

3M Locating & Marking

part of 3M Track & Trace Solutions



Innovating
Toward
Faster Growth

\$27 B Global Diversified Technology Company

Consumer and Office Business
Sales: \$3.5 billion

Health Care Business
Sales: \$4.3 billion

Industrial & Transportation
Business
Sales: \$7.1 billion

Electro and Communications
Business
Sales: \$2.3 billion

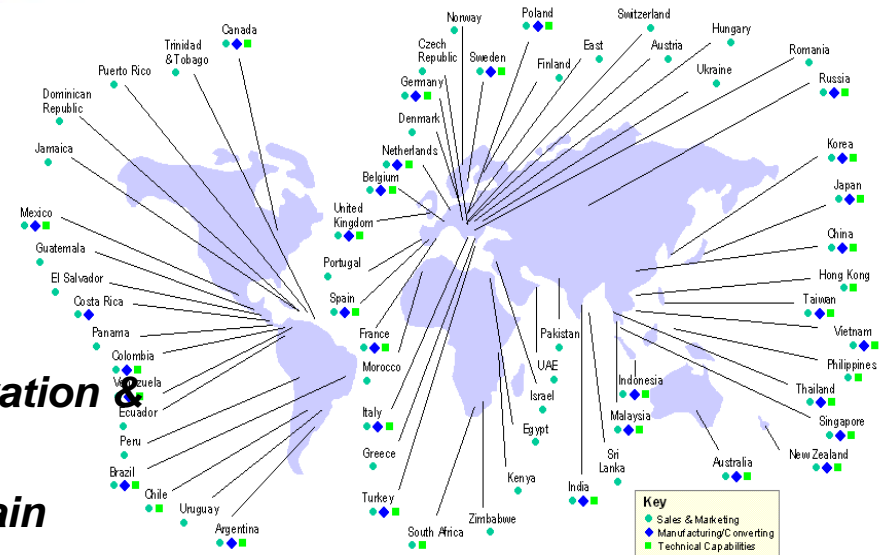
Display and Graphics Business
Sales: \$3.1 billion

Safety, Security and Protection
Services Business
Sales: \$3.2 billion



42 Divisions
Organized into Six Market
Leading Big Businesses

- **75,000 Employees**
- **Sales In >200 Countries**
- **Operations in > 65 Countries**
- **> 61% Sales From International**
- **Global Brands Recognized For Innovation & Quality**
- **Leading Manufacturing & Supply Chain Technologies**

