An EchoRFID

White Paper

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PIPETALKER™ – TRACEABLE, VERIFIABLE AND COMPLETE ASSET INTELLIGENCE FOR FIELD STAFF

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Abstract

Over the past 50 years the pipeline industry has grown to become an asset-intensive, highly regulated, technically complex business. While technology has provided the efficiencies required to effectively develop and manage the infrastructure, field-based lifecycle management has lagged behind other disciplines. As such, it represents a significant opportunity for process streamlining and cost reduction. To achieve these goals, EchoRFID™ has successfully developed PIPETALKER™, a system that will revolutionize how materials are tracked and traced, how construction documentation is retained, and how integrity management will be conducted in the future, all to provide significant value to pipeline owners and operators.

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1. Today's Energy Industry

Since the first North American pipeline was built over 150 ye ars ago, construction companies and pipeline operators have grappled with understanding, cataloging and operating the equipment they work with. Initially recorded in limitless numbers of ledgers and paper forms, the industry has slowly evolved to meet the scale of the infrastructure, 2.2 million miles worldwide, and the needs dictated by regulations such as the PIPES Act and new Mega Rule. Similar circumstances are found in many utilities and telecommunication companies. Ledgers and paper forms have been replaced by an IT-driven, centralized system of records surrounded by technical support platforms.

Today designers work in a graphical user system and share their drawings with stakeholders in real-time to ensure programs meet their deadlines. Compliance managers have access to detailed field records and operating records to ensure seamless operations, and GIS teams share content through portals and dashboards to guarantee a universal common operating picture. While operational efficiency has greatly improved, there is still one significant gap that is preventing operators from reaching their potential: field-based lifecycle management.

2. What is Field Based Lifecycle Management (FBLM) and Why is There an Issue?

FBLM is a critical form of asset management specifically focused on the material, construction, integrity and lifecycle management completed by the field teams. In the wake of the San Bruno pipeline explosion and similar tragedies/outages, these teams play a vital role in the mandated, comprehensive program for creating a record trail for the lifecycle of every asset now referred to as Traceable, Verifiable and Complete (TVC). Regrettably, compliance requirements overwhelm the methods currently deployed to FBLM teams.

Construction data management has traditionally been considered tangential to the project activities as KPIs are focused on project management, budgeting and the commissioning date. Consequently, associated data management procedures have not evolved, and little thought is given to the importance construction history plays in operation, equipment maintenance or asset lifecycle management.

While most departments have strong business process and integrated solutions to guide their activities and operations, these do not exist in FBLM. Today inspectors, field leads, and consulting firms continue to rely on paper forms for material tracking, data collection, retention and access with little or no standards and procedures. Where structure does exist, methods of data management are fractured, inconsistent and outdated. This is not aligned with the expectation being levied against the industry and does not deliver on TVC.

3. How does EchoRFID's PIPETALKER™ Solve this Problem?

PIPETALKER™ is a mobile or office-based, menu driven software solution that connects users to the intelligent digital forms essential to document asset lifecycle, provides access to the records needed to operate a system knowledgably and employs RFID & GPS to link to/recognize field equipment. All tangible data is linked to the asset's pipe or equipment number, material and weld number, QC segments, GPS and RFID tag. In addition, its open architecture provides for critical integration with an operator's existing, key enterprise platform such as GIS for visualization or ERP for Work Management and System of Record content.

Using PIPETALKER™ FBLM teams easily complete critical TVC tasks like input asset attributes, complete program and construction documents, record maintenance and operational inspections or perform quality control activities. It is a powerful asset management solution that empowers users to complete every step in the construction management, operations and maintenance processes. PIPETALKER™'s will address your organizations needs because:

- Content collected and stored in the field forms and project book empower your field teams and ensure content is traceable, verifiable and complete.
- It uses military-grade security protocols to ensure secure data access; it will address any security teams' requirements.
- The detailed workflow driven forms can be configured to collect a vast array of critical content; the information needed to confidently achieve your Compliance teams' requirements.
- In conjunction with lifecycle records, staff have the ability to capture photos, videos and voice recording so that every piece of work is auditable.
- It is an open solution that can share and consume content with your enterprise solution thereby minimizing the number of siloed solutions needed by employees.
- Of its ability to enhance safety, time management, team intelligence, cost management, and provide progress reporting for employees, in any teams to address any requirement.

4. Why do we use Radio Frequency Identification (RFID) and GPS?

The combination of these technologies provides the best of breed method for capturing critical information and validating its physical location. The term RFID refers to radio frequency identification and is used to describe various technologies that use radio waves to automatically identify objects.

RFID technology is similar to the bar code identification systems we see in retail stores every day, but instead of line-of-sight reading it uses an antenna & receiver to transfer information from a tag. Low cost temporary RFID tags (material tags) such as shown below can be applied at the point of manufacture to track individual joints, valves, and fittings as they move from the plant to the customer. These temporary material tags could later be replaced by more robust permanent tags (construction tags) that contain the material certification information written to the tag's user memory field to ensure that this information is not lost.

Figure 1: Temporary, Passive tag with RFID and Barcode

Figure 2: Omni-ID Permanent, Passive RFID tag with memory and adhesive backing

RFID can be used to quickly capture information as simple as a utility owners name and date of installation to complex instructions on who and how the utility was manufactured. Where RFID manages content, GPS is used to locate the user and ensure the records are defendable and tied to a real-world location.

