QVA - Qualisys Video Analysis- is an analysis software tool used to manage and report video data. Together with a Qualisys Motion Capture High Speed Video System, QVA provides an advanced and affordable solution for biomechanical motion analysis. The high speed video image can now be evaluated both visually – by watching the sequence in slow-motion – as well as analytically, by means of QVA. QVA is developed around and based upon TEMA, software created by Image Systems, one of Qualisys global strategic partners in developing and marketing world-class motion analysis systems.

With every shipment of a Qualisys High Speed Video Camera (Oqus), a 60-day trial version of QVA will now be included for the user to install and use at no extra charge.

Product Information
**INPUT DATA**

QVA’s standard input files are digital image sequences. A large number of digital formats can be read directly during tracking: AVI, TIFF, BMP, JPEG, MPEG2 and many others. QVA imports several different standard data formats like tsv and ASCII. The imported data is available for all parts of the program and can be used in calculations, graphs and tables.

**TRACKING**

QVA uses an optimal method for tracking each frame by using fixed cameras. The basic tracking function operates in two dimensions and produces 2D pixel coordinates for each tracked target in each image.

The tracking can be performed in a number of different modes: “Manual”, “Semi Automatic” or “Automatic”. In the automatic mode, the operator sets a tracker tolerance specifying how much variation in the target features that should be tolerated. As requirements for tracking a defined target are often user-specific, there are a number of different tracking algorithms available: Correlation, Quadrant, Circular, Center of gravity and Virtual points.

Furthermore, the image quality and appearance of target could vary too which means that different algorithms and trackers setups are needed.

**USER INTERFACE**

The windows-based user interface provides for a very flexible way of setting up tests. The user can easily load one or multiple camera views and define which points in the image sequence that he wants to track. There are many options to choose a certain function or feature: the “menu-bar”, “tool-bar” or “key-bindings” all provide quick access to desired user areas.

The interface is fully synchronized: change a parameter; click on an interesting value in a table; or move the time slider to an interesting position on a curve – all windows will be updated automatically and show the corresponding image in the image sequence, curve or table.

The time panel gives the user perfect control and overview of playing and tracking the image sequence. Step by step, normal speed or fast-forward; all supported in both directions.
SOFTWARE FEATURES
QVA can track a number of points throughout the image sequence and the results can be presented in a variety of predefined graphs and tables. Depending on the requirements of the user, QVA is offered in different versions, each with its own unique features. The standard version contains following features.

<table>
<thead>
<tr>
<th>Tracking</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of points in one session</td>
<td>5</td>
</tr>
<tr>
<td>Import of image</td>
<td>AVI, TIFF, MPEG, JPEG and others</td>
</tr>
<tr>
<td>Export of diagrams and images</td>
<td>To Word document</td>
</tr>
<tr>
<td>Scaling</td>
<td>Dynamic, static and manually scaling</td>
</tr>
<tr>
<td>Co-ordinate system</td>
<td>Visualizing of grid system/division and scale of image</td>
</tr>
<tr>
<td>Diagram</td>
<td>X/Y, X/T diagram, full interactivity</td>
</tr>
<tr>
<td>Tables</td>
<td>Free choice of parameters, full interactivity</td>
</tr>
<tr>
<td>Toolbox</td>
<td>Several options except printing parameters, scales of diagrams printing of logo types, test comments etc.</td>
</tr>
</tbody>
</table>

TOOLS AND PROPERTIES
QVA has a large set of predefined tools available to the user. This function makes it easy to handle functions such as image improvement, measurements in images and to perform calculations for the analysis.

OPTIONS
3D with two or more fixed cameras and a series of defined fixed targets in any one image can be tracked. The observations (tracked pixel coordinates) from each camera, computes the direction from each camera to the target, and finds the target position that is the best fit to the observations.

6 Degrees of Freedom (6DOF) is an optional feature that computes the position and orientation of a tracked rigid body from a single camera. The motion of the rigid body can be described with six parameters: three positions coordinates (x, y and z), which gives the position of a specific point on the body, and three altitude angles (roll, pitch and yaw), which gives its orientation in space.

To correct the image data from the camera, lens calibration is performed by using a mathematical model of distortion. A sequence of images from a target board is imported into the program and the coordinates of the target positions relative to the lens center is calculated.

Viewer allows the recipient to rerun the tracking with the images, graphs and spreadsheet data synchronized. Data collected during this process can easily be copied into other documents; the user does not require any additional program installation to run it.

The operator can also define properties like angles and distances between points. The system will then automatically calculate distance, angles, angle velocity and angle acceleration for each frame in the sequence.
PRESENTATION

One of the great advantages using the QVA system, is the possibility to present data and results in customized graphs and tables. It is easy to add comments, special graphics as well as to customize the appearance of a certain view. The main tools for presentations are 2D diagrams, diagrams in which data can be plotted against time or other values. All data, whether tracking data, or data inputted separately, can be plotted in single or multi axis X/T or Y/X plots with numerous options to customize.

Tables: All types of data can be presented in tabulated form using rows and columns. The diagram can easily be customized with different headers or combination of data.

APPLICATIONS

QVA provides maximum flexibility in managing, analyzing, and reporting optical data collected by the Qualisys Motion Capture System and Qqus High Speed Video. QVA has evolved from being a research tool into the most powerful and practical solution for many industries and researchers in fields, such as:

• Clinical Motion Analysis (including Gait Analysis)
• Human Factors Engineering and Ergonomics
• Neuroscience
• Sports motion analysis
• Animal motion studies
• Psychology studies