iVM-x

High Performance AHRS

V.M.SENS

Inertial Motion Sensing Technology

The iVM™-x is a high performance, miniature, gyro-enhanced Attitude and Heading Reference System (AHRS) / motion tracking system. Its internal low-power signal processor provides a quaternion-based iMTFusion™ algorithm to output drift-free 3D orientation as well as calibrated 3D acceleration, 3D rate of turn and 3D earth-magnetic field data.

The iVM™-x can be widely used for stabilization and control of cameras, antenna robots, vehicles and other (un)manned equipment and also other field where high-performance 3D orientation measuring is needed.

High Light

- Real-time computed attitude/heading and inertial dynamic data
- High Effective VMSENS EKF senses fusion
- 360º orientation referenced by gravity and earth magnetic field
- MEMS base 3D gyroscopes, accelerometers and magnetometers integrated
- On board data processor with real-time sensor fusion algorithm
- Gyroscopes enable high-frequency orientation tracking
- End to end software support

Performance

The VMSENS device uses multi-inertial sensors to estimate the orientation. The single used gyroscopes to calculate orientation, the drift is inevitable. To compensate for drift completely, the device corrects its orientation using the gravity and the earth magnetic field as reference vectors. The VMSENS iMTFusion™ algorithm can cope with magnetic and accelerations, resulting in a reliable orientation estimate. Additionally, the VMSENS provided a magnetic field calibration routine to correct for hard and soft iron effects.

Output

- 3D orientation Quaternion/ Euler/ DCM
- 3D acceleration/ 3D rate of turn/ 3D magnetic field

System Performance

Dynamic range	± 360 deg - Pitch/ -Roll/ -Heading
Acceleration	±20/ 50/180 m/s² (±2/ 5/ 18g)
Max rate of turn	±300/ 450/ 1200°/sec
Static accuracy pitch/ roll	< 0.3 deg
Static accuracy heading1	< 0.5 deg
Dynamic accuracy2	2 deg RMS
Angular resolution	0.03 deg
Max updated rate	120 Hz

1 in homogeneous magnetic environment,
2 under condition of VMSENS algorithm, decided by motion type

Sensor Specification

	Gyroscope	Accelerometer	Magnified
Dimension	3D	3D	3D
Range	± 300 deg/s	± 180m/s²	± 450 mGauss
linear	0.1% of FS	0.1% of FS	0.1% of FS
In-Run Bias Stability (1σ)	0.007 deg/s（-40～+85 °）	0.2 mg	0.1 mGauss
Noise	0.05 deg/s/√Hz	0.5 mg/√Hz rms	0.5 mGauss (1σ)
Alignment error Axis-to-axis	0.1 deg	0.2 deg	0.25 deg
Alignment error Axis-to-frame	1 deg	1 deg	0.5 deg
Linear Acceleration Effect on Bias	0.05 °/sec/g		

Physical Specification

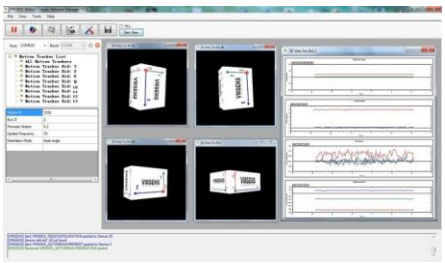
Environment	-20.... +60 oC
Working Environment	0.... +40 oC
Dimensions (WxLxH)	59×34×14 mm
Weight	32 g

Software System Integration

With the VMSENS SDK, your preferred solution is easy and fast to realize, with the demo source code, you will have your measurement unit up and running in just a few minutes to start your first R&D.

The COM-Object and DLL API interface Development Tools

The VMSENS COM-Object and DLL API will help save time in interfacing in a reliable way with VMSENS devices in a Windows environment. Direct low level interfacing gives full control and maximum flexibility. The example code (C/C++, Excel (VBA) and Matlab/ Labview) can be easily extended to a user-specific program.



Low Level Communication Lib (For embedded systems) (optional)

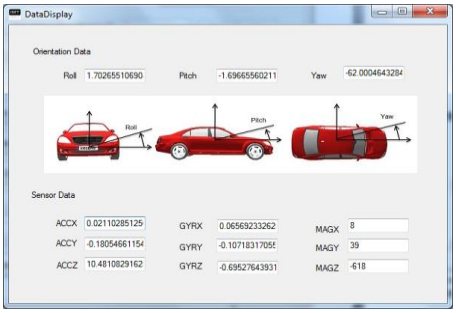
VMSENS provided low-level C libraries for embedded developments to ease the development procedure on embedded systems.

Sample code

The VMSENS provide sample code of the development ways mentioned above, by reading the sample code and comments, unprofessional developers can developer the motion applications in a few minutes time.

