™ MODULE

Middle mouse wheel & button:

If a certain signal portion is zoomed in time (click on the plus sign in time line or turn mouse wheel) and middle mouse wheel button is pressed, mouse movement to left and right pans the signal through time

If middle mouse (wheel) button and Shift key is pressed, the mouse movement up / down pans the amplitude/zeroline position.

If mouse wheel is scrolled up the signals are zoom out, if wheel is scrolled down the signal is zoomed in.

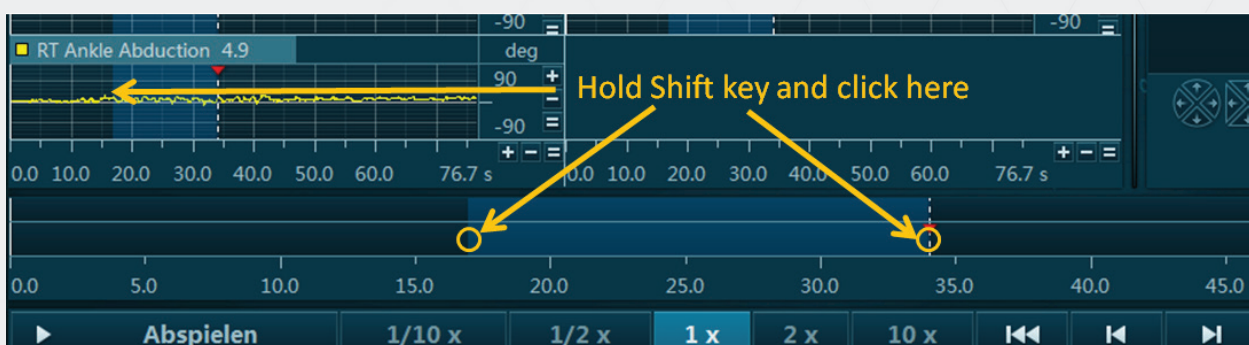
If mouse wheel is turned with pressed CTRL button is pressed, the amplitude of the channel below mouse arrow is zoomed in or out

Right mouse button

If right mouse button is pressed, context sensitive commands are available (in development). At the moment the function **Delete markers** is supported.

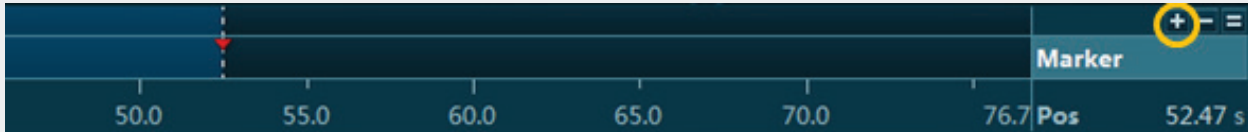
3) Time Line

The time line indicates the cursor and marker time positions, marker labels and the location of the analysis periods (see the Report chapter for details). The time line can be used to mark areas within the record and zoom them up with the plus button on right side of time line:

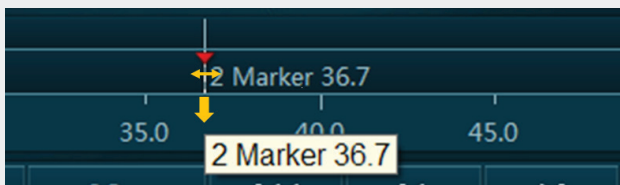




The marked area is high-lighted (colored in lighter blue color) both in time line and in the signal screen. Alternatively to time line the area can be marked directly in the signal screen. The plus/minus and equal sign screen icons can be used to zoom in and out the period selection and to show the full recording:

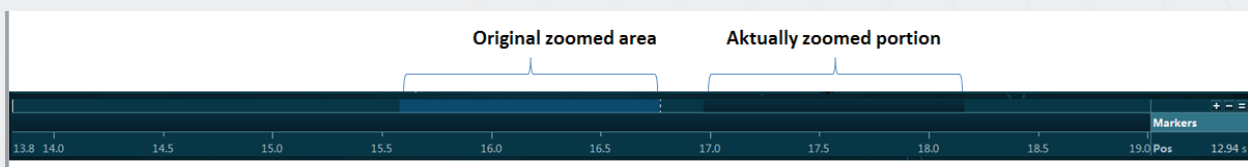


A left mouse double click places a marker to the record. In case a marker is placed its position is shown both in the signal screen and the time line. With pressed left mouse button you can move marker to the left or right side or drag it down to the next line to delete it:



The upper area of the time line can be used to step (view) through a recording with a predefined interval length. To do so, first mouse mark an interval in the timeline or signal screen, then zoom in by clicking the plus zoom but on right side.

The upper area of the time line can be used to step (view) through a recording with a predefined interval length. To do so, first mouse mark an interval in the timeline or signal screen, then zoom in by clicking the plus zoom but on right side.



Now you can use the page up/down buttons to scroll through the measurement with the selected interval length or drag it with pressed left mouse button.



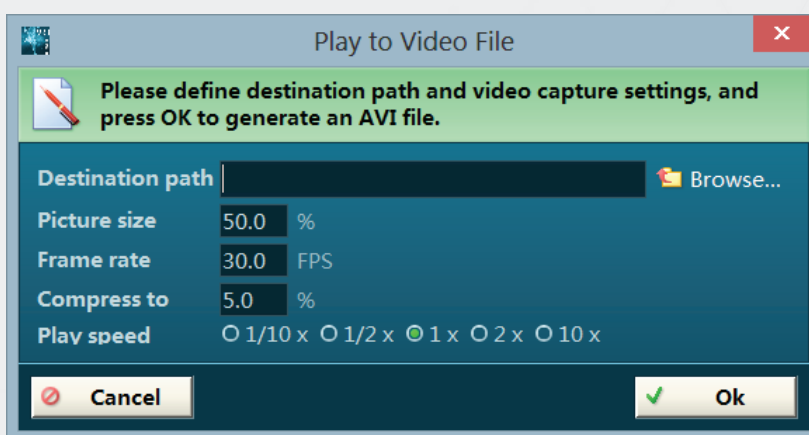
SOFTWARE myoVIDEO™ MODULE

4) Video control/replay and POI Analysis

At any time you can replay a video and all available animations (like skeletal avatar of MyoMotion or pressure Isobards of MyoPressure) by using the video controls:



Play	Plays all visible videos on the screen at the same time
1/10x, 1/2x, 1x, 2x, 10x	Control the play speed.
Arrows	Their function follows standard video control functions: Go to the beginning of the video clip, go one picture back, one picture forward or go to the end of the video clip
Play to Video File	This is MR3.10s video/screen recorder function and allows you to record any video, screen animation, time synchronized measurement signals, etc. (e.g. EMG, auto-tracked angles) to an .avi file. A small menu dialog allows you to define file destination directory, video size, frame rate and compression factor



The screen recorder function Play to video requires to set a path (**Browse**), define the **Picture size** (selected 100% for best quality), **Frame rate** (recommend is 30 Hz), **Compression ratio** (Compress to – recommended is 5%) and **Play speed**.

Attention: Do not operate any other action while the screen recorder is running!

SOFTWARE myoVIDEO™ MODULE



Recording intervals can be limited to a blue highlighted area in the time line (see below). To select a section within the video time line, click on the beginning of the desired recording interval, then hold down the shift key and click a second time at the end of the interval. You can also accomplish this by clicking on the beginning of the desired interval and dragging over the timeline until the end of the desired recording interval.



Add to Report

Whenever you want to insert a video picture (with or without angle drawings) to the report, press this button. This **point of interest (POI)** based analysis allows you to watch a video, stop at any point of interest, analyze it (see below) and click **Add to Report** to mark it for the video analysis report. Any POI created by this function receives an **orange** Report marker label in the marker/time line shown below.



SOFTWARE myoVIDEO™ MODULE



The time line shows a seconds-based time scale and a marker label line. MR3.10 operates a intricate system of markers related to biomechanical event triggering, manual marker labeling or POI based ("Add to report") labeling. Any created marker line is shown here and can be used to identify events, motion phases, interesting analysis sections, etc.

5. Video and animation window section

In case of multi-device setups including MyoMotion, MyoPressure data are visualized with 3D animation graphs:



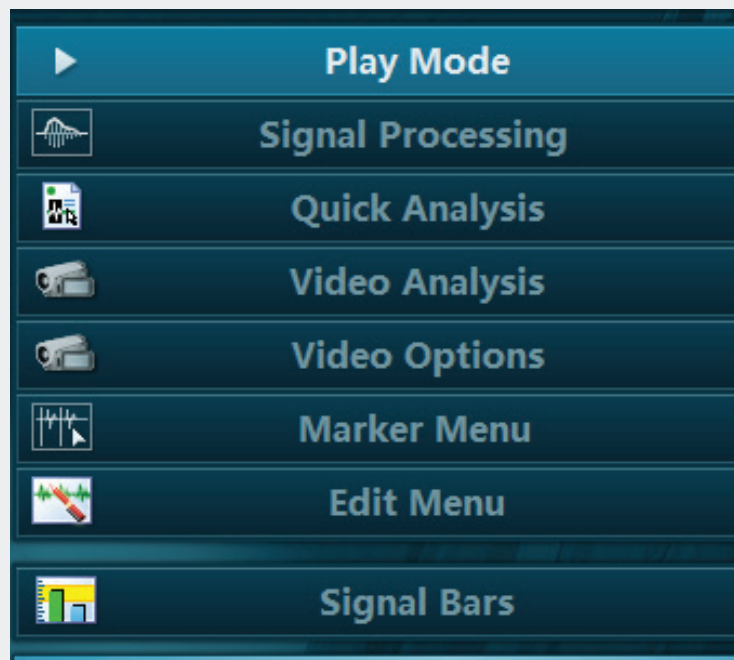
Several view and perspective buttons (left side) are available and already described in the measure menu.

Each of these animation windows has local tools which are described in their own manuals.



4) Right Tool Bar Options

The viewer tool bar offers a set of optional sub menus, by default the Play mode is active. This is the standard mode to visually inspect, zoom, and process your signal. Click on the desired sub menu to activate it and use more sub menu functions.



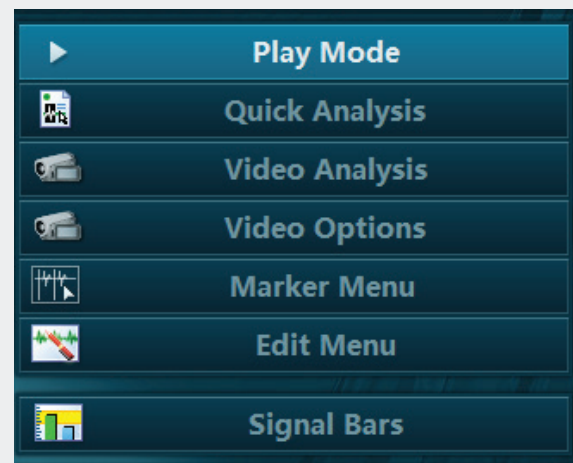
Signal Processing	Only available if myoMUSCLE or myoMOTION module is installed
Quick Analysis	Only available if myoMUSCLE or myoMOTION module is installed
Video Analysis	Described in detail below
Video Options	Described in detail below
Marker Menu	Described below
Edit Menu	Described below
Signal bars	Only available if signals are available, not applicable for video only records



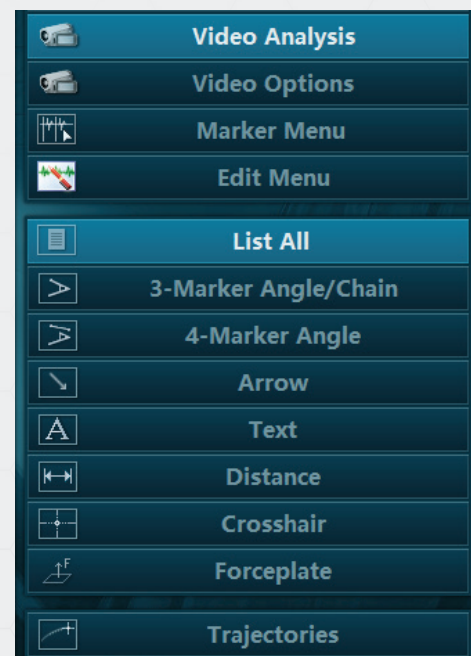
SOFTWARE myoVIDEO™ MODULE

Video Analysis

The Tool bar on the right side of Viewer Tab consists of two major functional tools for video records, which are **Video Analysis** and **Video Options**:



Video Analysis is the main video analysis tool for myoVIDEO and consists of a set of angle and distance drawing tools, a text label function, a distance measurement tool, crosshair function and trajectory analysis based on auto-tracked angles or single markers:



All drawings, except Trajectories, can be used as many times as desired on any video picture position. For example, there might be 4 sets of three marker angles for a total of 12 markers being tracked.



