This document provides a brief overview of the WAM library. It is not an exhaustive feature list, but it gives a sampling of the WAM library's functionality.

Every WAM comes with its own PC running real-time Linux. Many WAM control demos and example applications are pre-loaded on the PC, along with their full ANSI-C source code. Each WAM application is linked against the WAM control library (source included, with C++ wrappers). This library offers easy access to many properties of the WAM, including:
- Joint torques
- Joint positions

Once it receives the joint positions from the WAM, the library uses the forward kinematics and mass parameters (from an easily-readable configuration file) to calculate:
- Tool position and orientation (XYZ, RxRyRz)
- Jacobians for each link
- Mass (inertia) matrix

The WAM is a fundamentally torque-controlled robot. The typical control loop asks for joint positions and calculates new joint torques at 500 Hz. This control rate is adjustable (up to 1 kHz) to meet your requirements. To assist with application development, the WAM library offers:
- Adjustable control loop sample time
- Real-time data logging of any application data up to the control frequency
- Control loop callback hooks to perform calculations on the WAM data in real-time

Due to the WAM's tension element (cable) drive system, motor torque is directly related to joint torque with zero backlash and near-zero friction. This makes it possible for the WAM library to perform online real-time joint torque calculations (using the Jacobian transpose) to generate any desired link forces. The WAM's "gravity compensation" routines use this feature to make the robot arm appear weightless by constantly calculating and applying the correct upward force on each link to negate the effect of gravity. Gravity compensation makes it very easy to perform lead-through teaching and precision playback. Real-time link forces are also useful for creating "haptic scenes" or interactive virtual objects that a user can "feel" within the workspace of the WAM. The WAM library gives you access to:
- Joint torques calculated to yield gravity compensation forces
- Teach & Play functionality with a simple keypress
- Simple haptic scene primitives

Even though a key feature of the WAM is its ability to apply forces in Cartesian (XYZ) coordinates without requiring a force sensor, the WAM library also provides a simple position controller (PID) in order to perform joint-space or Cartesian-space position moves like other robot arms. Therefore, the WAM library also provides:
- Point-to-point moves in joint or Cartesian space
- Adjustable acceleration and max velocity (for trapezoidal moves)
- Continuous-trajectory path-following in joint or Cartesian space
- Adjustable PID gains (control stiffness)
- Joint torque saturation limits
- Cartesian force saturation limits

Because the WAM was designed to be used with people in its workspace, safety is paramount. The WAM library allows you to adjust the sensitivity levels in the WAM's embedded safety system. This circuitry actively monitors the state of the robot, even if the control PC crashes. Using the WAM library, you can adjust:
- Torque limits to trigger a shutdown
- Joint velocity limits to trigger a shutdown
- Endpoint and elbow velocity limits to trigger a shutdown

For a more in-depth description of the WAM library API, please see the Doxygen documentation provided with the source code.