

Advanced Orientations Systems, Inc.

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IQ-BORE wireless

Advanced Portable WIRELESS BI-DIRECTIONAL Compass Probe for Borehole Profiling and Tool Orientation.

Have you questioned yourself what the final position of the drill is, or what is its actual orientation?

Was the required borehole direction maintained?

Was the target location reached? Is directional correction needed?

How confident are you in your answer?

Are your movements restricted by cable or try-pod?

IQ-BORE wireless OEM Version --->



WIRELESS TECHNOLOGY IS HERE TO HELP !

Trial and error may work well in laboratory but when it comes to drilling and mining, there is no room for error and no time or money for trial. With elevated drilling costs and increased environmental regulations coupled with increasing labor and material costs the demand for specialized tooling has sky-rocketed. There is growing demand for low cost tools that help increase productivity and drilling accuracy, provide information on the profile of the finished borehole or tunnel, and allow accurate multi-drilling and multi-directional alignment. This is notably true in applications where GPS can not provide valid directional or total orientation information.

AOSI, (Advanced Orientation Systems, Inc.), a Linden, New Jersey, USA based manufacturer of inclinometers, tilt sensors and electronic compasses has a practical solution. With Wireless IQ-BORE-wireless AOSI puts mining and borehole professionals back in control.

IQ-BORE-wireless, a two directional borehole profiling system, includes 1.5" diameter 18.5" long compass probe and a cable. The system will operate with any users SMART PHONE. The new bi-directional IQ-BORE-wireless system is able to provide total borehole profile and tool face orientation, X-Y-Z magnetics fields, borehole pitch, tool

roll and temperature. This system is perfectly suitable for numerous Trenchless applications like HDD (horizontal directional drilling) and verification of prescribed paths for underground conduits, pipes and cables. The probe can detect and display deviations and/or deflections in horizontal directional drilling drills trajectory attributed to fractured formations or formations changing from soft to hard and back to soft sections.

IQ-BORE-wireless can be most useful in any of the following directional drilling applications where other methods are more expensive or not feasible:

Power cable installation	Pipeline and environmental inspections
Crossing waterways and roadways	Congested intersection & shore approaches
Water/sewer/gas/oil line installation	Borehole inspections
Telecommunications conduit installation	

Since AOSI's portable borehole probe can profile both VERTICAL as well as HORIZONTAL boreholes, there is no need to have two separate borehole deviation probes, one for each orientation. The user does not need to retract the probe or go through prolonged setups and re-calibration procedures in order to switch between orientation modes. Single click switches from vertical profiling mode to horizontal, or vice versa. This is achieved by sensing magnetic field of Earth together with pitch and roll orientation of the sensing IQ-BORE-wireless head. Then it uses AOSI's algorithm to accurately calculate the 3D orientation of the IQ-BORE-wireless compass and its direction.

While in Horizontal mode the IQ-BORE-wireless operates in special (**Avionics Roll mode**). Just like a rolling jet flying forward, the magnetic probe, while at any roll orientation inside the borehole, still outputs accurate borehole direction. This advanced feature sets the IQ-BORE-wireless apart from any other borehole profiling tool. The system includes special reinforced abrasion resistant cable. Due to systems modular design and construction the cable is available in various standard and custom lengths.

IQ-BORE and the ENVIRONMENT

For proper operation of the IQ-BORE-wireless it is important to teach the IQ-BORE-wireless its surroundings. One important item is IQ-BORE-wireless's proximity to ferrous effects or objects. If the IQ-BORE-wireless operates in an open field without any magnetic or ferrous interference, the response of the IQ-BORE-wireless will be without any distortions. The combined functions of X and Y fields will create a non-distorted circular response. In case the IQ-BORE-wireless is placed in an area where the magnetic flux is distorted, the output of the IQ-BORE-wireless loses its accuracy and linearity. To overcome errors due to external interference IQ-BORE-wireless is equipped with hard and soft iron calibrations. Each calibration can be easily selected from a pull down menu on the smart phone app.

The most common ferrous distortions are:

1. Placing the IQ-BORE-wireless inside a vehicle
2. Driving over a metal bridge or over utility pipes.
3. On a ship or large transport
4. Near a transformer or any random ferrous object

As a result of these field disturbances the response of the IQ-BORE-wireless may change from circular shape output. If a field distortion is detected, it is recommended to perform HARDIRON compensation (HIC). The purpose of HIC is to mathematically convert the elliptical output shape to a circular shape and centrally shift its poles. After the HIC calibration IQ-BORE-wireless will calculate translation coefficients which will be used to correct the output curve. The resulting output shape of the IQ-BORE-wireless output after Hard Iron compensation looks more like a circle.

For applications requiring higher IQ-BORE accuracy or having multiple ferrous field disturbances, the IQ-BORE includes a Dynamic Soft Iron compensation option. The idea behind this compensation is to segment the output curve into smaller segments and correct for linearity error in each segment individually. This compensation will remove the residual influence of multi-pole magnetic field interference and most linearity errors. The user is able to select the number of correction intervals (10 to 72) and then the IQ-BORE-wireless will store the raw IQ-BORE-wireless value and automatically instruct the user through all steps of calibration. The calibration sequence takes only one full revolution. Upon completion of the full rotation the "soft iron" calibration automatically calculates and stores all correction coefficients. Laboratory testing showed that with 72 point calibration IQ-BORE-wireless's accuracy was well within 0.25 deg. The field Soft Iron calibration with the phone app is limited to 12 points or one point every 30 degrees.

HANDHELD CONTROLLER is YOUR SMART PHONE

The custom IQ-BORE-wireless SMART PHONE APP communicates with the probe, sends and receives user commands and displays graphic and numeric data on the screen. All displayed data is in real time. Stored data can be forwarded via e-mail or text to any PC, Tablet or other smart phone for further data analysis, display or data sharing.

CONCLUSION

State of the art WIRELESS IQ-BORE-wireless systems are becoming more popular for their friendly interface, fast update rates and portability. It will not be long before these slick powerful instruments become the standard issue for numerous applications in the mining, surveying and trenchless industries. This low cost and reliable wireless solution helps integrating IQ-BORE-wireless into rough, dynamic and size sensitive environment. IQ-BORE-wireless is a perfect example where IQ-BORE-wireless proves to be the logical alternative to old style, bulky and slow coil based instruments. IQ-BORE-wireless can be used with similar success in underwater dredging, ROV navigation, pan & tilt camera orientation among other high tech applications where the dry-end section is used for wireless link to any Smart phone or Tablet.

More products and systems can be found at [**www.aosilt.com**](http://www.aosilt.com)