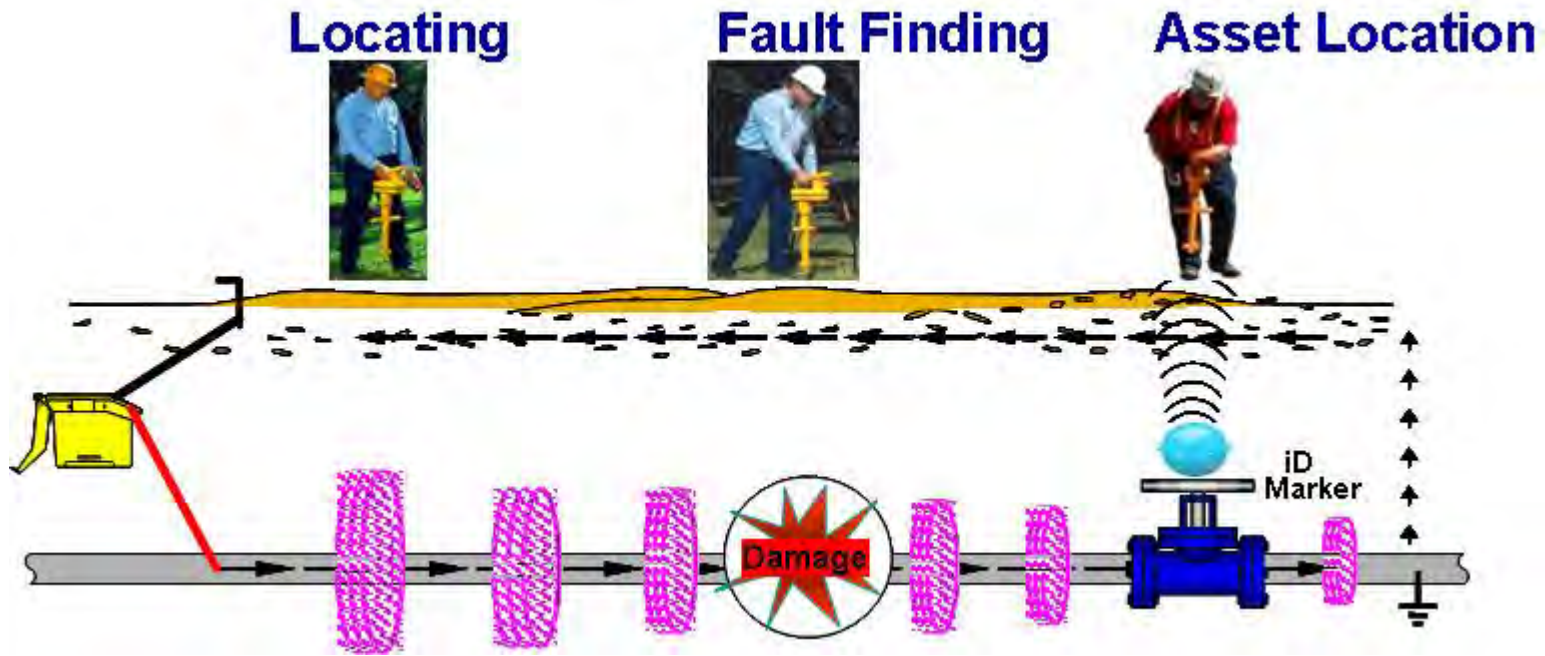


What do our customers need ?

- Locate Pipes & Cables
- Troubleshoot broken tracer wire
- Locate points of special interest
 - Maintenance
 - Construction
- Mark assets

Make the job of maintaining facilities safe and cost efficient

3M Locating & Marking



Provides solutions for locating, fault finding, and accurate marking of buried utilities for companies committed to ensuring safety, quickly restoring outages, minimizing operating costs and efficiently managing assets.



Telephone

Gas

CATV

Power

Water

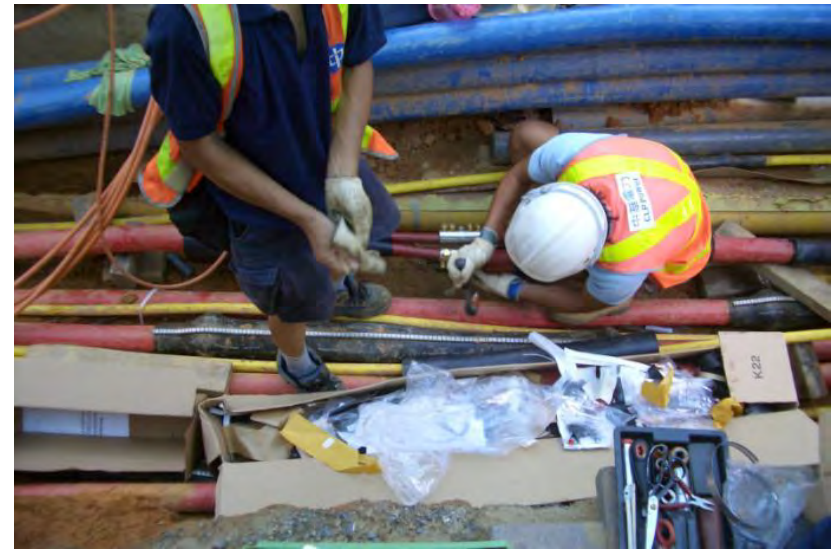
Wastewater

GP/Rec Wtr



The challenges for utilities globally are three fold:

Where are my assets?



How do I know they are mine?

How do I protect them?

Locating Challenges

Documentation

- Inaccurate records
- Incomplete 'As built' maps
- Un-mapped facilities
- Abandoned facilities



Environment

- Congestion
- Grounding
- Common Trenches
- Soil condition or type
- Facility access limitations
- Multiple utilities of same type
- Absence of metallic conductor(s)
- Multiple markers in area
- Need to access items of particular interest in buried facilities that are not locatable using EM locators

People

- Skill level and experience
- Workload fluctuation
- Quality & Productivity

Cost of Accidents



Repair Cost

Consequential Costs

- Death/Injuries
- Property Damages
- Emergency Services
- Repair Cost
- Lost Time
- Lost Material
- Lost Sales
- Lost Taxes
- Lost Production
- Machinery Damages
- Secondary Emergency
- Spoilage
- Legal Cost

