

DMS - DYNAMIC MOTION SYSTEM

The TENSA Dynamic Motion System (DMS) is an extremely powerful multi-function inertial and position information system designed to provide decision support information and data for offshore marine operations. It provides:

- vessel motions (heave, heave velocity, heave acceleration, unfiltered accelerations, angular rates)
- attitude (heading, pitch and roll)
- position and GPS data (lat, long, northings, eastings, elevation, velocity)

It incorporates a wireless communication system as well as the ability to connect over long distances (up to 500m) by wire as well as USB connection to a PC. The application software that runs on the host PC can view and log the data from multiple sensors and provide real time differential data using the information from 2 sensors. The system is designed to be user friendly, intuitive and to operate without the need for any supporting technicians or significant training. It is also designed to be extremely robust, highly portable and very cost effective.

There are 3 DMS models.

DMS Max - wired and wireless connectivity with long life battery

DMS Mini – USB connection only

DMS Buoy – portable floating unit with DMS Max functionality



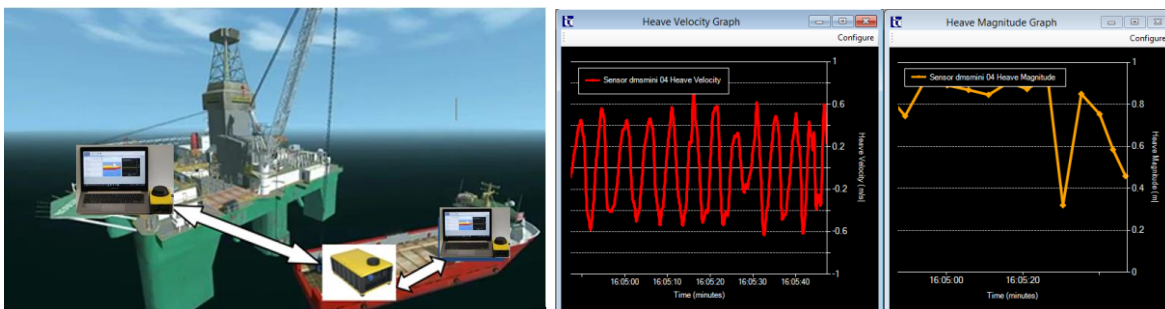
DMS Max with wireless receiver module, DMS Mini with USB connection and DMS Buoy.

APPLICATIONS

Offshore Lifting - Vessel Heave Velocity Monitoring

When lifting a load from a moving boat deck, the crane is subjected to dynamic loads produced as a result of the difference in velocity of the load and hook at the instant of lift. This velocity difference requires energy to be absorbed by the flexibility of the lifting system. Traditionally, the significant wave height (Hsig) has been used. This is an inaccurate method of estimation which can easily underestimate loads by 50% as it is a statistical sea state parameter and does not necessarily correlate to the motions of the load on a vessel.

The DMS gives a graphical output of the load velocity and allows a crane operator to see the vessel heaving in real time. He can then predict when lulls are likely to occur between large wave sets. The systems logging capability offers the ability to record the actual conditions during the lifts.



The DMS provides data to both the vessel and the rig via wireless or wired connections.

The DMS is equipped with a GPS which allows the load position relative to the crane centre to be displayed. These facilities give the software the capability to recommend a dynamic factor, choose the crane chart and define the crane capacity at the current load radius.

Vessel Motion Monitoring

The DMS can be used to monitor the motions of a towed vessel using its telemetry link. In this mode the DMS can output and log a selectable range of variables which would typically include:

- sensor accelerations (useful for determining the true loads at any location)
- heave acceleration, velocity and displacement
- GPS position
- pitch , roll, heading, speed

The logging and monitoring computers can be on the towed barge, on the tow vessel or in both locations. Log files can be archived daily. Remote desktop can be used to view data in real time over the internet.

Vessel motion monitoring is also used to determine if conditions are suitable for personnel transfer.



Determine safe conditions for access



Monitor towed cargo from tow vessel

Vessel Position Monitoring

The wireless linked GPS system can be used as a simple remote position indicator. It has a range of up to 1km in standard form. This is ideal for monitoring the position of moored or standby vessels, mooring buoys etc. Output can also include each vessel's position, heading, speed and motions. The sensors could also be mounted on buoys to monitor anchor locations or to monitor wave conditions.

Helideck Monitoring

The DMS can provide motion monitoring information of offshore helidecks for assessing whether it is safe to operate. At this stage the system does not provide the meteorological data to be CAP437 compliant.

Custom Applications

TENSA can provide custom solutions using this hardware and data management platform.

DMS MODELS

DMS Mini

The DMS Mini is an entry level system designed to be ultra portable and to provide all of the DMS functionality where wireless or a long distance wired connection is not required. Just plug it in to the USB port on a Windows notebook and start using it. The software application has the full DMS functionality and the DMS mini can work alongside other DMS units.

DMS Max

The DMS max adds a 12 hour battery, RS422/485 and wireless connectivity and the ability to run from an external power supply between 5V and 24V. The RS485 connectivity allows the unit to be hard wired to the PC up to 500m away. Power is transmitted over the same cable connection. The DMS Max is ideal for permanent mounting on a vessel. It will display information locally and transmit this data to a receiver on another facility when in the vicinity.

DMS Buoy

The DMS buoy is a DMS Max inside a portable buoy. As well as providing the full DMS functionality, it can deliver real time wave data. The DMS Buoy is designed for applications where an accurate measurement of wave conditions is needed to support an operation such as a rig move. The DMS buoy can be lowered over the side of the rig or vessel and a wave sample recorded for say 20 minutes before deciding whether conditions are suitable. The DMS buoy can also be connected directly to a PC by USB cable if used indoors.



FEATURES AND SPECIFICATIONS

- Sensor with 3 x accelerometers, 3 x gyros, 3 x magnetometers, GPS and high resolution air pressure sensor.
- Simple to use Windows application with intuitive setup (Windows 7 and later compatible)
- Powerful software capability to create "pseudo sensors" at points where data is required using information derived from sensors located at fixed offsets. This allows the vessel motions at a critical position to be determined when the sensor is located at another place on the vessel.
- Powerful software capability to create differential results from the output of 2 sensors. This allows relative motion between 2 sensors or between a sensor and a fixed point to be output in real time and logged as a parameter.
- Unit is self calibrating and does not need to be critically aligned.
- maximum cable run 500m.
- wireless range up to 1 km. Wireless uses 900MHz bands and can be easily adapted to the requirements of any country. 2.4GHz band optional.
- up to 4 sensors can be monitored at one time
- ability to incorporate and log load cell data simultaneously with motions.
- Tensa has a product development programme to add new features, sensors and capability in upcoming software revisions. Sensor firmware and PC software is upgradeable.

Comparison of Features

FEATURE	DMS Mini	DMS Max	DMS Buoy
USB interface	■	■	
Wireless interface		■	■
Wired interface RS485		■	■
12+ hour battery		■	■
Power from USB	■	■	■
Power via interface cable		■	■
IP67 enclosure	■	■	
IP68 enclosure			■
Dimensions LxWxH (mm)	150x100x50	225x140x100	350x350x1000
Weight	0.5 kg	1.0 kg	9.0 kg

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