

THE ADVANCED PIPELINE GEOMETRY PIG



Why Pipesurvey International?

Pipesurvey International is a new pipeline inspection and services company, established in the year 2002. At the same time, its engineers accumulate decades of experience in the pipeline industry. The company has set up a range of tools that are based on the very latest standards of technology.

Pipesurvey International has grown to be a key supplier of high technology and cost effective pipeline integrity tools. The philosophy of Pipesurvey International is to open new frontiers in technology for the pipeline industry and develop tools that make no compromise in performance and accuracy. Pipesurvey offers unbeatable quality of service and is yet capable to offer these services and technology against competitive terms.

Being a small and flexible organization, Pipesurvey International is able to respond promptly to the customers requirements and offer services that are tailored to today's demands for pipeline integrity



The Advanced Pipeline Geometry Pig

The Advanced Pipeline Geometry Pig is a multi channel high resolution mechanical caliper pig that incorporates numerous extra devices which register the dynamic behavior of the pig. The complete set of data offers valuable information about the pipeline geometry, such as deformations, curvatures, misalignments, bend radii.

The Advanced Pipeline Geometry Pig offers insight to the operator about the structural integrity of the pipeline and surpasses the capabilities of many so called caliper pigs that are available in the market. For the calibration measurement, Pipesurvey uses a unique design of sensors which offers the highest resolution attainable in caliper pigs. As a result, any change in pipe radius will result in an amplified signal.

The sensors are in direct contact with the pipe wall and give a complete coverage of the circumference of the pipe. The sensors are of an extremely rugged design which makes the caliper pig suitable for the hostile environment of even old and hard-to-operate pipelines.

To give an idea about the vast range of information that the Advanced Pipeline Geometry Pig gathers about your pipeline, it is equipped with the following sensors:

- Special design independent and multiple channel mechanical sensors to detect deformations at the highest possible resolution and with exact indication of clock orientation.
- Two odometers of a special low-slip design for accurate location.
- A time based bench marking system links inspection data to GPS coordinates and prevents unnecessary excavations.
- Rotational and linear inertial sensors register the dynamic behavior of the pig and offer information about the pipeline profile, bend radii and angles.
- High frequency linear inertial measurements reveal data about friction, weld penetrations sediments and other pipe wall characteristics.
- Temperature, pressure and ΔP measurement sensors offer additional data which help to analyze the operational and pipeline conditions.

A wide scope of applications

The Advanced Pipeline Geometry pig is a versatile tool that can be applied for the assessment of pipeline features, conditions and events, such as:

- Dents, buckles, wrinkles, ovalities, weld penetration
- Bends and bend radii, upheavals, misalignment, slope instability, inclinations, land slides, river crossings, risers, valves, Tees
- Sedimentations, wax growth zones, liquid slugs, erosion.

The Advanced Pipeline Geometry Pig can be used at new construction as well as in operating pipelines. Running an Advanced Geometry Pig to monitor the pipeline and operational conditions offers added value to the pigging program, which may include cleaning or metal loss inspection.

Pig location in GPS coordinates

The Advanced Pipeline Geometry Pig uses a time based benchmarking system with above ground markers that are linked to GPS. The above ground marker will exchange signals with the pig as it passes and the location is stored for future reference. The absolute accuracy of the defect location depends on the interval of the natural or artificial marker points and is specified as 1:2000.

Local Pipeline Mapping

The system of inertial sensors offers sufficient resolution to create local pipeline profiling and mapping as the pig continuously monitors acceleration and rotation in 3D space. Depending on the velocity of the pig, bends with radii up to 50 D can be detected.