3 Marker Angle/Chain

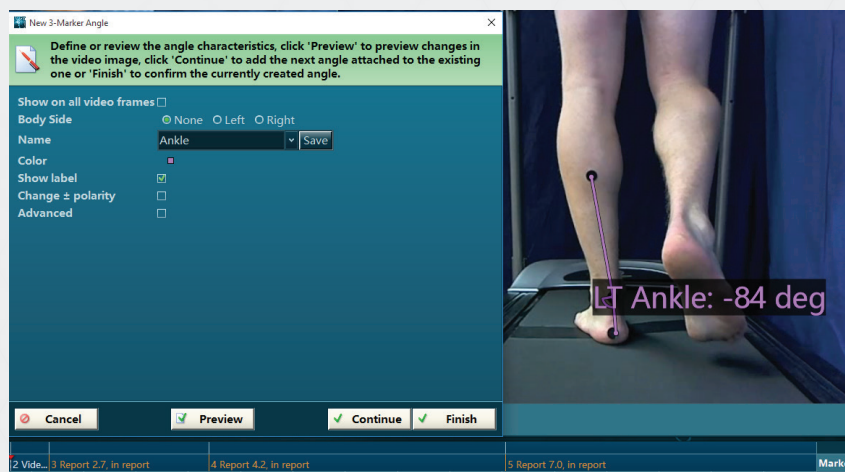
As indicated by the name, this analysis allows you to place three markers to create an angle – typically placed around a joint. Click on the tool and place 3 points with the left mouse button:



To better view a marker or point use the mouse wheel to zoom into the video picture (this only works after you have selected 3 Marker Angle/Chain).

If placed on reflective markers, the 3 Marker Angle/Chain tool can auto-track dynamic changes by as explained in the auto-tracking section.

When completed, an angle property menu pops up and offers a set of helpful options and functions:





SOFTWARE

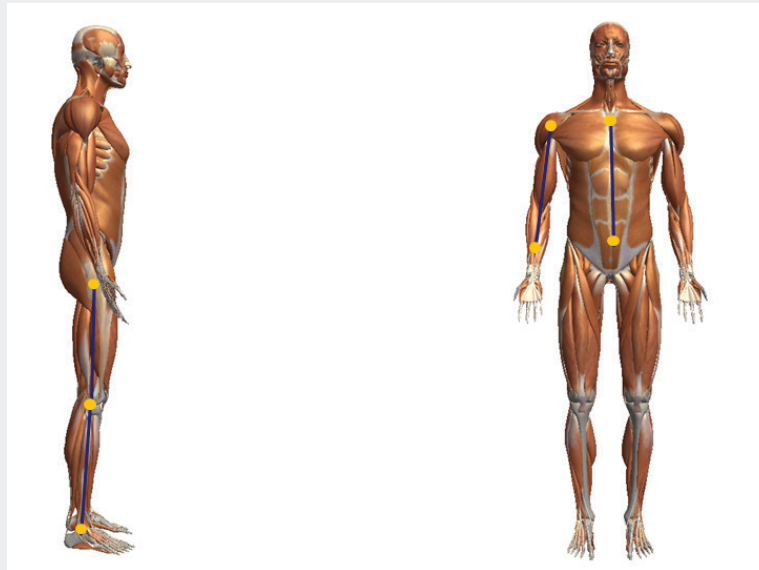
myoVIDEO™ MODULE

Show on all video frames	Activate to show angle on all video frames.
Body Side	As explained later, the body side or camera view defines the polarity of an angle. For example, a knee flexion motion changes polarity if this motion is seen from the other side
Name	This allows you to create or use already existing angle names. Use the pull down list to check the list of available angle names. myoVIDEO comes pre-loaded with a set of commonly used angle names and their correct setup.
Color	Changes the color of the angle and text.
Save	Any label name and all settings done for this given angle can be stored for permanent use by pressing this Save button
Change + Polarity	Depending on the body side, e.g. a knee flexion can create a negative or a positive polarity curve, this switch allows you to change the signal polarity if needed
Advanced	This switch enters a more comprehensive setup system for anatomical angle definition based on the neutral – zero method typically used in the medical and health care field. A more comprehensive introduction is given

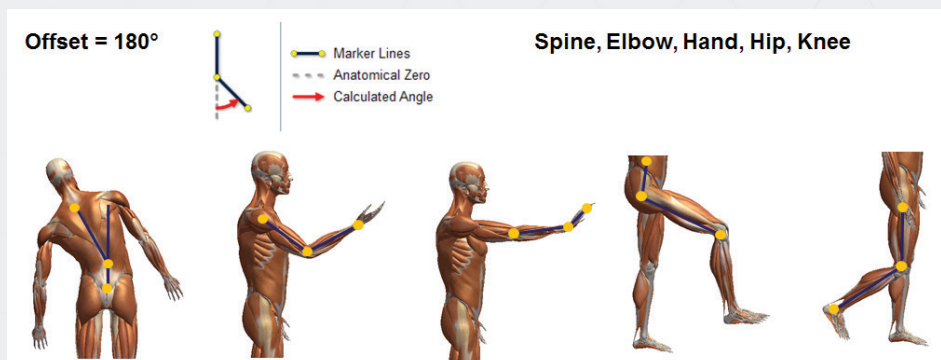
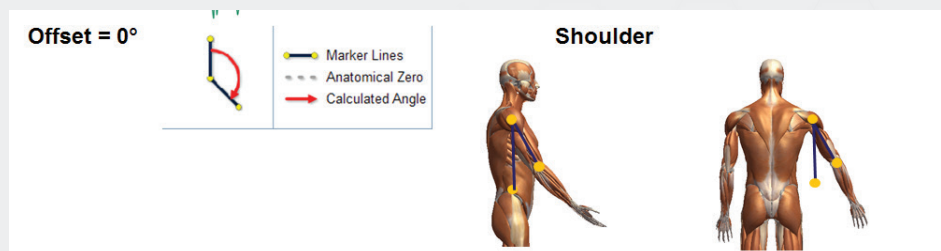
The Advanced marker menu manages the offset of anatomical angle definitions.



By general convention anatomical angles are defined to be Zero when a human body is standing upright in normal position:



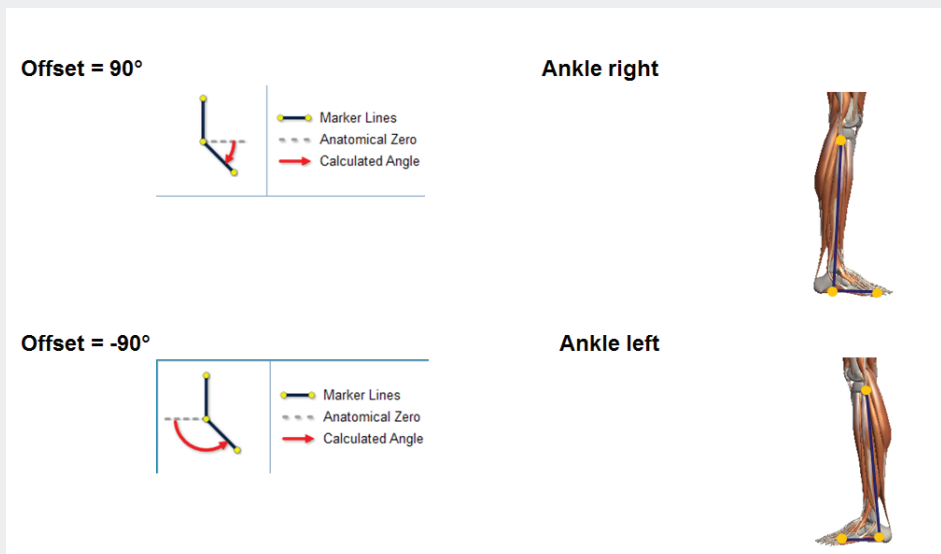
Mechanically, most angles already show an angular offset in this position, except for the shoulder joint:





SOFTWARE

myoVIDEO™ MODULE



Other	<p>Allows you to enter any desired offset value</p> <p>To correct for these offsets use the Advance settings offset correction factors listed under Anatomical Zero</p>
--------------	---

The button **As shown in current video position** can be used to apply the defined zero offset to the current video position and angle chain. It is meant to be used so that you first stop at a video picture that shows the given angle in its zeros position, click the three marker angle and use the button

As shown in current video position

Any setting definitions done in the standard or advanced section can be stored under an angle name by clicking on the **Save** button to the right of the angle name.

SOFTWARE myoVIDEO™ MODULE



New 3-Marker Angle

Define or review the angle characteristics, click 'Preview' to preview changes in the video image, click 'Continue' to add the next angle attached to the existing one or 'Finish' to confirm the currently created angle.

Show on all video frames ☐

Body Side ☐ None ☐ Left ☐ Right

Name

Color

Show label ☒

Change ± polarity ☐

Advanced ☒

Anatomical Zero ☐ 0° ☐ -90° ☐ 90° ☐ 180° ☐ Other

All drawings added to the given video record are listed in the **Drawing list** in the right tool bar:

→ Review the existing drawings or click a tool to add one. ?

#		Name	Value	Time
1	<input checked="" type="checkbox"/>	Ankle Dorsi/P...	5	2.66666
2	<input checked="" type="checkbox"/>	Ankle Dorsi/P...	11	7.03333
3	<input checked="" type="checkbox"/>	Ankle Dorsi/P...	10	0
4	<input checked="" type="checkbox"/>	Ankle, deg	-84	2.3

Track



SOFTWARE

myoVIDEO™ MODULE

Track	This function allows you to operate an auto-tracking algorithm for the given drawing element. Pressing this button will apply the auto-track algorithm to the entire video record. NOTE: Auto tracking requires certain camera settings and tracking markers, which is explained in more detail in the chapter Auto tracking
Delete	Deletes the highlighted drawing. You can select multiple drawings by holding down the CTRL button and selecting the records. The green check marks turn the drawing on/off for viewing purposes only.
Properties	Will open the drawing tool property screen again and allow for modifications to the angle/drawing settings.
Copy	This function allows you to copy and paste all drawing data to other Windows applications, such as Excel.

4 Marker Angle/Chain



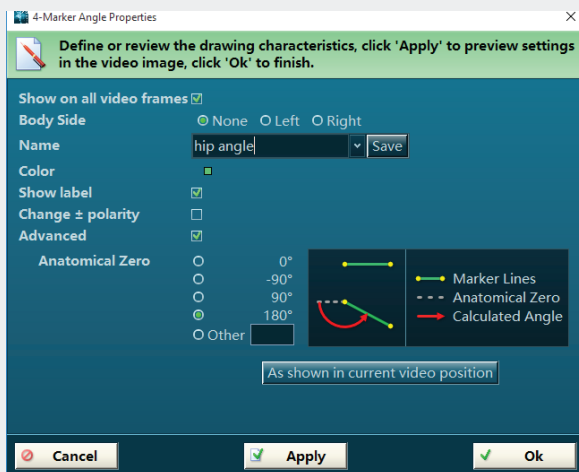
4-Marker Angle

The four marker angle tool calculates the angle between one line (two markers) and a straight line (other two markers).



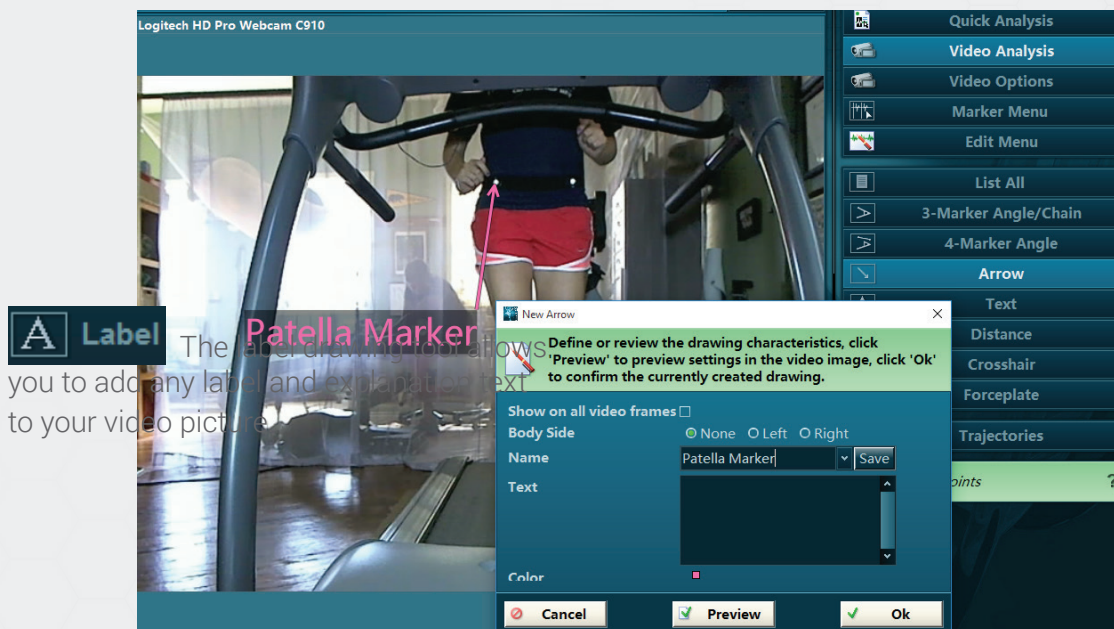


Begin by left clicking where the first two markers of line 1 will go, and then continue by left clicking where the two markers of line 2 will go. When done, an angle properties screen will show up that allows you to define body side, angle name, color, polarity and anatomical offsets as explained in the previous chapter.



