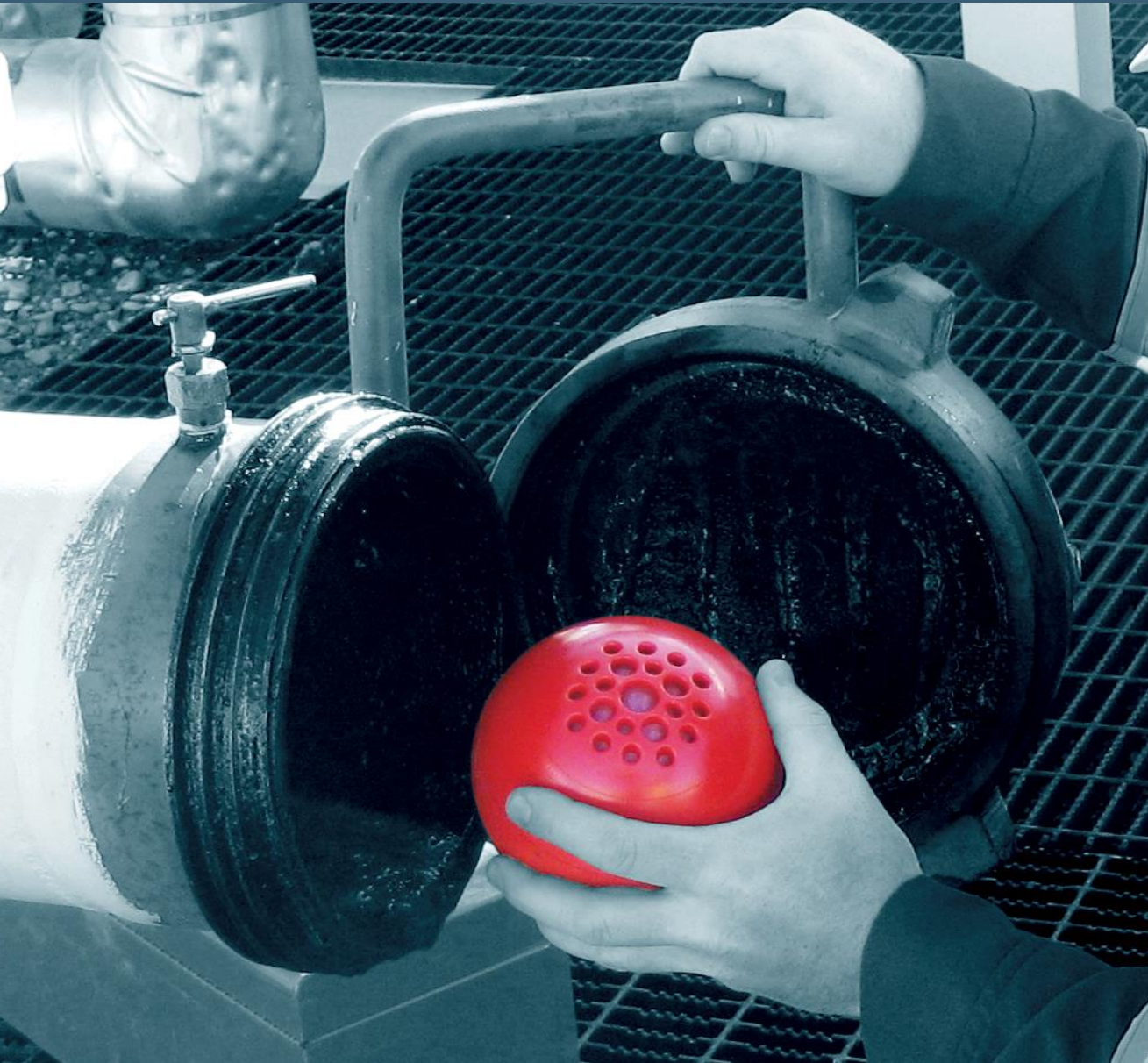


# Smartball® Technology

*A free-swimming, multi-sensor tool  
for inspection of oil and gas pipelines*

# Technology Overview



- Free-swimming multi-sensor platform
  - Equipped with acoustic, pressure, temperature, magnetic and inertial mapping sensor packages
- Used routinely in piggable & unpiggable pipe
- Effective in both liquid and gas pipelines
- Launched and retrieved from existing pig traps

