

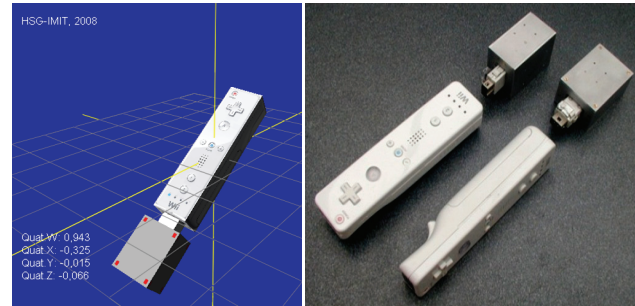
## VR inertial input device

VISENSO (Stuttgart), HSG-IMIT (Villingen),  
MicroMountains Applications AG (Villingen)



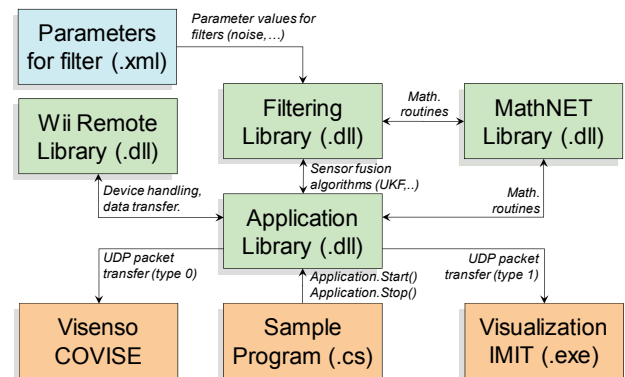
### BACKGROUND and BASICS

- Low priced, wireless 6DOF input devices are needed to realize cheap VR solutions for even small companies. This work addresses this problem by using existing consumer hardware and overcomes its limitations in the virtual-reality field (VR) while keeping the balance between price and technical feasibility.
- To reach this goal HSG-IMIT, MicroMountains and Visenso started a collaborative project to couple the knowledge of VR and micro systems to create an input device meeting those requirements.



### CONCEPT and SOLUTION

- The solution is based on the Nintendo Wii Controller ("Wiimote") and a LED bar of the gaming console because of its low cost and extendibility.
- The unmodified version of the Wiimote contains a 3-axis controller and a IR-camera which isn't sufficient to cover the needs to VR input devices like e.g. recognizing arbitrary orientation in space.
- Thus a custom Wiimote extension containing a 3-axis gyroscope was built and combined with Kalman filtering algorithms to overcome these limitations while still being low cost.



Software structure including Kalman filter algorithms

### STATUS and OUTLOOK

- The prototype is currently used as input device for the software COVISE to find appropriate usage scenarios in a VR environment and to adopt applications to this new tracking system.
- Further improvements of existing consumer hardware can be incorporated into our solution and therefore a tracking system even for engineering applications is available at a low price.



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