Locators

Locator Products

Best
2500 Series

6 Frequencies

2550
2550-ID



2573
2573-ID



Better
2200M Series

2220M



2250M
2250M-ID



2273M
2273M-ID



Good
2200
Series

2210



Good
Cable Locate
2 Freqs

2250



Better
Cable Locate
4 Freqs

2273

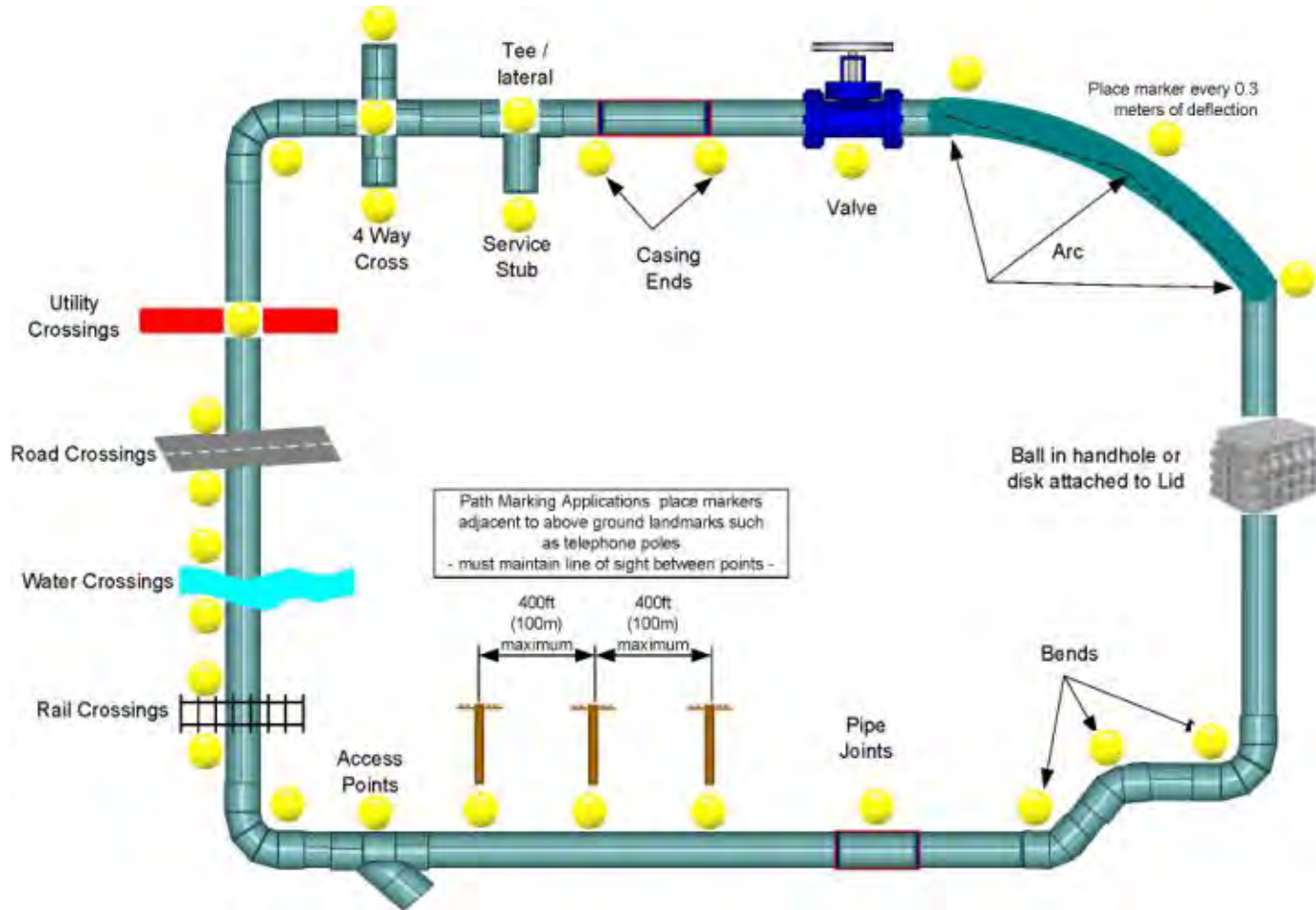


Best
Cable/Fault
Locate 4 Freqs

Electronic Marking Products



Oil & Gas Marking



Crossings - Water - Major roads - Rail - Other Utilities	Service Stubs Repair Points Squeeze points Valves Valve Boxes	Non-metallic pipe Path on straight sections Bends & Arcs Depth Changes Laterals / Tee's	Annode Electrodes, Test points for CPS/CPM Encasement ends Access points
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Electronic Marking System