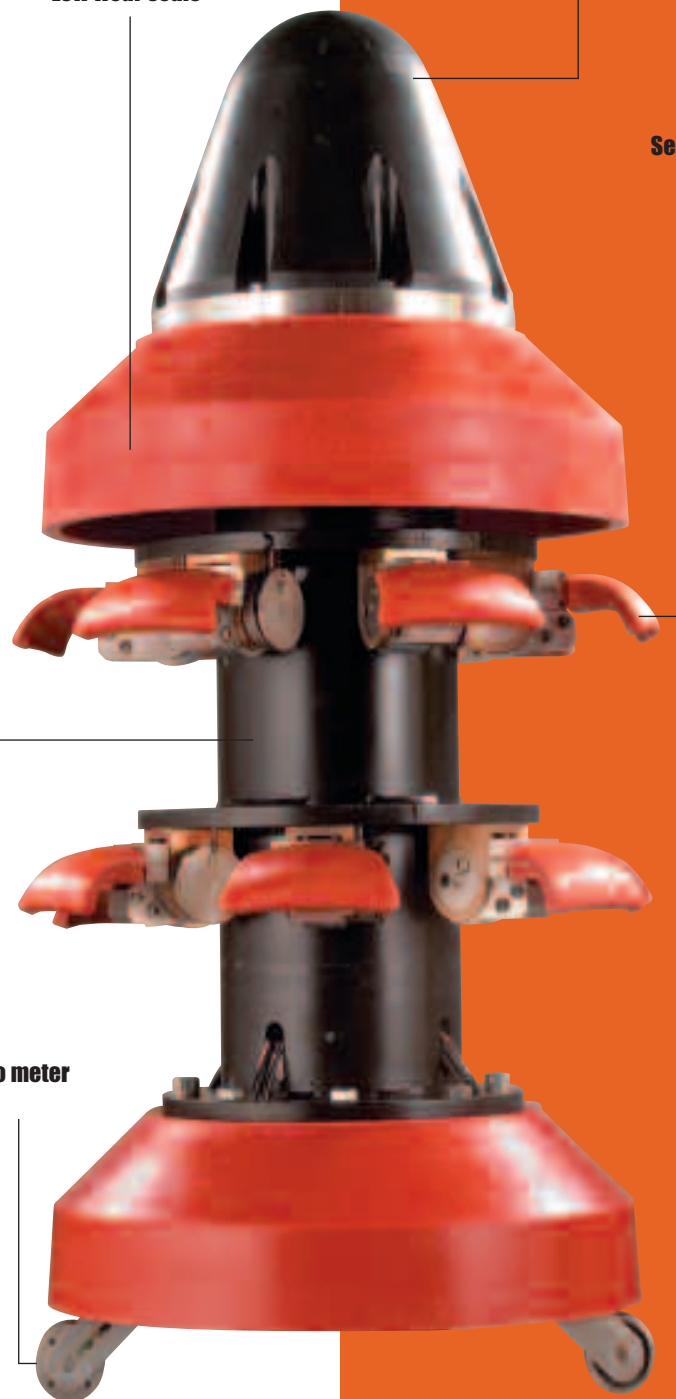
Boardcomputer

Transmitter

Low wear seals

Sensor

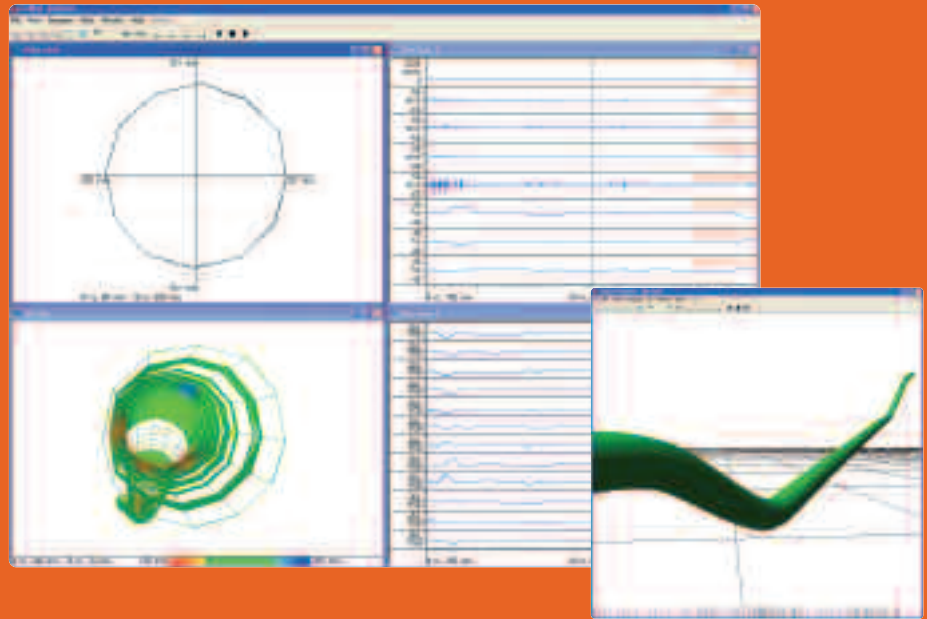
Odo meter



The Advanced Pipeline Geometry Software

The Advanced Pipeline Geometry Software is an extremely powerful and highly user friendly diagnostic tool. It allows the user to visualize the detected features, view the pipeline on variable scale, select length sections, view cross sections, curved sections, and zoom in on anomalies and generate 3-D plots. Each spot can be printed on a data sheet with log distance, weld distance, the length of affected pipe, clock orientation and characteristics of the deformation.

One can scroll through the complete inspection data, assess and quantify deformations, correlate caliper data with pig dynamics and pressure differential data, plot a velocity profile, monitor pipeline



profiles and the operating conditions. The software can be installed on the users PC together with the data and is a helpful

instrument to interpret measurements. It enables the pipeline operator to prioritize pipeline remediation activities.

Service

Pipesurvey International offers complete customer service. Prior to each inspection, Pipesurvey will hold a pre-inspection

meeting with the customer to discuss and agree the running conditions, operational procedures, safety procedures, required

facilities, pipeline access, general layout, GPS locations, adequate pipeline cleanliness and the mutual responsibilities. For each job, Pipesurvey International mobilizes the calibrated Advanced Pipeline Geometry Pig with adequate spares, computer hardware for on-site data verification and well trained field engineers.

A field report is normally available within 24 hours after completion of the inspection and determines the completeness of the inspection data.

The final report is normally submitted within 30 days after completion of the inspection and contains:

- a complete set of processed data
- a copy of Advanced Pipeline Geometry Software
- a daily site report
- a complete list of categorized features in hard copy

Technical specifications of the Advanced Pipeline Geometry Pig

Available sizes:	6" - 56"
Min. required pipeline bore:	80% of nominal pipeline I.D.
Accuracy:	+/- 1.0 mm
Ovality:	+/- 1.0 mm
Location accuracy:	+/- 0.1% of travel distance
Distance to girth weld:	+/- 0.1 m
Curvature detection:	max. 50 D radius
ΔP measurement:	1 mbar standard
Operating pressure:	0 – 100 bar
Operating temperature:	0 – 60 °C
Bend capability:	1.5 D
Battery life:	min. 50 hrs
Operating speed:	0.5 – 4 m/s
Number of caliper channels:	8 – 36, depending on pipe size
Pipeline Media:	Natural Gas, Crude Oil, Finished products, Water, Air
Specific technical specifications for special applications are available upon request.	



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