Arrow Drawing Tool

The arrow tool can be used to point to interesting details seen in the video:



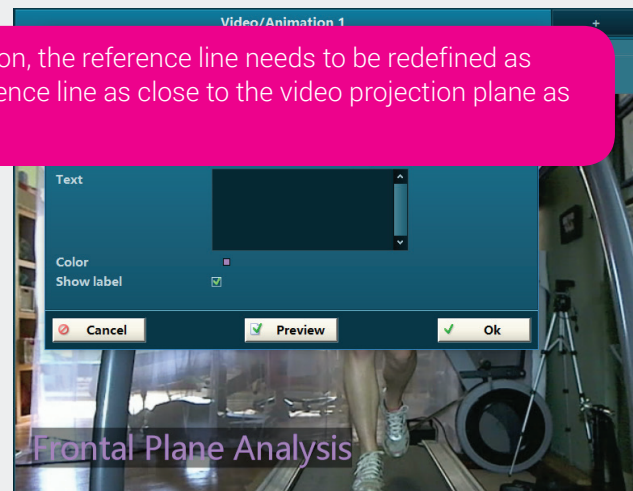


SOFTWARE myoVIDEO™ MODULE

Each arrow can receive a title and detailed text description, effectively adding a comment to the screen, which can also be performed with the Label Drawing tool.

Label Drawing Tool

ATTENTION: if you change the camera position, the reference line needs to be redefined as well. Please also make sure to place the reference line as close to the video projection plane as possible to avoid perspective errors.



After activating this tool in right tool bar you can move the mouse to the position where you would like to place the text label and select this position by left mouse click

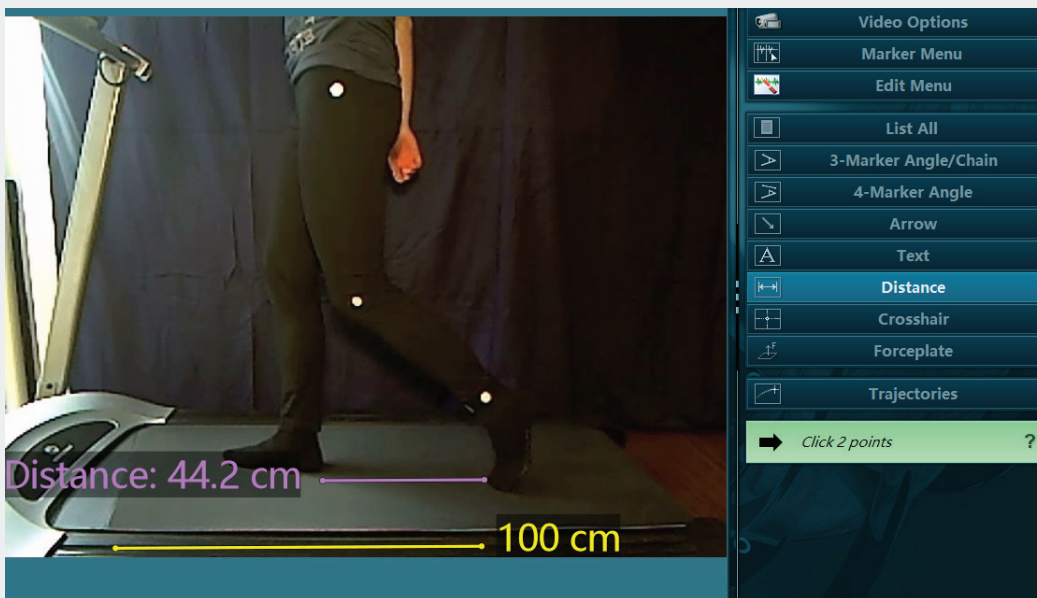
The label property screen allows you to enter any title (label) text, additional text body, and text color. Text size can be changed in the **Video Options/View Settings** dialog explained in the next chapter.

Distance Drawing Tool

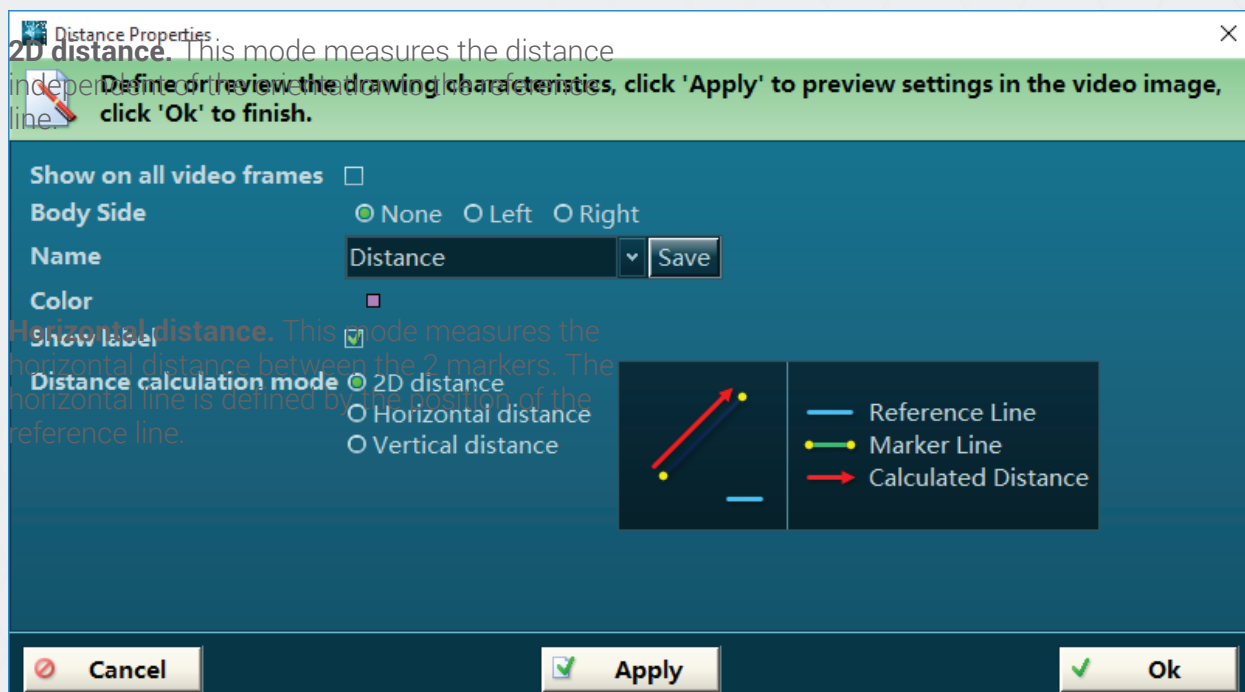
This tool allows you to measure the distance between two objects visible in the video. This measurement is based on a reference line that determines a known distance within the same video, e.g. a one meter long scale. The reference line is defined in the Video Options /View Settings Menu introduced below. After selecting this tool just click two points in the video to



determine its distance:



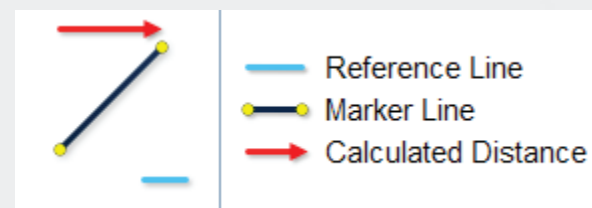
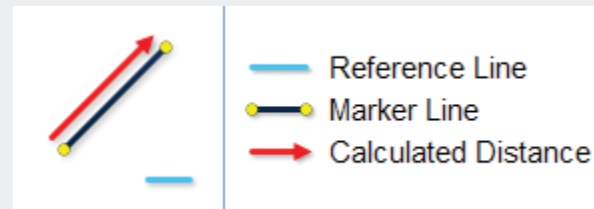
When done, the Distance property settings screen automatically pops up and allows you to determine body side, name, color, and distance calculation mode. The latter offers 3 modes:





SOFTWARE

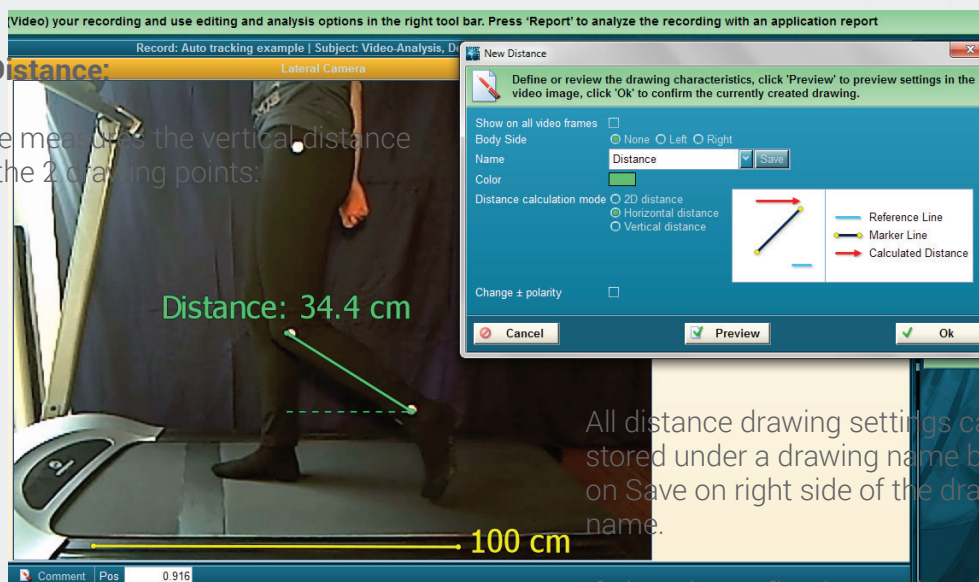
myoVIDEO™ MODULE



In this example the horizontal distance between knee marker and ankle marker is determined (see dashed line):

Vertical Distance:

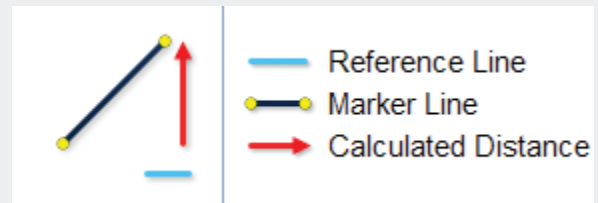
This mode measures the vertical distance between the 2 drawing points:



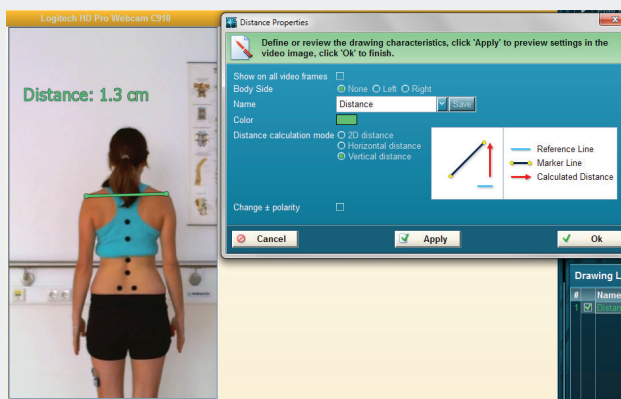
All distance drawing settings can be stored under a drawing name by clicking on Save on right side of the drawing name.

If placed on reflective markers, the distance tool can auto-track dynamic changes by as explained in the auto-tracking section.