Near Surface
• 2 ft depth



RFID Option

Ball Marker
• 5 ft depth



RFID Option

Disk Marker
• 5 ft depth



RFID Option

Vault Marker
• 5 ft depth



Duct Marker
• 2 ft depth



Mid Range
• 6 ft depth



Full Range
• 8 ft depth



RFID Option



Telephone

Gas

CATV

Power

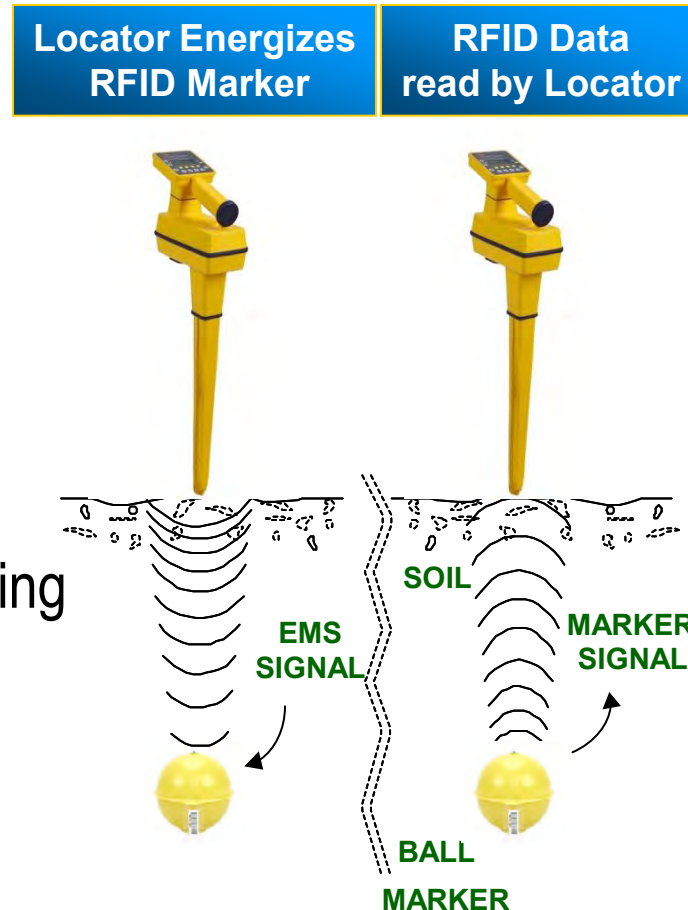
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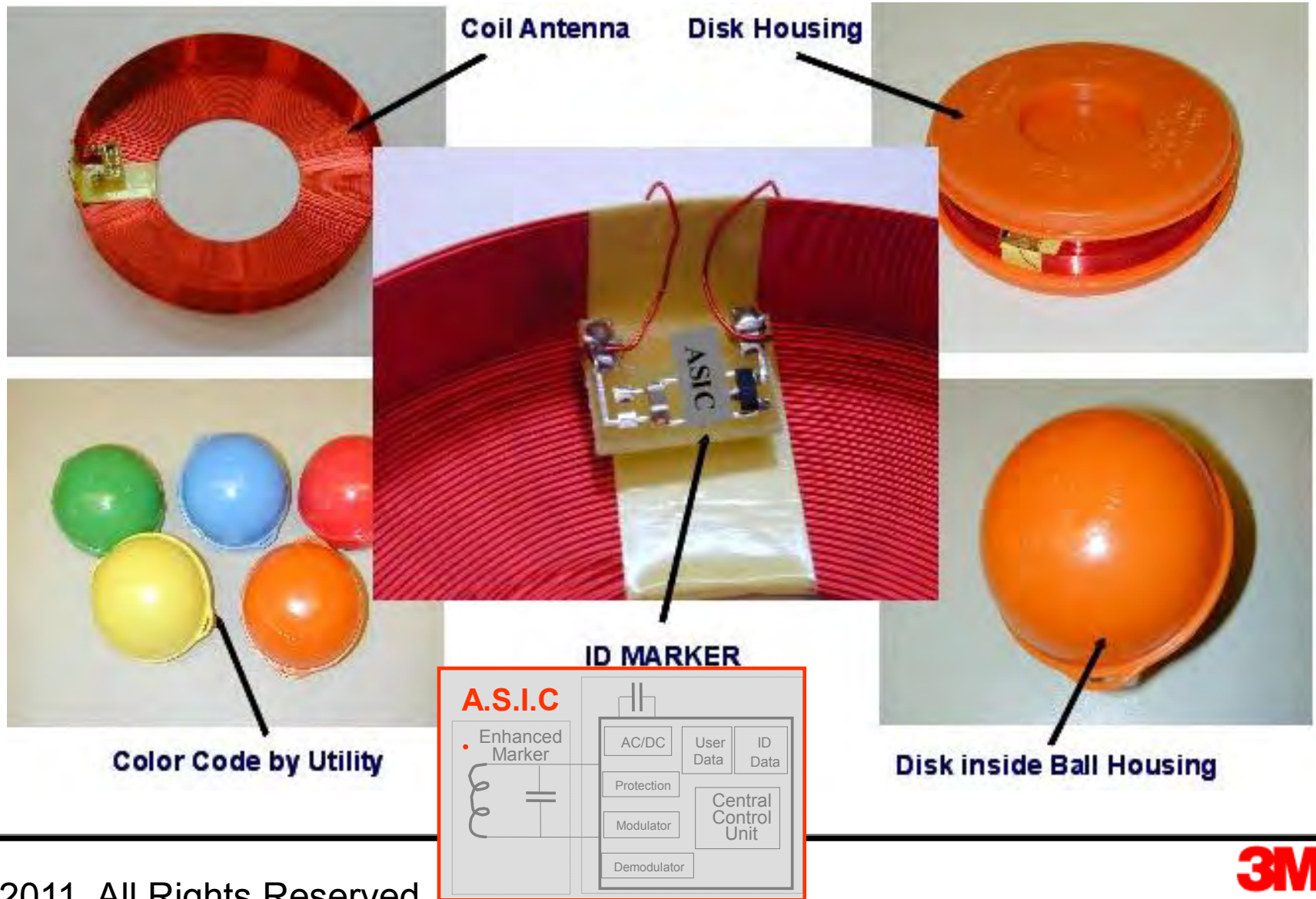
Electronic Marking System (EMS) Technology