# SmartBall Applications



Confirmation of Containment



Pipe Wall Assessment



Pressure and Temperature Profiles



Inertial Mapping

# Platform Benefits



Multi-sensor tool that provides a variety of pipeline data



Able to identify small leaks undetectable using conventional systems



Can complete long surveys in a single deployment



Easy to deploy and track throughout survey

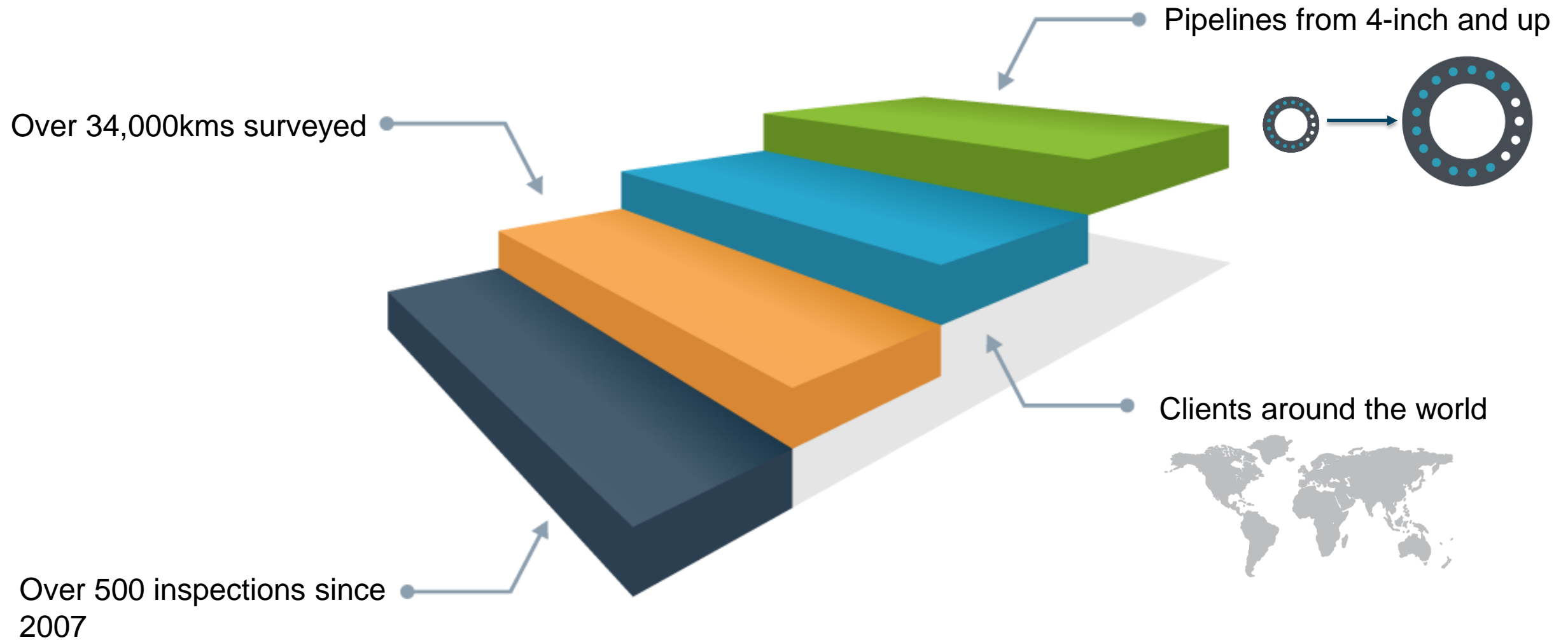


Able to assess difficult-to-pig and unpiggable lines



Lightweight platform for easy shipping and tool preparation

# Proven Experience



# Applications

## *How does SmartBall fit into Integrity Programs*



01 No ILI tool can detect all defects



02 Capture axial but not radial



03 Minimum size threshold



04 No pinhole defect detection



05 Stress/Geo-Hazard screening

# Applications

*How does SmartBall fit into Leak Detection Programs*



01 CPM models lack sensitivity



02 Validate alarm conditions



03 Complementary to LDS



04 Recurring HCA inspection



05 Pinhole sensitivity

# Confirmation of Containment

- ▶ Equipped with a sensitive acoustic sensor
- ▶ Can detect pinhole leaks as small as 150 mL / min
- ▶ Can identify leaks that conventional LDS cannot
- ▶ Location accuracy within 1.5 meters

## Can be used for:

- 01** Routine surveys on critical pipelines 
- 02** Compliment ILI surveys 
- 03** River crossings 
- 04** Illegal tapping 
- 05** Hydro testing 



# Pressure and Temperature Profiles

- ▶ Equipped with pressure and temperature sensors
- ▶ Not sealed against the pipe wall like traditional ILI tools

## Can be used for:

**A**

Integration into flow models for ICDA



**B**

Coating defects due to high temperatures



**C**

Input of temperature and pressure profile into SCADA



# Pipe Wall Assessment

- ▶ Equipped with magnetic sensor
- ▶ Records: girth welds, bends, valves, taps and pipe wall stress
- ▶ Identifies: large cracks, wall loss, dents and physical loading that cause stress on the pipe wall