SOFTWARE myoVIDEO™ MODULE

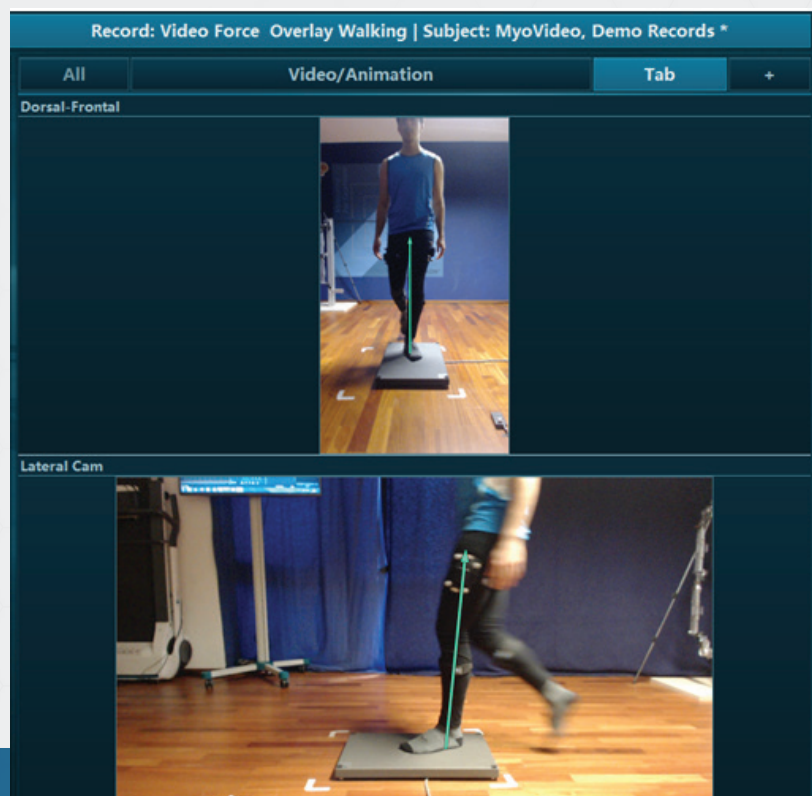


This tool can, for example, be used to measure the shoulder height difference between left and right side.



Forceplate (Force Vector Overlay)

myoVIDEO can be combined with 3D force plates to show the force vector overlay of subject when touching the force plate:

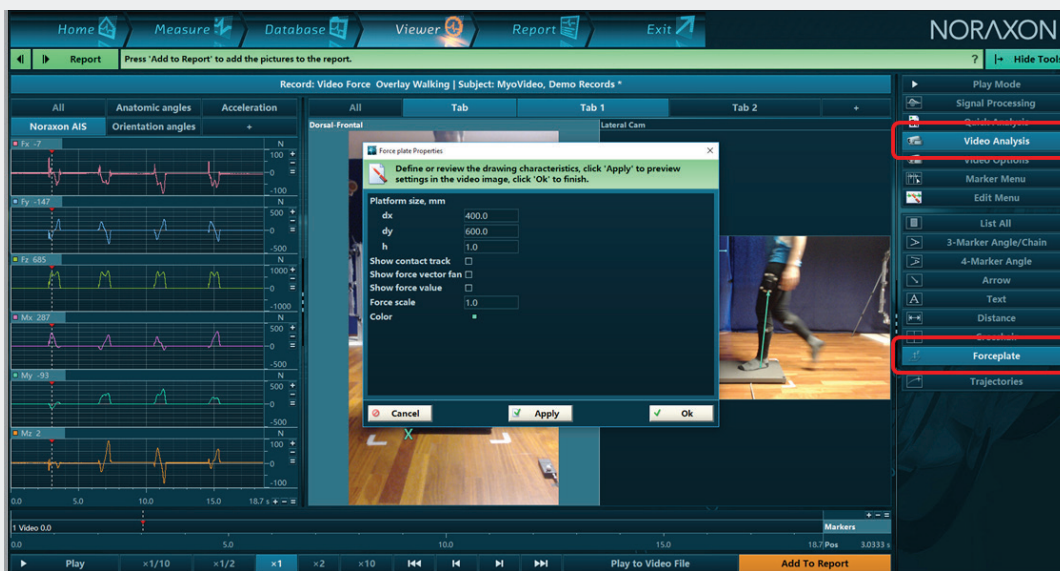




SOFTWARE myoVIDEO™ MODULE

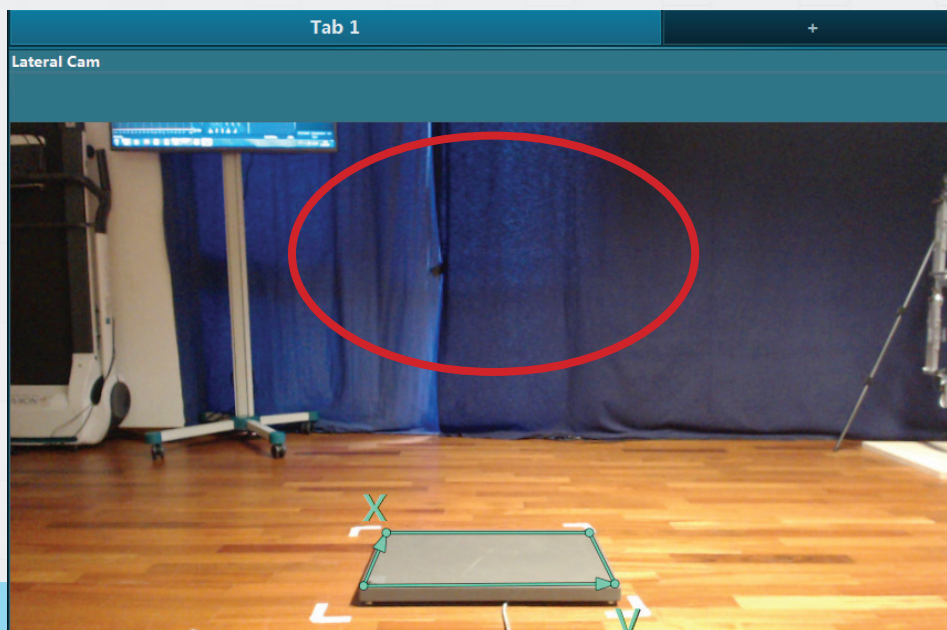
Technically a force plate can be integrated to MR3.10 recordings via connection to Noraxon AIS analog input board or digitally via firmware driver of the given manufacturer. Please refer to the MyoForce manual or contact Noraxon support for more details.

To apply force vector overlay, mark the video window first, select Video Analysis in the right tool bar and choose "Forceplate".



A force plate configuration menu will pop up, allowing you to enter a set of force plate properties, such as the dimensions of your force plate. The default settings shown above should work for the Bertec standard plate 40 x 60cm and portable 3D plate.

Confirm the force plate settings and move the green calibration frame to the border of your plate.

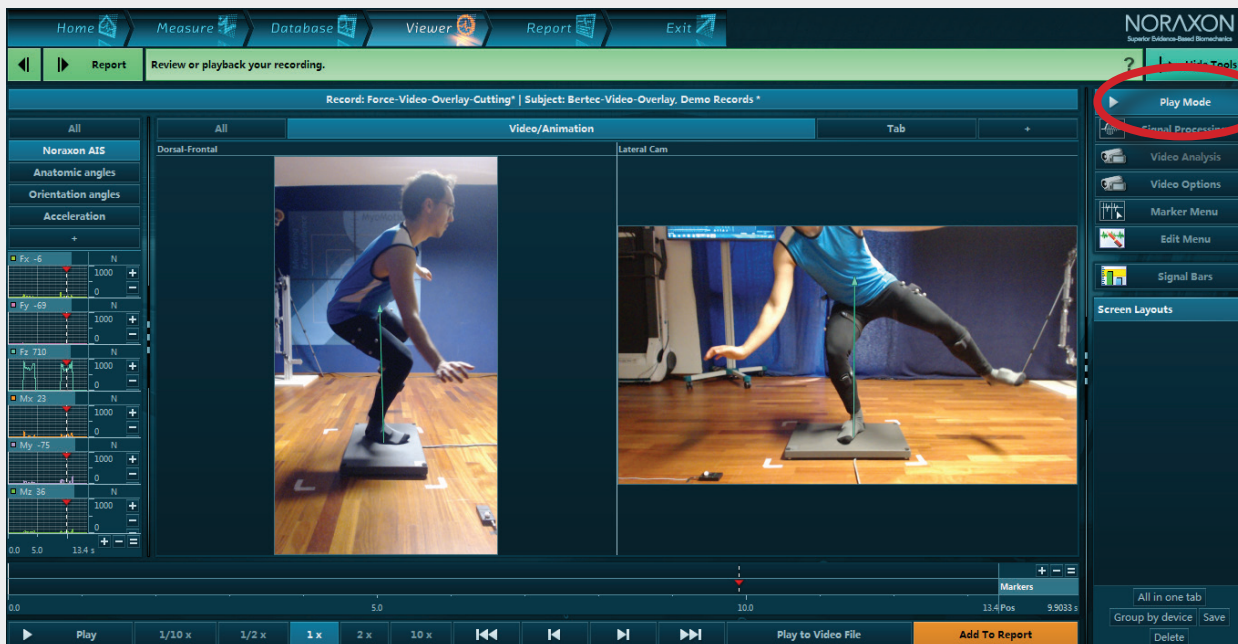




Click into video-window and drag “x-y-frame” on to the force plate by placing the corners (be aware of orientation of force plate coordinate system).

Note: the calibration frame is only shown in Video Analysis mode, not in Play mode!

Go into “play mode” to see force vector during replay of the record.



You can view the vector traces by clicking “show force track” in the force plate properties window.

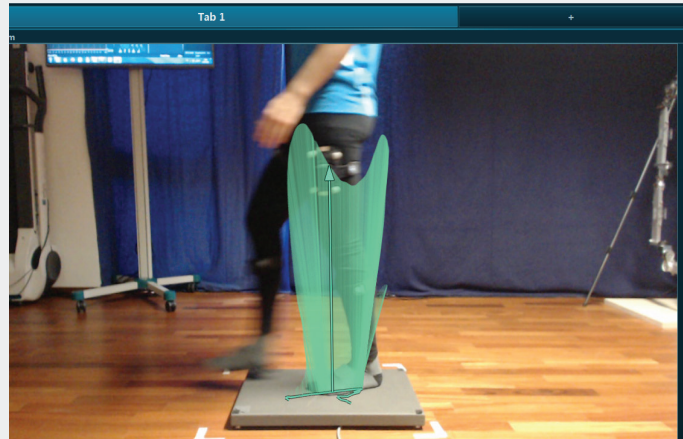
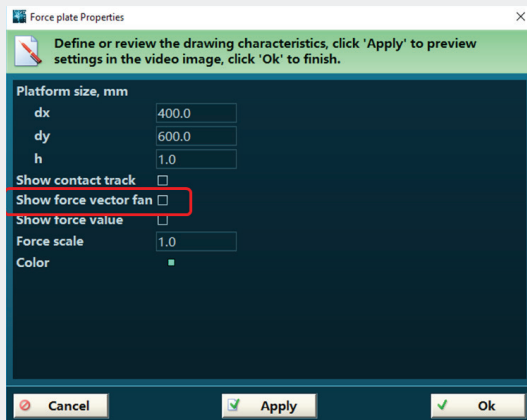
Show Force Vector Fan

This option allows you to visualize the sequence of vectors over time.



SOFTWARE

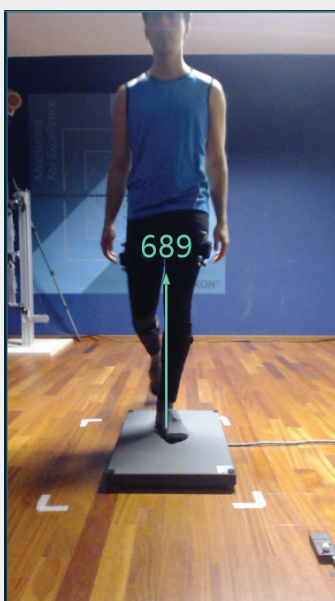
myoVIDEO™ MODULE



All settings done for the force plate setup are automatically stored as a camera setting and are automatically available if “Forceplate” analysis option is selected for a new record. The setting will stay active as long as it is overwritten by new settings.

Show Force Value

This setting will display the magnitude value of the force vector in the video.



Force Scale

The force vector magnitude may exceed the visible video window or may be too small to visualize the force vector. This setting allows up upscale or downscale the vector magnitude.