- 30+ Million markers WW
- 30+ years of experience
- Passive Transponder
 - No Battery needed
- Precise & Accurate Location
- 30+ Year Lifetime
- RFID Capability
- Enhanced Asset Mgt - Mapping
- Positive Identification
- Certainty in an Uncertain Underground



- User Input Data
- Facility information
 - Owner information
 - Location information
 - Unique Serial No. pre-programmed

RFID Marker Technology



Locating Technologies

Electromagnetic Locating	
(+)	(-)
Quick	Access limitations
Appeals to generalist workforce	Issues with congestion
Eqpt relatively inexpensive	Non-metallic facilities
Ubiquitous	Points of special interest
	End of facility stubs
	Laterals
GPR	
(+)	(-)
Non-metallic facilities	Specialist operator
Price coming down	Soil type dependant
	Eqpt relatively expensive
	Bulky

GPS	
(+)	(-)
Efficiency in Field Mapping	Specialized skill requirement
Efficiency in updating Back Office	Economic relocation of points
Cycle time to update map records	Sensitivity to physical environment
	System Cost

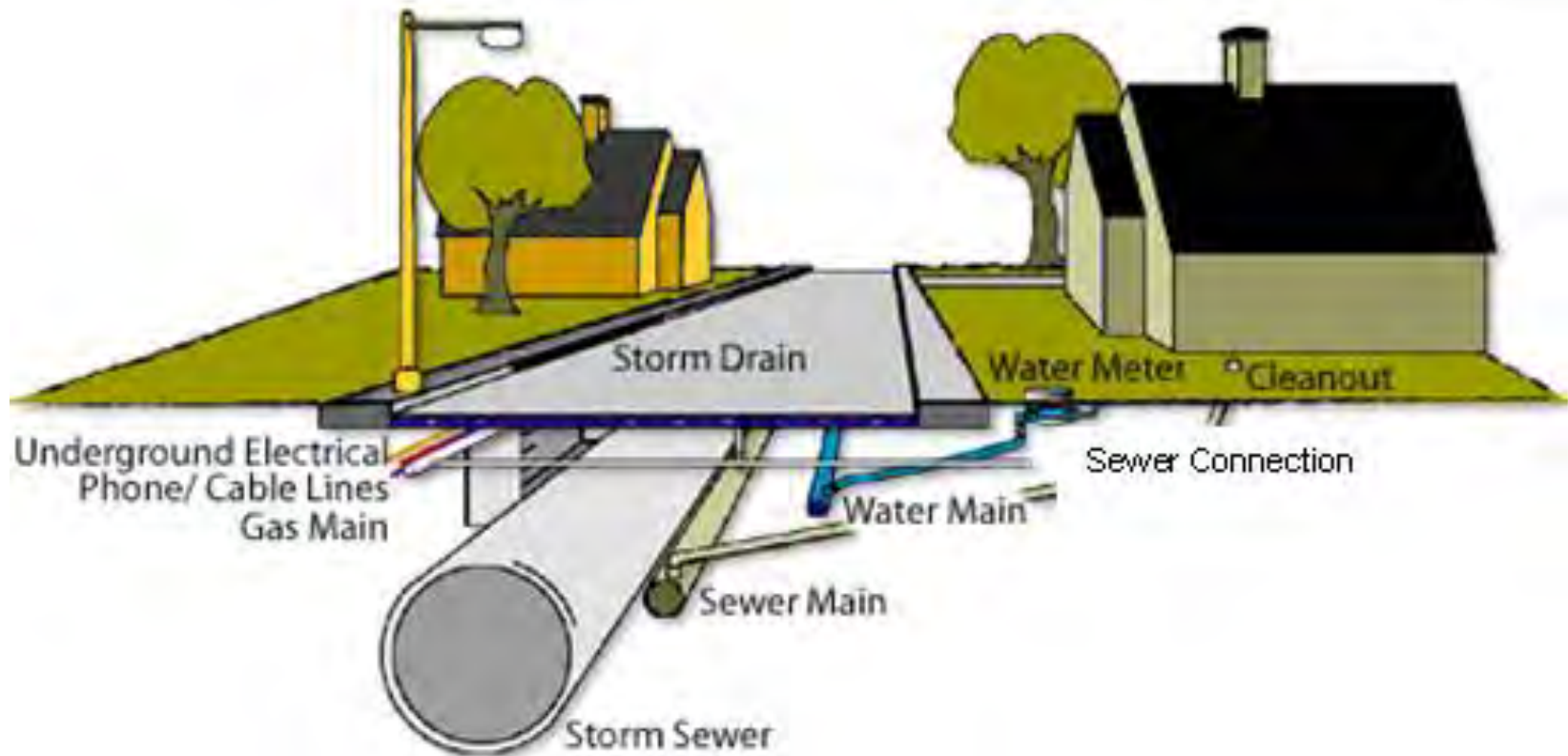
Above ground marking	
(+)	(-)
Visible at grade	Succeptable to physical & environmental damage
Displays facility information	Do not outlast the facility
No specialty eqpt reqd to locate	Maintenance required over time
Relatively inexpensive	



