

# Maritime Technologies | Optical Magnetic Heading Sensor

## MODEL 321 BENEFITS

### CHALLENGES

Key problems facing subsurface vehicle operators today are:

- Sufficient of azimuth / compass heading accuracy in GPS/GNSS deprived underwater environments
- Re-calibration for each new project or change of location due to compass operating magnetic field changes
- Increase in drifts after a short period of usage

### CONVENTIONAL PRODUCTS

The main products available today are magnetic compasses and flux gate compasses. They all have common limitations and challenges:

- None of the above flux gate or equivalent direct sensing electronic compasses eliminate inaccuracies due to vertical heeling error
- Re-calibration is required for each new project or change in location
- Some underperform in harsh marine conditions

### ION INNOVATIVE SOLUTION

Model 321 Optical Magnetic Sensor

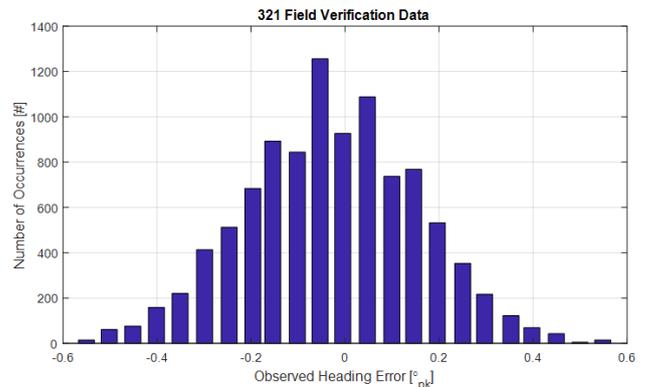
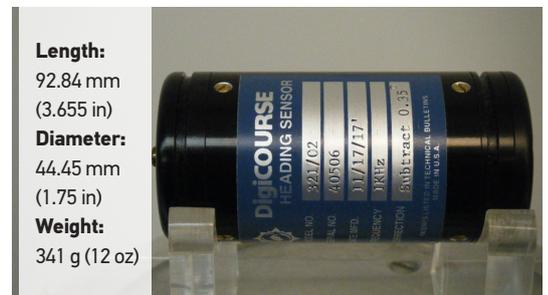
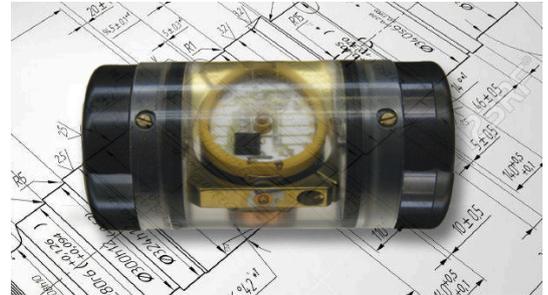
The Model 321 is a heading sensor that uses an optical encoder that is magnetically aligned to the earth's North Pole providing:

- Accurate, reliable measurements under a variety of marine operating conditions worldwide
- Unique, magnetically coupled optical encoder construction which eliminates the need for in-theater re-calibration: ION's sensor can be used on multiple projects, and multiple locations, without the need of re-calibration.
- Proven history of 0.5 degree (or better) accuracy in many applications

### PROVEN TRACK RECORD

ION's 321 Heading Sensor is the industry standard in the seismic exploration sector:

- Installed base of more than 70,000 units worldwide
- Successfully deployed in harsh environments, and all latitudes, in military, scientific and commercial applications
- Stringent compass verification processes performed on many thousands of projects globally
- The failure rate, regardless of elapsed time since the last factory calibration or field verification, has been less than 0.2% (i.e. less than 2 units per thousand failed)



Above is data from more than 8000 field verifications from around the globe over a period of 4 years. The standard deviation of 0.198° is approximately 1/2 a bin width of the 10-bit compass code card.