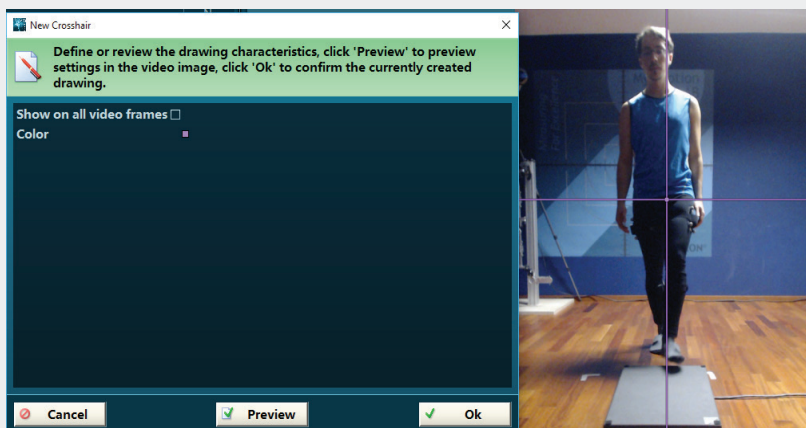
NOTE: Settings need to be repeated (similar to sync light position) whenever the selected camera position is changed.

To test the accuracy of force vector visualization please refer to Appendix A



Crosshair Tool

The cross hair tool is a pure visualization tool. It can be used to visualize symmetries, side ratios, distances against vertical and horizontal orientation lines, etc.

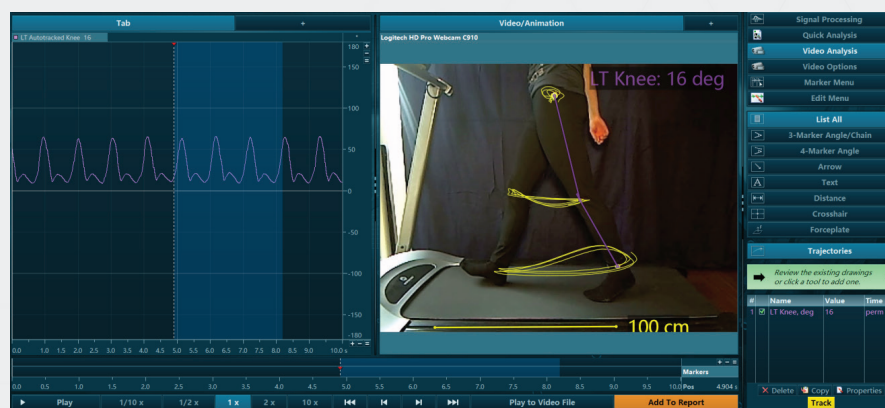


If placed on a reflective marker, the crosshair tool can be auto-tracked by the auto tracking tool explained below.

Track

Trajectory Tool

This tool is based on the results of auto-tracked dots or angles (see next chapter) and visualizes their two dimensional path along the video projection plane.



This tool allows the visualization of motion patterns, motion quality and constancy.



SOFTWARE myoVIDEO™ MODULE

Auto Tracking of Markers

Marker auto tracking is a powerful tool that tracks marker position over the course of all frames within a video clip. myoVIDEO's auto-tracking algorithm works on the principle of contrast and object recognition (circle dots). Successful auto tracking requires well defined video recording conditions, which are described below.

A) Equipment

30Hz HD camera(s)
Noraxon Power LED light
Reflective markers 1.9 cm

B) General remarks

It is highly recommended to use all of the equipment provided by Noraxon as all components have been tested for their ability to work in conjunction for the best possible results during automatic angle tracking. The 30 Hz cameras included in the myoVIDEO package have on-board video compression, which allows them to provide a much clearer and crisper image than other cameras that have frame rates twice as fast.

C) Best Practices:

Our testing, based on the above listed equipment, showed that we can track any angle while walking and jogging up to 4-5 mph and knee joint angles during a moderate run up to 7-8 mph. The most important strategy is to keep shutter time (exposure) as low as possible; otherwise marker blurriness can become an issue. It is also very important that marker sets stay in a perpendicular plane to the camera.

- If you see running strips on your video it means that lights from the ceiling of the room are causing interference. Turn them off (if possible).
- There is a chance that any reflective, white areas or spots on and around the treadmill could distract the auto-tracking algorithm.
- The typical distance between subject (or midline of treadmill) and camera should be between 1.2 and 1.8 meters.
- The Noraxon Power LED light is the only light needed to illuminate the reflective markers. It is best mounted on top of the camera (as shipped by Noraxon). No additional light source is needed.
- Room light can even be turned off to avoid interference patterns in the video data. Light is reflected best if the power LED light is adjusted to the same height level as the reflective markers.



D) Camera Settings in myoVIDEO

Motion JPEG at 800 by 600 pixels is a good compromise between picture quality and data file size. Certain computers (with high-end graphics cards and processors) can also use full HD but higher resolution does not improve tracking stability.

If the camera(s) are rotated to portrait position (recommended) the rotate setting should be clock wise or counter clock wise, depending on the mounting direction.

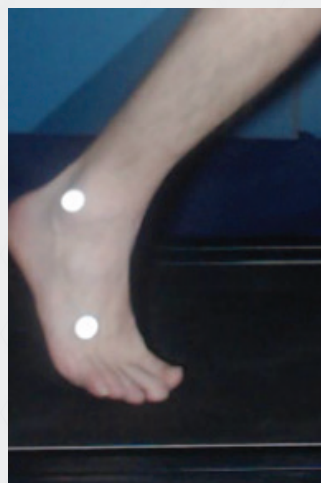
Exposure	This is the most important parameter for stable auto tracking: it reduces the lens shutter time, which is important to avoid “blurriness” of markers. Please select the lowest available value. For the standard Noraxon cameras it is (-1).
Gain	The gain factor depends on the overall light condition. The gain factor can be used to brighten up the video which is automatically darkened by the low exposure value. Find a good contrast between good visibility and contrast between reflective markers and the body. Typical gain will be around 125.
Focus	Found in advanced settings. Turning on manual focus gives more tracking stability. The value should be 0.

Marker blurriness:

It is important to avoid any marker or object distortion. The most important action here is to use the lowest exposure time available at a given light/gain condition.



Exposure too high



Good exposure



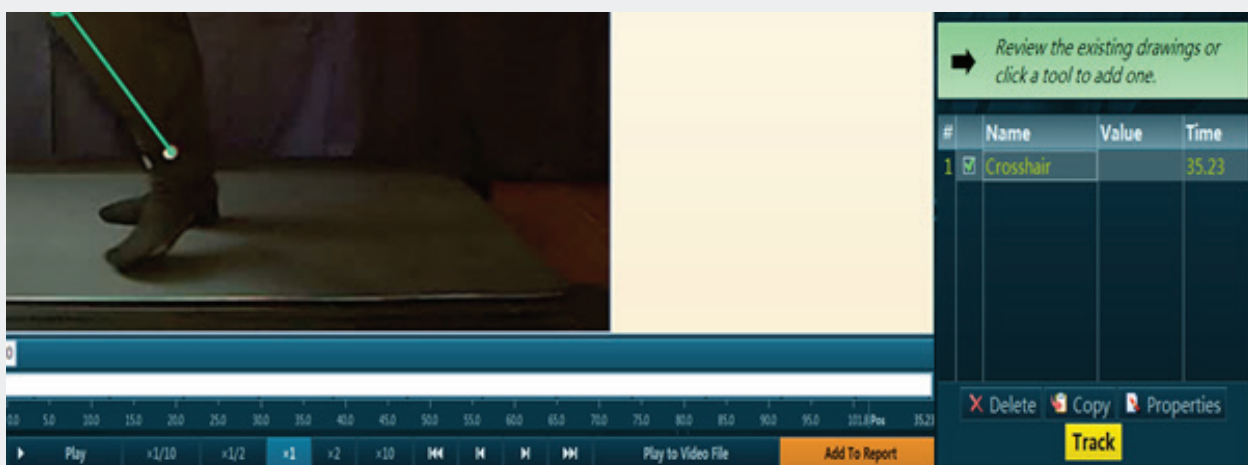
Good compromise between brightness and contrast



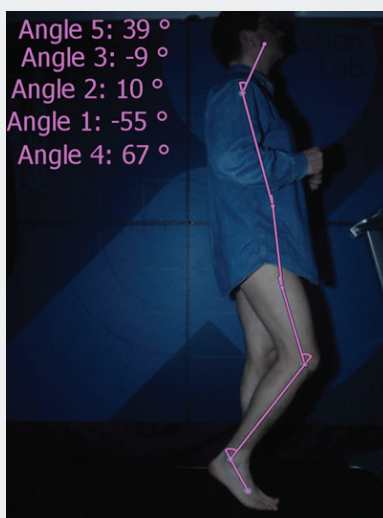
SOFTWARE myoVIDEO™ MODULE

E) Tracking

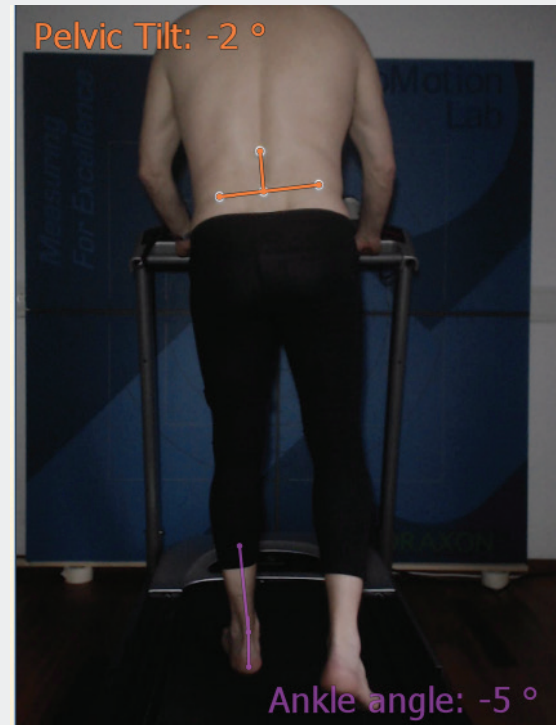
Dots, crosshair, and marker sequences (angles) can all be tracked. Typically, 3 markers are used to define a joint angle. To begin, a tracking object has to be determined or created, like an angle or a chain of angles. Once an angle is created or highlighted in the list of drawing objects (in right tool bar), press **Track** to start the tracking process



The system also tracks multiple angles acting in a chain. To create multi-joint chains, start with the definition of the first angle, name it under Name, then press **Continue** and define the second angle and so on. When done with the angle chain, press **Finish** :

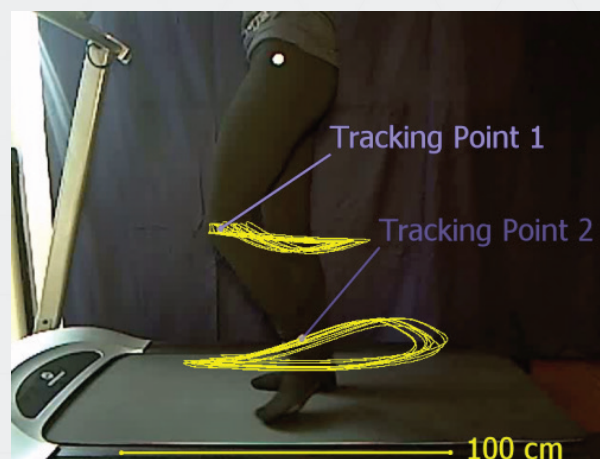


The algorithm can also track black dots on bright skins/ surfaces, although we strongly recommend white reflective markers (included in the package from Noraxon) for tracking. For the black dots, low shutter time is required, as well as care that other black objects do not distract the tracking algorithm.



Auto Tracking of Trajectory

When single markers are tracked, their two dimensional pathway can be visualized by the **Trajectory** tool introduced above.





SOFTWARE myoVIDEO™ MODULE

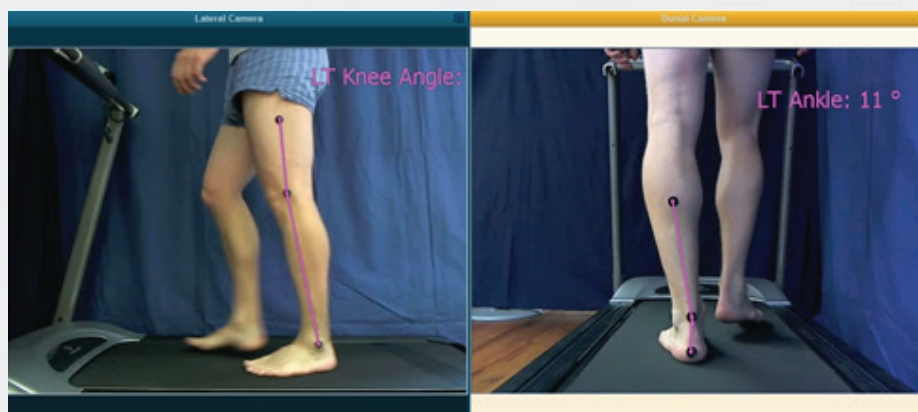
If you need access to the 2D coordinate data, use the record Export function in the Database menu, and it will export the time line data and the two x, y coordinates of each picture position.