Electronic Marking	
(+)	(-)
Ease of use	Requires locator
Precision of locate	Not visible at grade
Confidence in location	Standardization by all utilities
Tolerance to congestion	Need to be aware marker is present
Metallic and Non-Metallic facilities	
Path and Point identification	
Outlasts life of the facility	

Locating Plastic Pipe

Locatable Pipe and Caution Tape



Transforming L&M to Infrastructure Asset Management Solutions

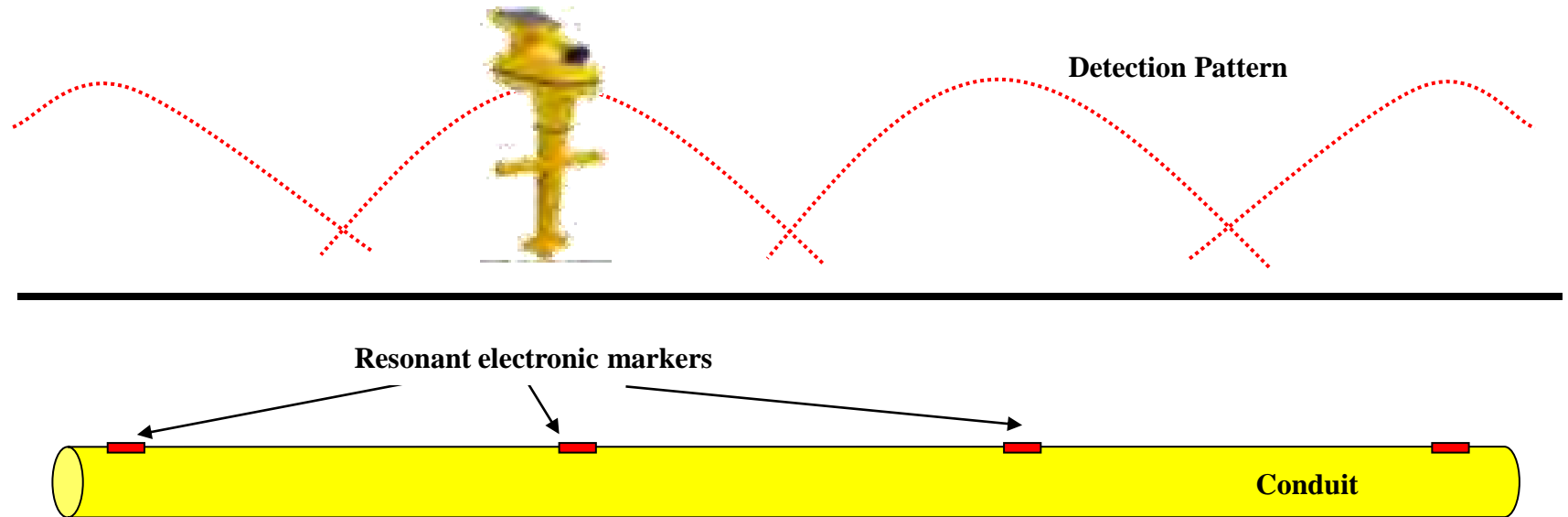
Underground assets moving to plastic which presents locating problems

- **Worldwide, plastic accounts for 80% of pipe manufactured today**
 - Cost of plastic and increased durability make it a financially more attractive choice
 - Non-Conductivity of plastic pipes can not be found the same way as traditional metal
- **Solutions for finding plastic pipes today have limited success**
 - Tracer Wire commonly used but has many problems
 - GPS can identify the general area of the pipe, but it is not precise enough for digging
 - Ground penetrating radar works in some applications but it is expensive
- **With increased liability and safety concerns growing worldwide, a new solution is needed for locating plastic pipes**

What If ? . . .

- **Tracer wire was not required for non-metallic facilities**
 - No maintenance to maintain a wireline network that doesn't carry revenue
 - Reduced material cost
- **No installation costs**
 - No more issues with breakage, corrosion, access points getting lost
- **No issues with metallic wires that could attract lightning or cause other safety issues**
- **No need for locator transmitters and reduced labor for location**
- **No issues associated with electromagnetic locating and congestion of utilities and bleed over**
- **No issues with congestion in public right of ways**
- **No interference from**
 - Nearby utilities
 - Chain link fences, guardrails, cars/vehicles, above ground objects

How does it work ?