## Can be used for:

**A**

Girth weld and joint tally for mapping



**B**

Low level of pipe wall condition assessment



**C**

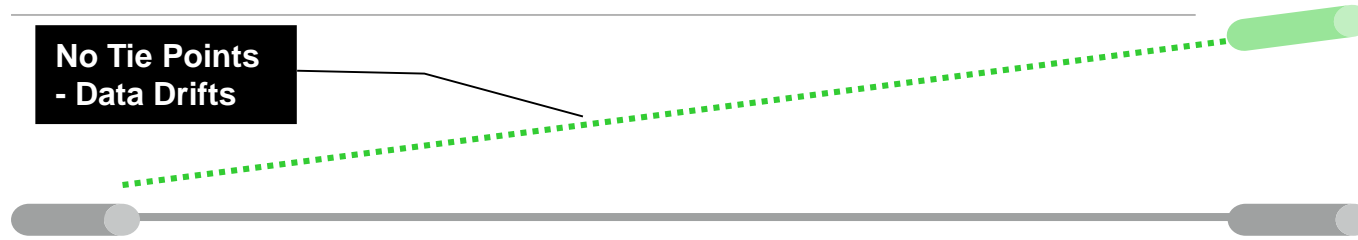
To confirm bend locations and pipeline geometry



# Tracking

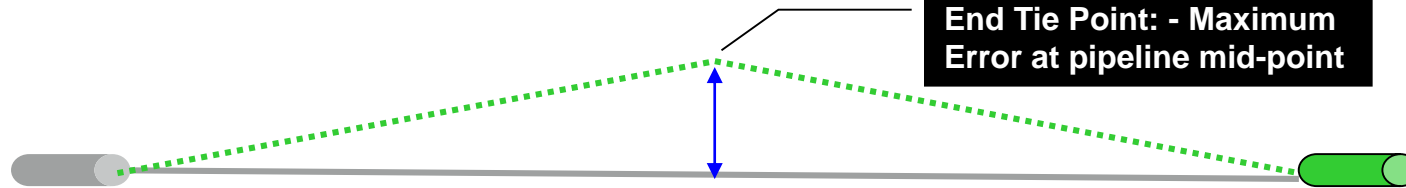
01

No Tie Points  
- Data Drifts



02

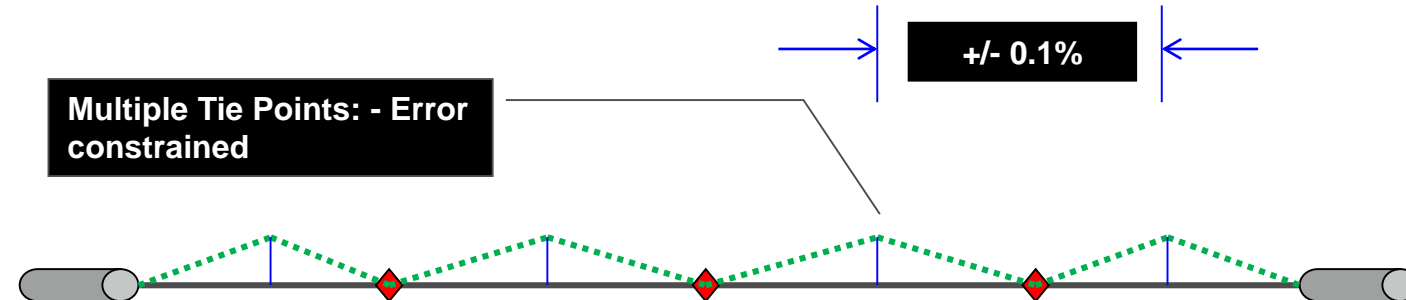
End Tie Point: - Maximum  
Error at pipeline mid-point



03

Multiple Tie Points: - Error  
constrained

+/- 0.1%



# Tool Specifications

## Tool Characteristics

SmartBall Diameter	4"	6"	8"	10"	12"
Outer Diameter of Tool	3.15" (80mm)	5.3" (135mm)	7.125" (180mm)	8.75" (220mm)	10.75" (275mm)
Suitable Pipe Diameter	4" (100mm)	6" (150mm)	8" (200mm)	10" (250mm) and greater	12" (300mm) and greater
Power Source	Lithium primary	Lithium rechargeable	Lithium rechargeable	Lithium rechargeable	Lithium rechargeable
Tracking	22Hz & SBR	22Hz & SBR	22Hz & SBR	22Hz & SBR	22Hz & SBR
Maximum Run Time	12 hours*	55 hours	115 hours	150 hours	400 hours

\* 4-inch tool can have 29 hour battery life upon request

**Thank You!**