Example of 2D coordinate data export to an Excel spread sheet:

Z1S1		Name					
1	2	3	4	5	6	7	
1	Name	Auto tracking example					
2	Frequency	1000					
3	Date	14-04-2011					
4	Time,s	Markers	Marker Name	Activities	Activity Names	Logitech HD Pro Webcam C910.Tracking Point 1.x,cm	Logitech HD Pro Webcam C910.Tracking Point 1.y,cm
5	0	1	Report	1	Begin	64,74	72,23
6	0,001	0		0		64,63	72,3
7	0,002	0		0		64,52	72,36
8	0,003	0		0		64,41	72,42
9	0,004	0		0		64,3	72,49
10	0,005	0		0		64,19	72,55
11	0,006	0		0		64,07	72,62
12	0,007	0		0		63,96	72,68
13	0,008	0		0		63,85	72,75
14	0,009	0		0		63,74	72,81
15	0,01	0		0		63,63	72,87
16	0,011	0		0		63,52	72,94
17	0,012	0		0		63,41	73
18	0,013	0		0		63,3	73,07
19	0,014	0		0		63,19	73,13
20	0,015	0		0		63,08	73,19

Two Video Camera Recording

myoVIDEO is capable of supporting as many cameras as necessary. myoVIDEO ships with two HD video cameras.

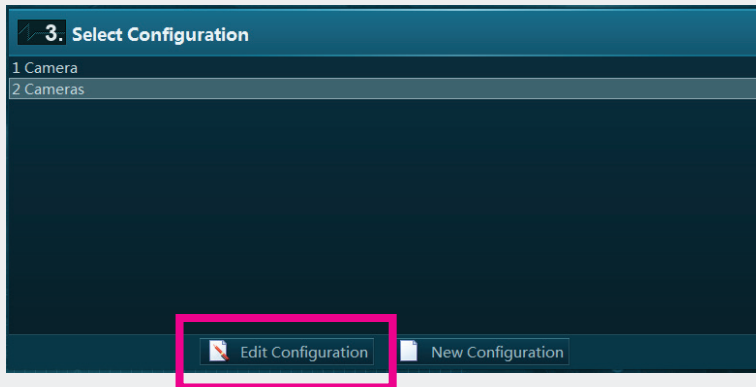


At any time you can add a second camera to any configuration by entering the **Measurement** setup menu or selecting the preconfigured **2 Cameras** configuration in **Home** screen.

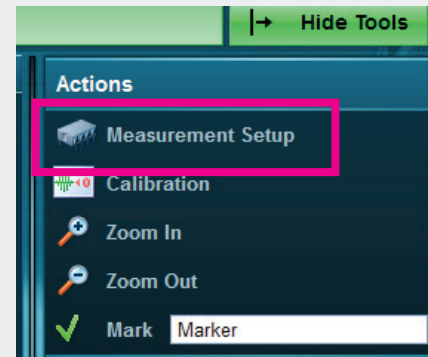


The measurement setup screen can be accessed via pressing Edit for a given configuration in the home screen or Measurement Setup in the right tool bar of Video recording monitor:

Home screen step 3:



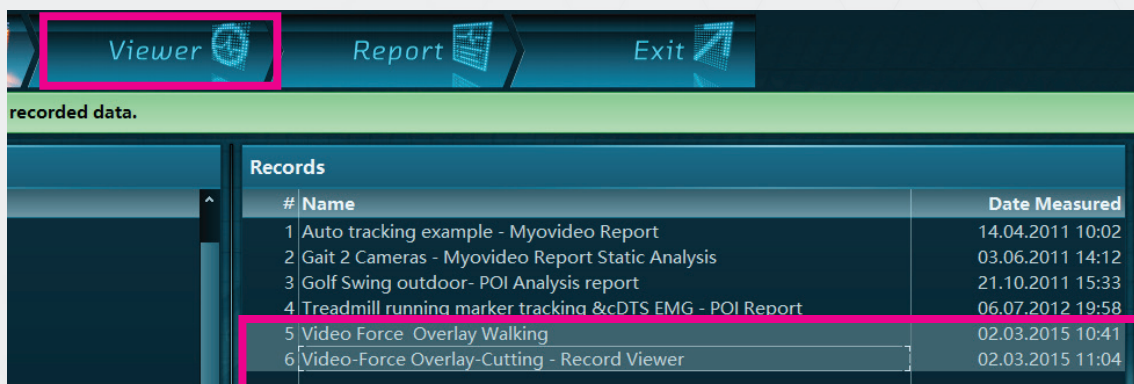
Measurement screen - tool bar:



All video analysis functions can be utilized and a light blue color indicates the selected video clip window and limits all drawings to this video window only. Both videos will be automatically included at any point of interest analysis (use the Add to **Report Button** to define POI s).

Two Video Record Comparison

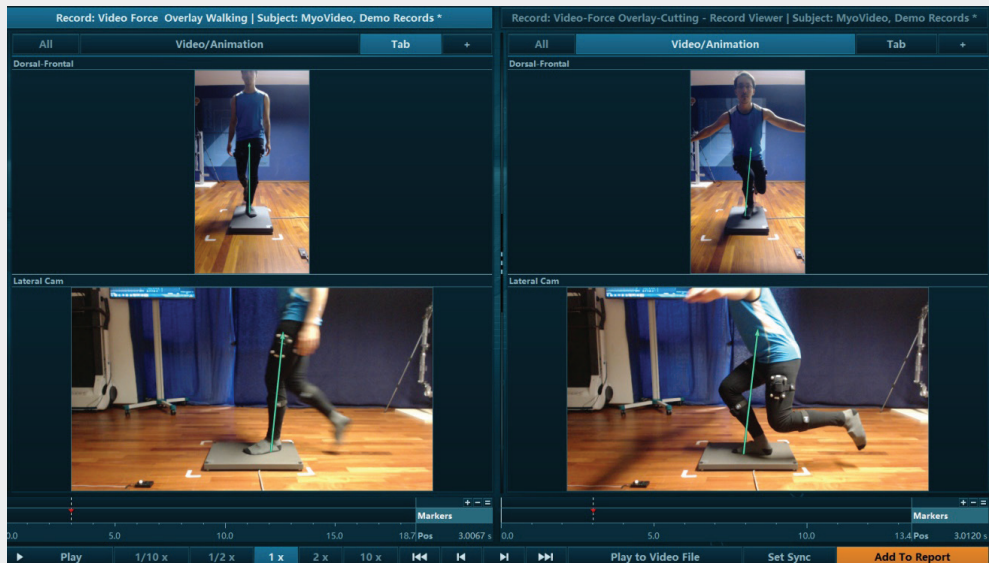
myoVIDEO supports a direct comparison of two video records in the record viewer. To load 2 records into the viewer, select a record from the database menu, hold the CTRL key and select a second record, then click the green action button **View** or **Viewer** in the top navigation bar:



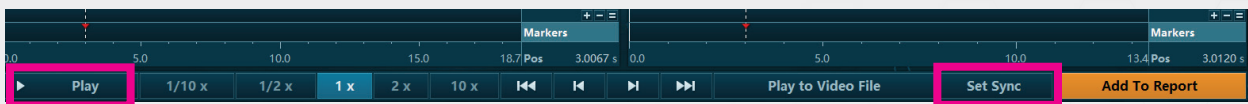
Both records will be shown in a direct comparison.



SOFTWARE myoVIDEO™ MODULE



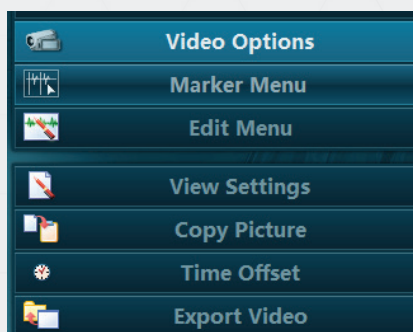
The **Play** button in the video control bar will play both videos simultaneously:



Click the **Sync** button in the video control bar to let a video start at a defined position and repeat the same procedure with the other video record. The **Play** button will now play both videos from the sync points.

Video Options

The second functional menu under the tool bar on the right side of Viewer Tab is the **Video Options** menu:

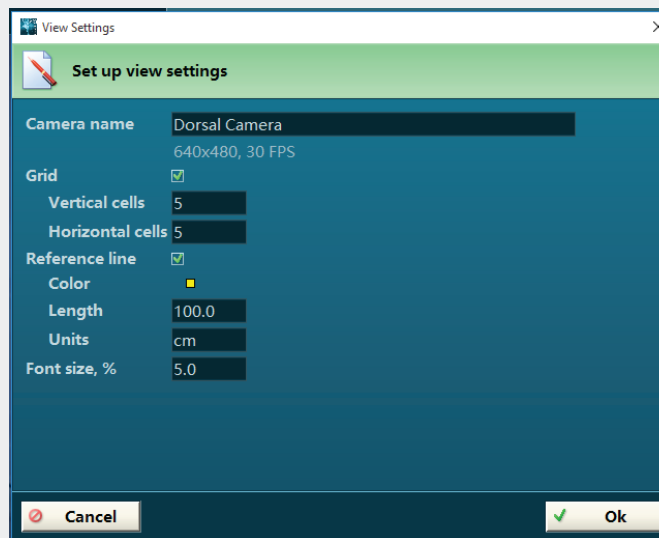


Video Options consists of a setup for View Settings, copy picture, time offset and export of video.



View Settings

This button opens up a setup screen where you can rename the camera, add a grid (enter how many vertical/horizontal lines you want), a reference line (used in conjunction with the distance tool) and the ability to adjust the font size.



Copy Picture

This button takes a snapshot of the POI or point in time in the video. It copies it to the clipboard and you can then paste it (CTRL "V") into any other Windows based document or even an email.

Time Offset

This function allows you to offset the video when trying to sync it with other peripheral devices, such as EMG, or another video that you may have imported from an external location. You can also choose to only apply to the current video or all video associated with the record.

Export Video

This menu option allows you to export the raw video. Only raw video is exported.



SOFTWARE myoVIDEO™ MODULE

Marker Menu (optional)

Typically not needed for Pressure distribution recordings!

Several modes for marker labeling and auto marker settings for trigger and angle channels.

Note: Markers can be manually set in the signals screen by double clicking with the left side of the mouse.

Edit Menu (optional)

Typically not needed for Pressure distribution recordings!

Several signal editing tools like delete, rename or copy channels are presented here.

Signal Bars

This function requires auto-tracked angle data as described above (section E Tracking).

When selected a new diagram appears on screen showing the amplitude data at cursor position as a bar graph:



Show channels with unit < > –


Allows the user to select what type of signal/channel will be displayed as a bar graph.

Smoothing – The value entered here defines a smoothing interval based on the mean value of this selected interval.



Section 9: Report Tab

Introduction

From the **Viewer** menu, click on the  **Report** button in the top navigation bar or green Report button in the main action bar:

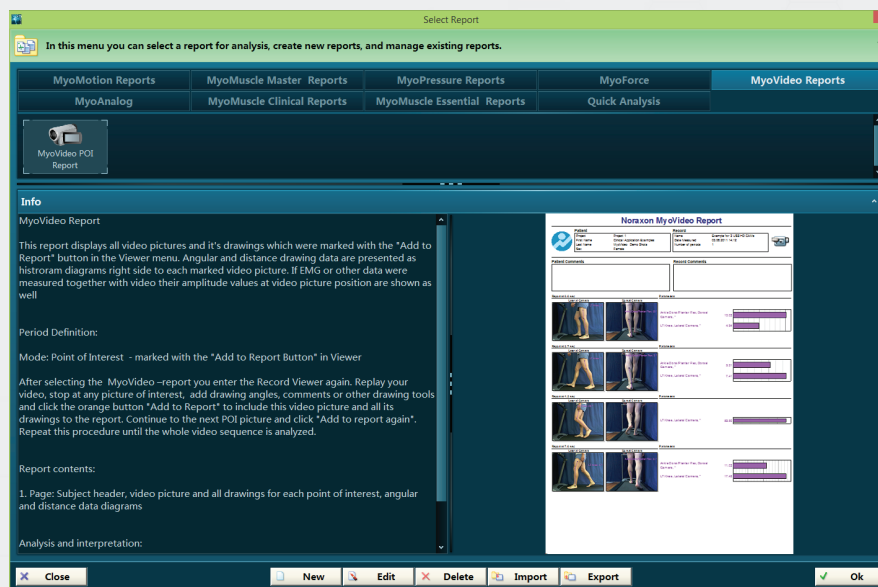


When done, the **Select Report** menu is opened. Depending on the number of installed modules, a selection of ready to go analysis reports are displayed.