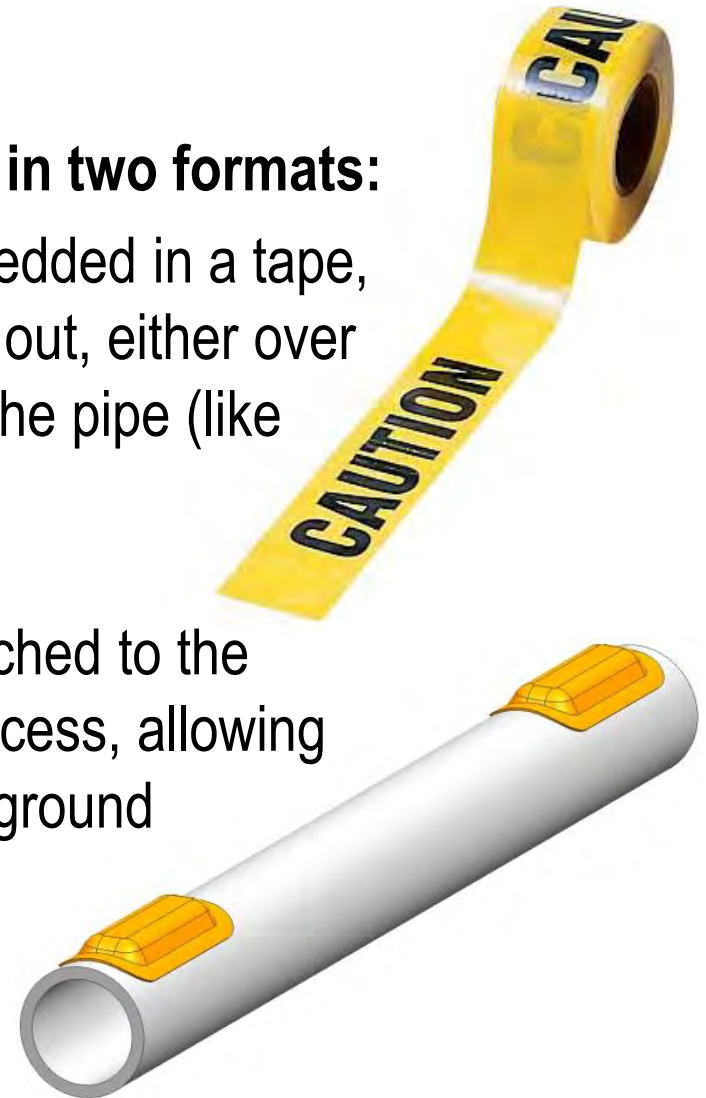


- **Detection method:**

- Electronic resonant markers are placed 1 - 2m spacing
- Detector based on integrated unit that locates existing marker frequencies and RFID markers, cable/pipe locator option
- Different frequencies will be created for each utility, allowing for differentiation in detection

Form Factors

- **Plastic Pipe Locating Solutions will come in two formats:**
 - **On-Tape:** electronic markers will be imbedded in a tape, similar to warning tape, that will be rolled out, either over the pipe (similar to tracer wire) or above the pipe (like caution tape)
 - **On-Pipe:** Electronic markers will be attached to the actual pipe, during the manufacturing process, allowing for pipe to be “locatable” once it is in the ground



Detection system designed to last as long as the assets they mark

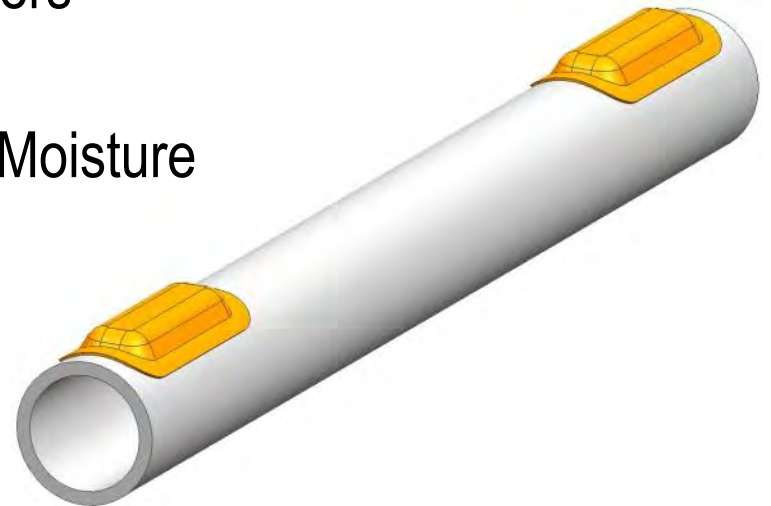
Specification:

- **Frequency:** Industry specific for Water, Gas, Telecom and Sewage
- **Max depth:** Initial Launch products: 0.9 m and 1.2 meters
- **Environment:** Any type of soil irrespective of moisture content
- **Expected life:** > 50 years
- **Temp. Range:** -20C to +40C
- **Installation:** directly pre-mounted on warning tape or plastic pipe
- **Pipe size:** 12 mm (0.50") diameter to over 300 mm (12") diameter
- **Pipe material:** HDPE or PVC
- **Detector:** Ruggedized, hand held