VMSENS Motion Tracker Network Manager

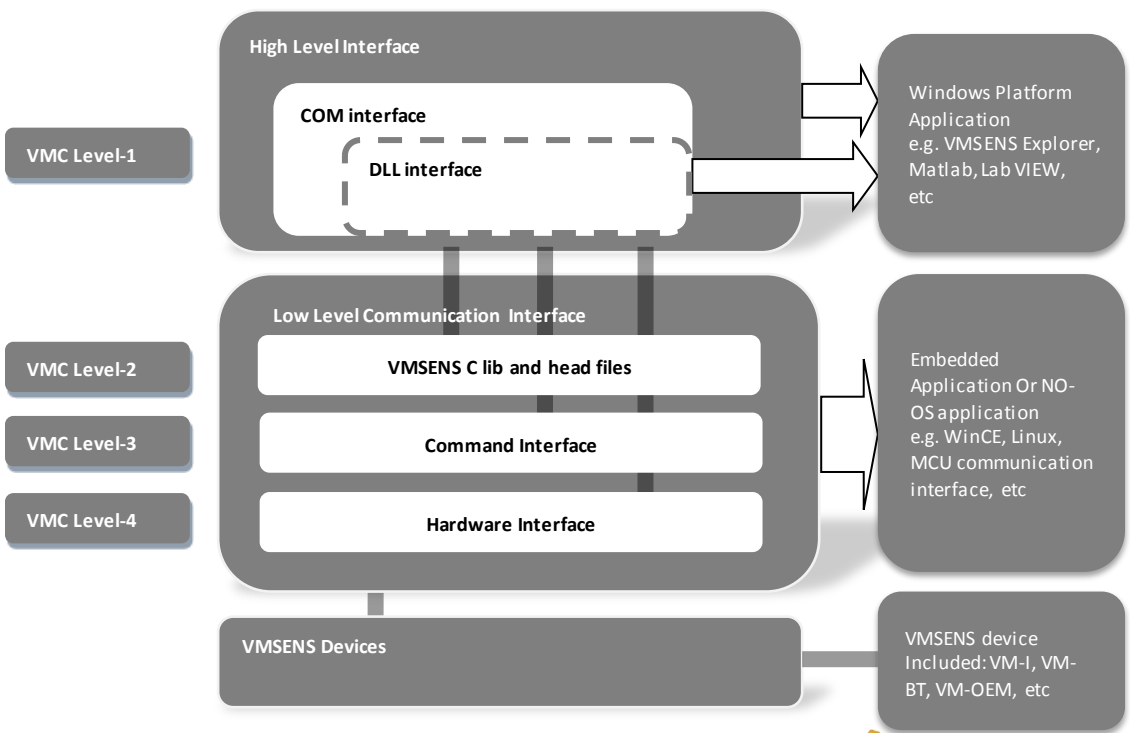
The VMSENS Motion Tracker Network Manager is graphical interfaced software to be used with the VMSENS devices, by using the Motion Tracker Network Manager, user can get ,save and view the real-time inertial motion data easily, the data is shown via friendly graphical component to the you.



iMT™ inertial Motion Tracking

The inertial Motion Tracking Package（iMT）is a collection of functions used in the inertial measuring field by the VMSENS, by exploring the iMT, users can find useful functions needed in the motion and attitude measuring field, also user can integrate these function components into their own systems quickly.

The 3rd Party Support



iVM-x Development Kit include:

- VM-I motion sensor
- power calbe
- USB adapter
- Document
- Portable case

Application

Unmanned Vehicles control

• Stabilization AUV/ROV/UUV

•Orientation adjustment for equipment under water

•Vehicle performance analyzing

•Orientation measuring for unmanned vehicles

•GPS enhancements

The Inertial Navigation System (INS) is one of the most critical parts of an unnamed vehicle. VMSENS has developed reliable products to help you in the design of a miniature and powerful Navigation System. Due to its small size and high performance, a full featured Attitude and Heading Reference System (AHRS), is perfect to measure the orientation and the position of a miniature unmanned vehicles.

VMSENS AHRS products are fast responding can ensure stabilize the orientation and can also keep the heading in normal and abnormal situations.

Platform Stabilize

•Antenna platform tracking

•Camera platform

The VMSENS product is small enough for integration with most of the platforms where stabilizing is needed, such include cell base station antennas, radar systems, the satellite tracking antennas, the VMSENS provide product with fast response and high turning rate measuring range to track the platform in full 360 orientations, for Stabilizing the camera platform, the picture quality of the camera can be ensured.

Robot &Equipment Control and Stabilize

•Equipment Control and Stabilize

•Robot orientation sensing

•Balance control for humanoid& biped robot

•Robot arm control

•Remote control robot

Vmsens Inertial Technology specializes in the design and development of ultra high performance inertial motion tracking technologies meeting the needs of our global customers.

As the leading solution provider of inertial motion tracking technologies, we provide miniature (MEMS) inertial motion tracker/ AHRS (VM-i, iVM-x , iVM-w) and portable, occlusion free, camera-less inertial motion capture system (MOX), combining high-quality hardware and easy-to-use software, we offer innovative ground-breaking solutions.

Vmsens' R&D stuff has created unique intellectual property in the field of sensor fusion algorithms and biomechanical modeling; our inertial tracking system has been proved to be accurate, fast response, reliable, and robust against any harsh environments.

Now, Vmsens brings all the benefits of the inertial tracking solution to market with our unique motion tracker product line.

Industrial Application

Equipment Control and Stabilize
Unmanned Vehicles control
Robot controls
Platform Stabilize
Personnel Tracking

Media & Entertainment

Animation
Games
Virtual Reality

Virtual Reality & Simulation

Training Simulations
HMD Walking in Virtual World
Full-Body Motion Capture
Interaction

Biomechanics

Biomechanics
Sport Science
Gait Analysis & Rehabilitation