The last step in MR3.10s top navigation bar **Report** starts with a Report selection menu.

Video Report

myoVIDEO is equipped with one base **myoVIDEO POI** report that can be selected in the Video Analysis section of the Report dialog box:



The other sections are meant to be used for EMG and other biomechanical measurement device setups and can be ignored for video only records.



SOFTWARE myoVIDEO™ MODULE

The myoVIDEO report is based on the Point of Interest selection done in the Viewer menu: Any video position that was marked with “Add to Report” will automatically be included in the report analysis. If no POI was set in viewer menu the report will stay empty.

Here is a brief recap of the operation steps required to produce a Video Report:

1. Replay and watch the video
2. Stop at a POI and add drawings, angles, labels, etc.
3. Press **Add To Report** in the video control bar
4. Continue to play the video and stop at next POI
5. Repeat step #3
6. When finished adding all POIs, click on **Report**

Report Elements

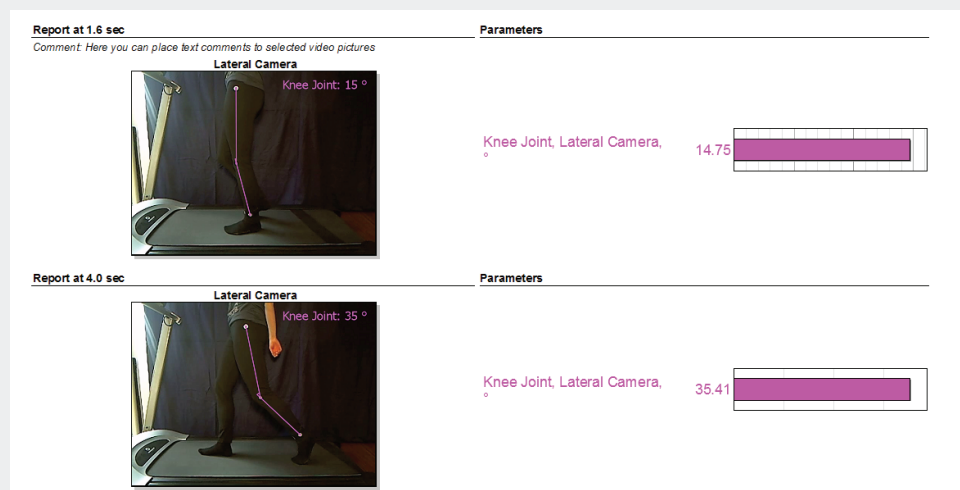
After selecting the **myoVIDEO** report and confirming the selection with OK, the Video report will open:



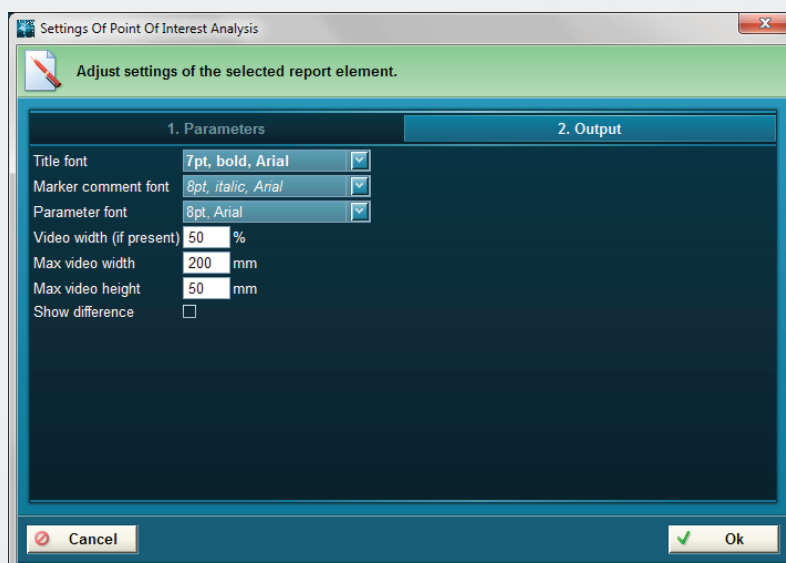
The report consists of several report elements, which all can be customized or edited by simply double clicking on a given element.



The following analysis of video pictures is based on the **Point of Interest (POI)** definition done in the Viewer menu: each video picture/position labeled with the button **Add To Report** will be shown here in chronological time order. Drawings will be shown in the video with video comments just above each video picture. Angle and distance data determined for that picture are displayed as numerical bar graphs on the right side of the video picture:



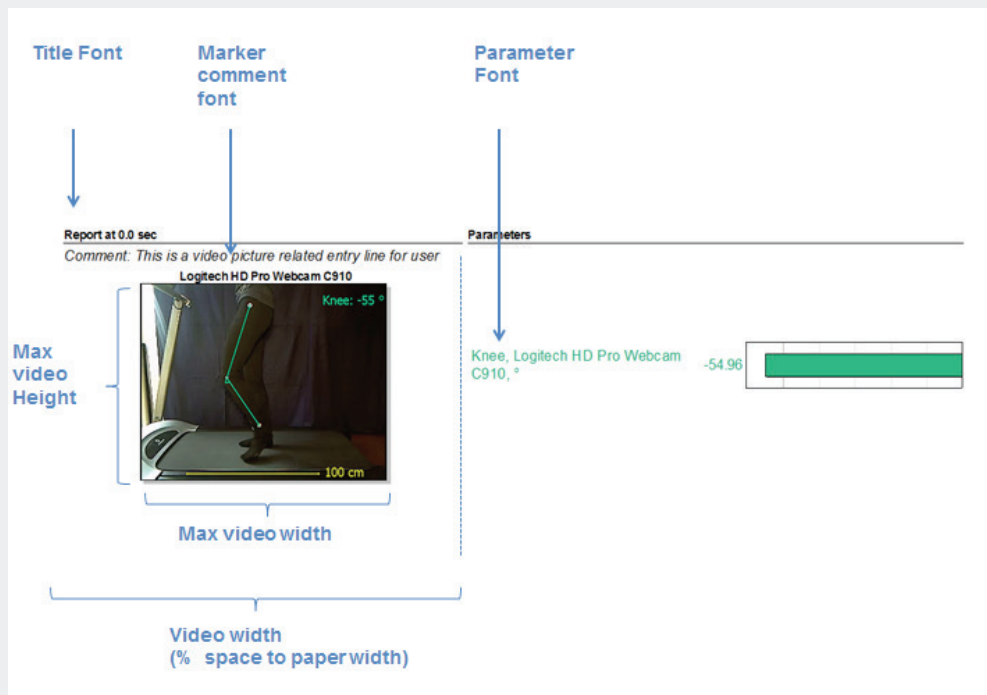
Double clicking this report element opens up a setup menu:



The Tab section **Parameters** is reserved for video clips with integrated EMG recording (or other devices signals) and calculates parameters based on their measurement curves. The Tab section **Output** allows you to make adjustments to font and pictures sizes. **Show difference** only has an effect if several calculation parameters are compared.

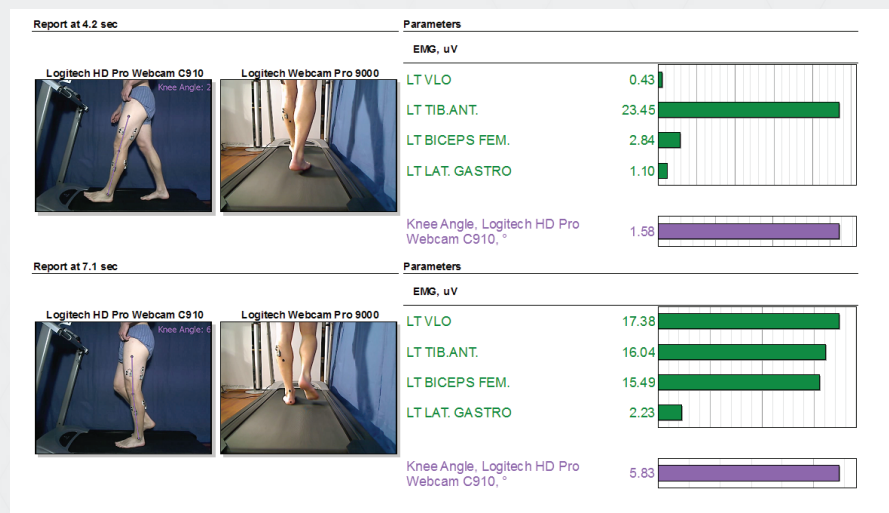


SOFTWARE myoVIDEO™ MODULE

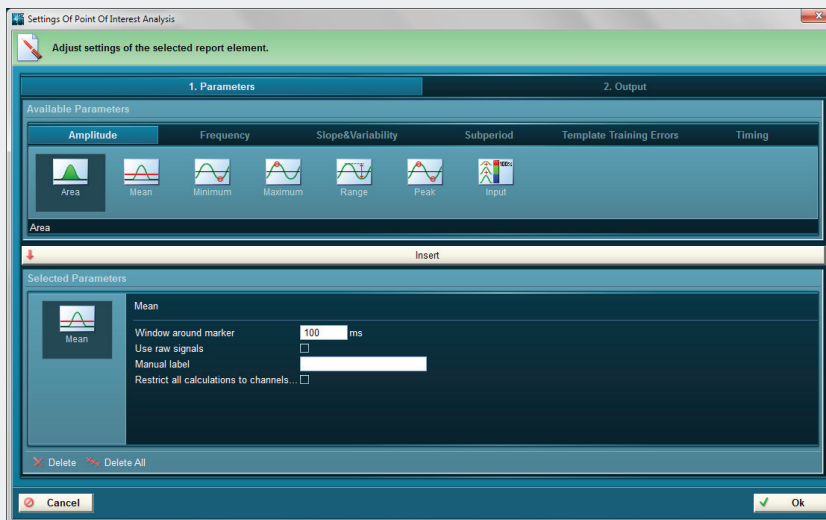


Automatic EMG and Signal Analysis

If a video clip was recorded in conjunction with EMG, the EMG data will be automatically analyzed for each point of interest:

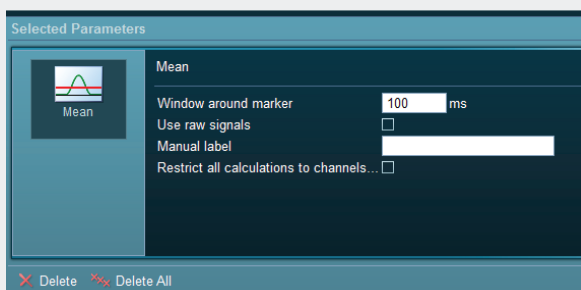


SOFTWARE myoVIDEO™ MODULE



By default the EMG calculation is set to the mean amplitude EMG value of a 100ms analysis period located around the point of interest (50ms before and 50ms after POI). This analysis interval and also the calculation parameter for the EMG curves can be modified in the Parameter section of the report element setup menu, which can be approached by left mouse double click on the myoVIDEO report element.

The list of available calculation parameters is sorted in **Amplitude** and **Frequency** parameters, **Slope & Variability**, **Sub period**, and **Timing** parameters. Each selected parameter has its own group of settings:



Window around marker	The entered values define the analysis interval around the POI.
Use raw signal	Forces the use of raw data for the parameter calculation, even if the signals were processed. This switch is important if frequency parameters are selected.
Manual label	The calculated parameter can be manually labeled.
Restrict all calculations to channels...	This switch allows you to limit the parameter calculation to certain channel types (e.g. EMG) or to physical numbers used in the record viewer.