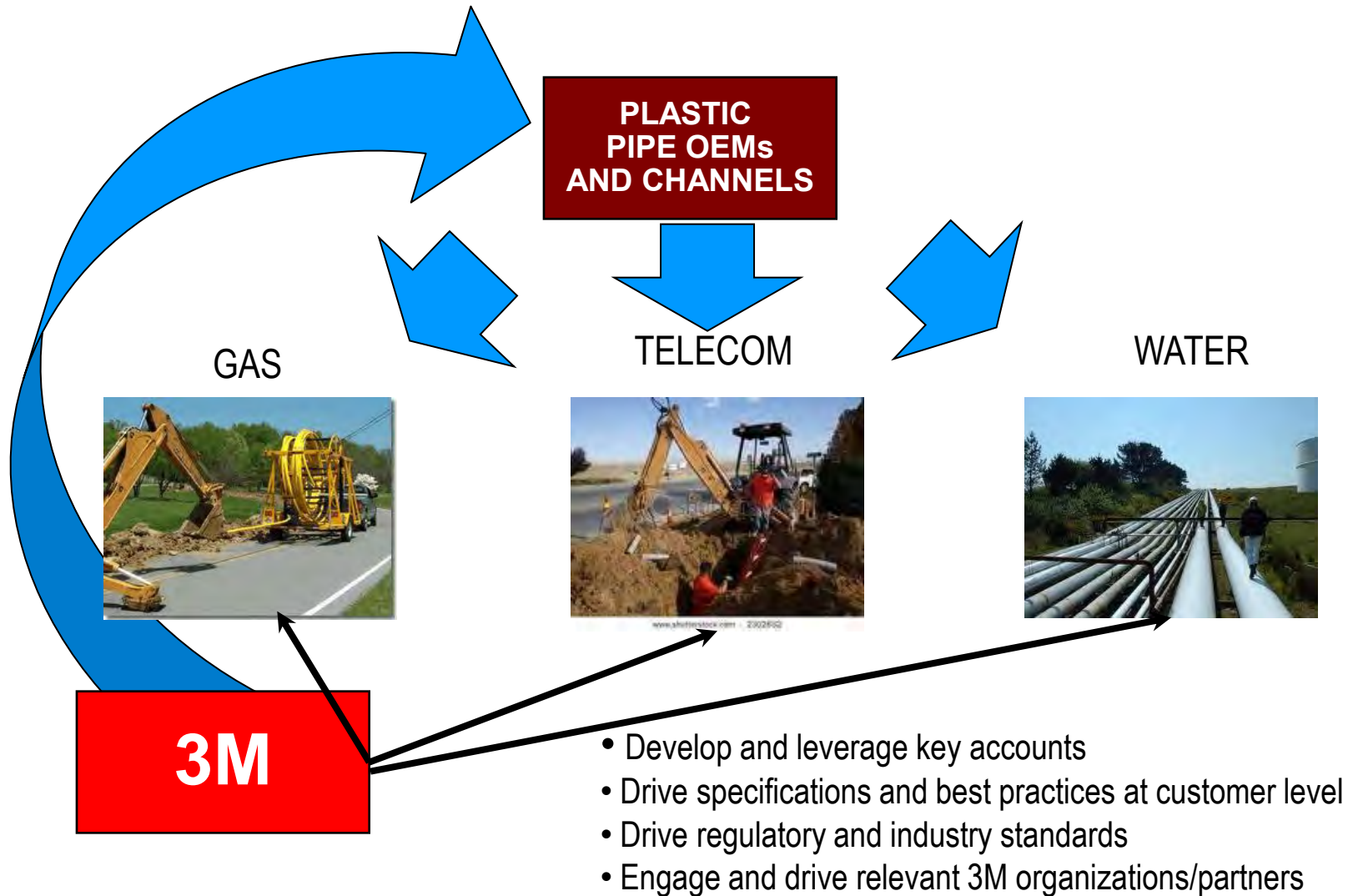


On Pipe Attachment

- **Key Requirements:**
 - Does not degrade pipe performance in any way
 - Environmentally hardened housing
 - At least 50yr Life underground
 - Attachable to Caution Tape and Direct to PVC or HDPE
 - Reliable Attachment to withstand rough handling
 - Configurable Spacing between markers
 - Attached during extrusion process
 - Key Failure Mechanisms: Crushing; Moisture



Customers/Partners/Components



Benefits . . .

- **Tracer wire not required**
 - No maintenance to maintain a wireline network that doesn't carry revenue
 - Reduced material cost, No installation costs
- **No issues with tracer wire breakage, corrosion, access points getting lost**
- **No need for locator transmitters**
 - Reduced labor to perform a locate since there is no hook up.
- **Reduced complexity of locator and training requirements**
- **Easier to learn for field technicians, more accurate in difficult field conditions**
- **No interference from nearby utilities or issues with congestion**
- **Life just got a little easier**
- **Reduced insurance ?**

Major breakthrough in improving underground safety

Thank You !