Custom **Inertial Navigation** Based **Solutions** for **YOU**

IPOZ ML1® Inertial Module for SMART PIG is a mapping module used in In-Line Pipeline Inspections (ILI) based on Inertial Navigation technology. It is the perfect mapping tool for all pipeline inspections (pigging) for pipe diameters of 16 inches upward to any size. After post-processing the raw inertial data recorded by ML1®, IPOZ will deliver complete 3D position and 3D orientation at 100Hz for all features and attributes plus the precise 3D map of the pipe.

The IPOZ ML1® Inertial Module™

Embedded in the ML1® is a highly accurate tactical grade IMU, it provides direct measurement of linear and angular motions as the PIG travels down the line. The raw data are recorded by the ML1® electronics which are downloaded for post processing at the end of the pigging. A sophisticated IPOZ post-processing software, INSPIG, is used to compute the best estimate of the pig moving trajectory.
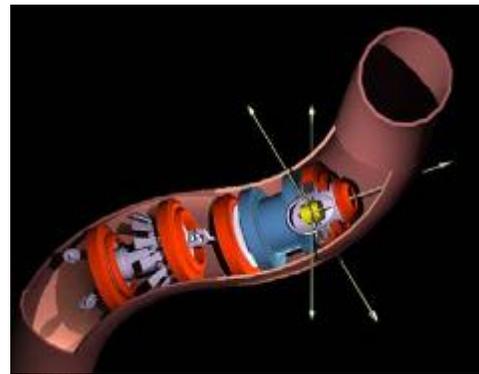
To maintain accuracy, a control point is placed approximately every kilometer along the line to provide "ties". Those tie points are precisely surveyed and often times occupied by a device called an Above Ground Marker (AGM) box, which gives exact timing information of pig passage in order to apply the tie position to correct the inertial error.

Advantages of integrated inertial over external surveys:

⑨ **Centerline, Full Feature Mapping**
⑨ **Out-of-straightness**
⑨ **Bend detection and characterization**
⑨ **Dent and buckle discrimination**
⑨ **Strain detection and analysis**
⑨ **Geotechnical, such as frost heave / thaw settlement surveys**
⑨ **River crossing / Marine span**
⑨ **Pipe joint misalignment**
⑨ **Orientation of Electric/Magnetic readings etc...**

Accuracy and Productivity The results of comparison surveys show that the accuracy of the 3D positions and orientations derived from the IPOZ ML1™ data are of the highest level in the industry. After post-processing, continuous 3D positions within 1m are the norm, and can be brought to the decimetric level by request. Orientations are typically 0.1 degree or less.

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High Definition Profiling and GIS

SPECIFICATIONS:

An IMU is an Inertial Measurement Unit composed of 3 accelerometers and 3 gyroscopes, capable of measuring three-dimensional linear and angular changes without external information.	**Post-Processed Positional Accuracy:** Horizontal Position: <1m, better on request Vertical Position: <1m, better on request Recommended distance between AGM & Control Positions: <1.6 km or 1 mile (linear). Accuracy <0.1m
By design the IPOZ ML1™ ILI module can operate in the most extreme pigging situations including high pressure, velocity and temperatures, and is meant to flow inside the pig, with the pipeline product usually.	**Post-Processed Orientation Accuracy:** 3D Orientation: <0.1 degree **Solutions** delivered typically at 1" or user defined intervals
Inputs Power: 28-32 volts, 25W Optional Odometer pulses: TTL	**KEY SPECS:** Power: 25W nominal Dimensions: 7 in. OD x 12 in. length Cylinder Pressure: 3000psi Operation temp: -54C +65C continuous operation Connector: Burton 13 pin for Power and Ethernet IO Length of operation: unlimited, determined by batteries
Outputs Raw inertial data are encoded and stored in an internal hard drive. After trapping the survey the data is sent to IPOZ for post-processing. Reports in Industry Standard formats (ILI reports, ASCII, SEGP1, DXF, DWG, SHAPE…).	**Warning:** ITAR Controlled. Requires Export Licenses.