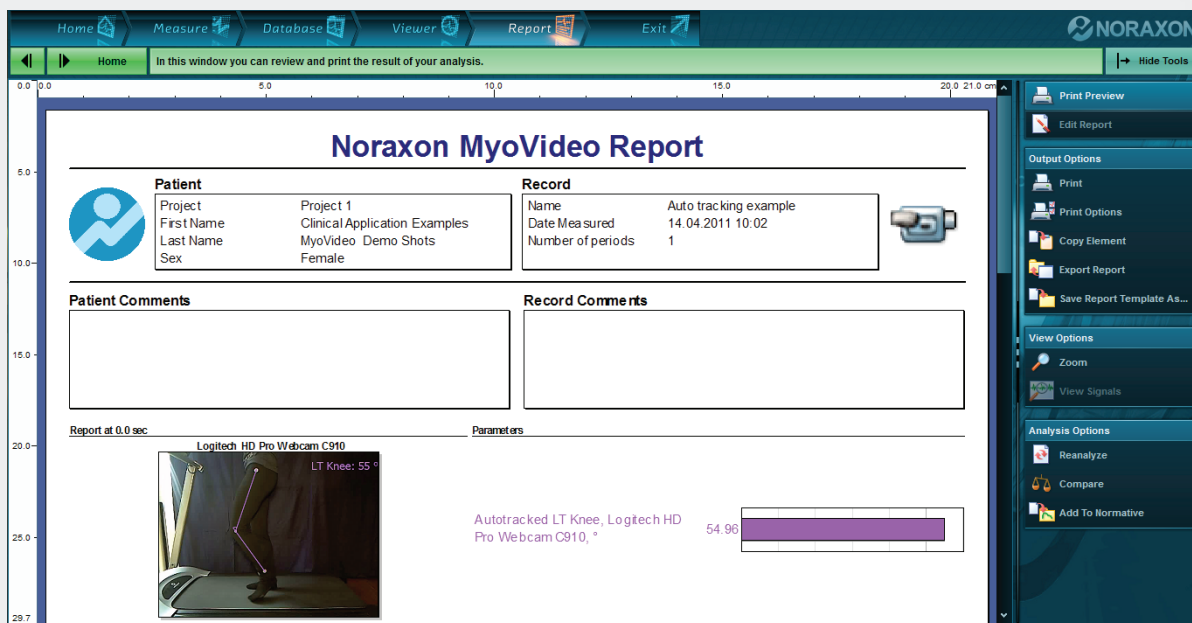


SOFTWARE myoVIDEO™ MODULE

Report Tool Bar Options

When entering a report, the right tool bar shows **Print Preview** as a default mode which is meant to be used for visual inspection and analysis of reports. Depending on the number of POIs selected, the report can contain 1, 2 or even more pages, which can be scrolled through by using the mouse wheel or right sight slider.

Print Preview



The tool bar offers more Report related functions, which are sorted in:

Print Preview, the mode you are currently in, and **Edit Report** mode, a mode for experts, that allows you to modify, delete or add new report elements (only available in myoMUSCLE Master Edition).



Output Options

Under **Output Options** are the following dialog boxes:



Print	Will send the report to your connected printer. Another dialog box offers the choice of printing the Whole Report or the Current Page .
Print Option	Loads the Windows printer setup menu. Here you can change the Output settings for your printer and adjust the paper size. If you want to store your report as a PDF file, select the PDF maker as a printer and save it as a PDF file. This operation requires that you download and install a PDF maker program to your PC.
Copy Element	Copies any selected analysis element to the clipboard. Click once on an element to select it (the elements receives a dashed border line). Once in the clipboard, you can paste it to any other Windows application, like Excel, Word, etc. Many applications support the paste special command. It allows you to paste the analysis frames as a bitmap or as numerical data.
Export Report	The complete report can be exported in HTML, ascii, excel (*.slk) and clipboard format and reloaded in another program, such as Word or Internet Explorer.
Save Layout As...	If you have modified any element or setting of your report, you can save these changes under a new report name, avoiding any chance that the original report is overwritten by these changes.



SOFTWARE

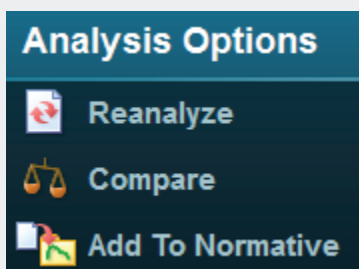
myoVIDEO™ MODULE

View Options



Zoom	Defines the report size displayed on the screen. This function supports a range from a 2 page overview to 200% detail zoom.
View Signal	This function is implemented for associated EMG and other biomechanical sensors devices that create measurement curves. For video only records this function is inactive. Any signal graph created by the report (e.g. averaged curves) can be reloaded to the Record Viewer. Here you can not only inspect single data points, but also Store this graph as an individual record at the regular database level. This allows curves to be processed, compared, or exported again.


Analysis Options




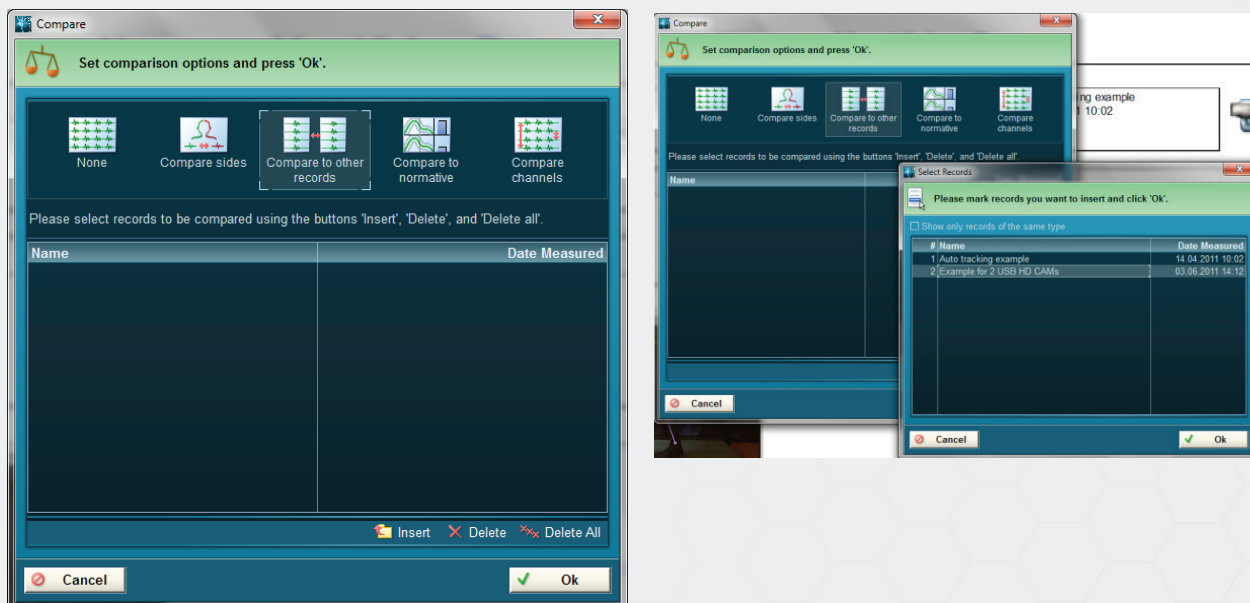
Reanalyze	Will go back to step 1 of the Report Setup 3 Step Menu. Here, you can repeat and modify the selections done in the three steps to setup a report (channel selection, period definition, comparisons).
Compare	Allows you to compare the given report video data to data from another video record and its associated report.
Add To Normative	This function is designed for averaged EMG curves as utilized in Gait Analysis or other motion cycle analysis concepts.




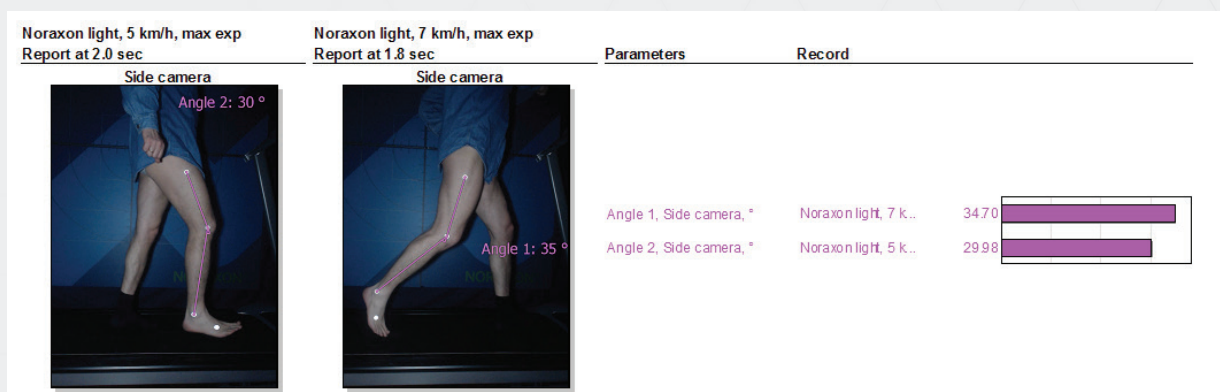
How to use the Compare feature

In case you want to compare the given report video data to data from another video record and its associated report, click  **Compare**, check the box and select **Compare to Other Records**.

Click on  **Insert** to open the database list of available records to be compared, select a second video record and add it to the comparison list. For video analysis only, one other record can be loaded for comparison.



After confirming the record selection with  **Ok**, both records will be shown side by side in the report.

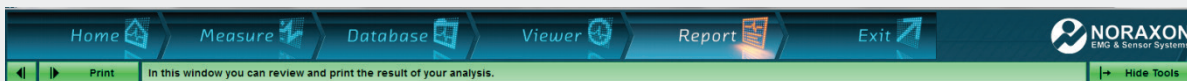




SOFTWARE

myoVIDEO™ MODULE

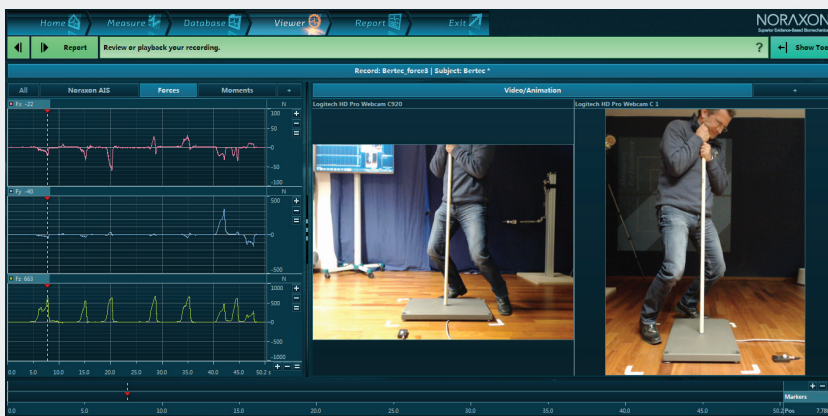
The comparison is based on points of interest: the first POI in the first record will be compared to first POI in the second record and so on. If angle data or EMG data are associated to the given POI, their data will automatically be shown as bar graphs on the right side of the video pictures. After finishing the report review you can freely continue to print the report or directly jump into any other main menu shown in the main package navigation bar:



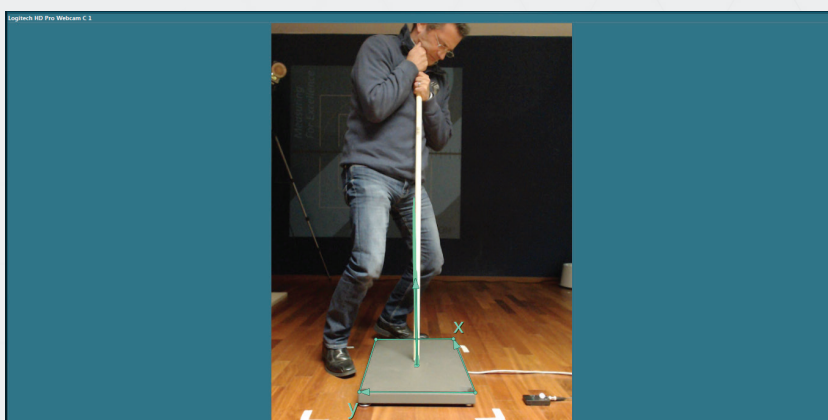
At this point you can also choose to **Exit the program.**

APPENDICES

Appendix A: Test Force Vector Overlay



To ensure the right position of vector on plate please take a long wooden stick and record some test pressure trials: Place the stick on the force plate and apply pressure to it.



Once saved, load the test record to the Viewer menu, start the Forceplate analysis, and check if the vector angle hits the stick axis and pressure point position.

SOFTWARE

myoVIDEO™ MODULE





SOFTWARE

myoVIDEO™ MODULE

NORAXON™
MOVEMENT • DATA • PEOPLE

Noraxon, the Noraxon logo and myoRESEARCH are registered trademarks and myoMETRICS, myoMUSCLE, myoMOTION, myoANALOG, myoVIDEO, myoPRESSURE, myoFORCE, TRUsync and NiNOX are common law trademarks of NORAXON USA. © 2017, all rights reserved. All other trademarks remain the property of their respective owners.
