

Wireless 3D Motion Tracker



Xsens' MTw miniature wireless inertial motion tracker has been developed for ambulatory 3D kinematic measurements. Its wireless body-area network system will be shown for the first time at the Neuroscience 2010 conference, taking place from 13th to 17th November 2010 in San Diego.

The small but accurate wireless inertial 3D motion tracker offers new possibilities for ambulatory 3D kinematic measurement systems. One of the features of the MTw is the Awinda radio protocol which ensures highly accurate time synchronisation within the wireless network, comparable to the wired measurement systems from Xsens currently in use at hundreds of research institutes around the world. The importance of accurate time

synchronisation can be explained looking at the arm movement when playing tennis - both the upper and lower arm can move at angular velocities easily reaching 1000 deg/s. When tracking the 3D elbow joint angle, any error in timing, even of just a few milliseconds, would give rise to errors of several degrees.

The Xsens MTw brings the unobtrusiveness and ease of use of wireless technology to inertial 3D motion tracking. Colleen Monaghan, Product Manager Movement Science of Xsens says that the goal with this product is to further enhance the freedom of movement that inertial sensor technology brings to the field of 3D kinematics measurement systems by making the sensors wireless. "Losing the cables makes the system easier to put on and more comfortable to wear; something that is essential when working with patients outside laboratory settings. However, while making the product wireless, there was no question on compromising on accuracy - at any level. In fact, the MTw is our smallest and most accurate motion tracker ever."

Per Slycke, CTO of Xsens explains; "Xsens' R&D team has developed a patent pending radio protocol we call Awinda, based on standard low-cost 2.4 GHz ISM chipsets, that takes care of time synchronization of up to 32 MTw's across the wireless network to within 10 μ s." Fred Dijkstra, System Architect at Xsens adds; "Wireless data transmission is great because of the freedom it gives the user, but from a technical point of view you have to deal with data packets being lost during transmission. Traditional radio protocols reserve a lot of time for acknowledgement of data packet reception and re-transmission of data, which means the network throughput will drop dramatically. With Awinda, specifically developed for inertial sensors, we took a new approach - if a data packet from the sensor is lost in transmission the sensor will not re-transmit that packet but use the embedded processor to integrate the information from the "lost" data packet into the next one. This way, you can keep the accuracy in real-time motion tracking, without any impact on radio network throughput. The benefit for the user is that you do not have to worry about the accuracy of your measurement varying with the quality of the radio link." The MTw Development Kit includes; multiple MTws, a combined wireless receiver and charging dock, MT Manager, a Windows software for recording and real-time visualisation of data and an SDK compatible with amongst others C/C++, MATLAB, LabVIEW. Using the specially designed click-in straps ensures efficient and secure fastening to the body.

The MTw is available for ordering with shipments in place in December 2010. For a preview of the MTw, visit Xsens at the Neuroscience 2010 conference November 13-17, 2010 in San Diego, USA at booth #2635.