The GPS Transponder can be used to track each load of pipe as it moves from supplier to customer so that the client knows where the material is and when they can expect to receive it. When combined with the RFID tag information, customers will be able to know precisely where each load is, and what each load contains. The Globalstar Sat-Fi2 Transponder is used when regular cellular communication is unavailable.

Figure 3: Globalstar Tracking Device

Figure 4: Globalstar Wi-Fi and Voice Device

While an operator can deploy the PIPETALKER™ system with any capable field devices, for example the Android handheld, we recommend the Zebra Hardware. These products are shown below.

Figure 5: Zebra MC3300R, Zebra L10 tablet, and a typical Android smartphone

The advantages RFID+GPS offer your company are:

- **Lower costs and enhance productivity**
  We automate the collection of accurate and reliable information about the movement and location of assets.

- **Improved data quality**
  location and equipment are identified without human involvement thereby avoiding missed assets, incorrect identification, data transcription errors and other human input errors.

- **Capital cost reduction**
  You have better control of your asset thereby reducing duplication and over purchasing.

- **Reduce fulfillment delays**
  As you know what you have and where it is, you can confidently supply projects without interruptions.

- **Improved compliance**
  reliable, auditable inspection records ensure that regulatory requirements are defendable, satisfies insurers and stakeholders and is the foundation for safety compliance.

- **Ensures TVC requirements are met**
  This system efficiently and reliably creates FBLM records that fill the gaps between purchasing documents and retirement and ensure TVC requirements.

5. How does PIPETALKER™ Fit into Your Business Workflow?

PIPETALKER™ blends RFID technology with a data management system that presents a very strong business case for addressing material tracking, regulatory compliance, and supports integrity and lifecycle management. The team of users is extensive and includes internal staff from teams like construction, operations, maintenance, or integrity and external service providers and contractors. In addition, since PIPETALKER™ is open and integrates with your enterprise environment, it can share and consume content from a limitless number of platforms ensuring that operational intelligence is widely available and field teams don't need access to numerous siloed solutions.

To understand how PIPETALKER™ will improve your operations and meet your organizations key performance indicators the following pages depict the end-to-end lifecycle workflow of assets in your organization. After each section we have indicated the products use and how it provides value. The numbering will help you connect cost reduction/benefits with specific parts of the workflow.

Supply Chain Management

Pipetalker ™

1

Transponder

Material RFID / Barcode tag

Construction RFID / Barcode tag

Global Star WI Fi enabled Satellite

Manufacturer

1.1 ***EchoRFID transponder*** *on the material* shipments *augment SCM and material security.* **Cost Benefit:** *Deferred*

1.2 ***Tagging assets*** *at the manufacturing stage would be in the clients interest; the manufacturer / supplier information can easily be integrated with Pipetalker software*

Cost Benefit: *Deferred*

1.3

Walkie T

Tag ← **Read / Write** → Mc 3300R Mobile Computer Reader

Pipetalker Software → Digital e-form → **Digital Project /QC Book**

Gate Readers *automatically read each item on the load and informs managers / field offices of asset status gate readers negate manual interrogation.*

Cost Benefit: Immediate

Workflow Reduction: *95 %*

Coating Plant

1.4

1.5

Drones *with RFID readers can quickly and accurately complete inventories in laydown areas*

Cost Benefit: *Immediate*

Workflow Reduction: *90 %*

1.6 **Cost Benefit:** *Deferred*

Manage material *from anywhere in real time and know an asset (s) exact location*

1.7 **Cost Benefit:** *Deferred*

Surplus material tagged *and returned to storage: records show complete asset pedigree*

Warehouse / Project Laydown Yard

Cost Benefit: *Immediate & Deferred*

Work flow Reduction: 80%

1.8

The RFID tag *facilitates a specific asset to be located in seconds. The tag has space for 64 characters and is linked to the material e-form*

1.9

Systems integration is quick and complete

Cost Benefit: *Immediate & Deferred*

1.10 ***Pipetalker™ software*** *and e-forms use a standardized procedure to collect data*

Cost Benefit: *Immediate & Deferred*

Work flow Reduction: 80%

Supply Chain Management

1.1. The use of Globalstar transponders is inexpensive way to assure the security and location of loads and is an excellent loss prevention tool. ***Cost Benefit: Deferred***

1.2. The RFID tag can be used anywhere in the world and on any asset that requires tracking. Attaching the combination RFID/barcode tags at the supplier stage ensures the individual items are identified as to specification, location and ownership; however, this would be a client driven endeavor.
Cost Benefit: Deferred

1.3. The RFID tag can have information written to it (up to 64 characters) and read by the Zebra, MC330M-R handheld mobile device. The handheld also has a built-in walkie talkie, which is useful in a warehousing, lay-down yard setting. The digital e-forms are accessed by the MC330M-R and the completed e-form housed in the digital project book in the cloud. ***Cost Benefit: Immediate & Deferred & Workflow Reduction: 95%***

1.4. Gate readers are readers situated at the entrance and exit of a storage yard area. Managers are notified immediately when the material items pass the reader. Gate readers provide reduced workload for employees and assurance as to where items are. ***Cost Benefit: Immediate& Workflow Reduction: 95%***

1.5. For the larger storage yards readers can be attached to drones for taking quick and accurate inventory.
Cost Benefit: Immediate & Workflow Reduction: 90%

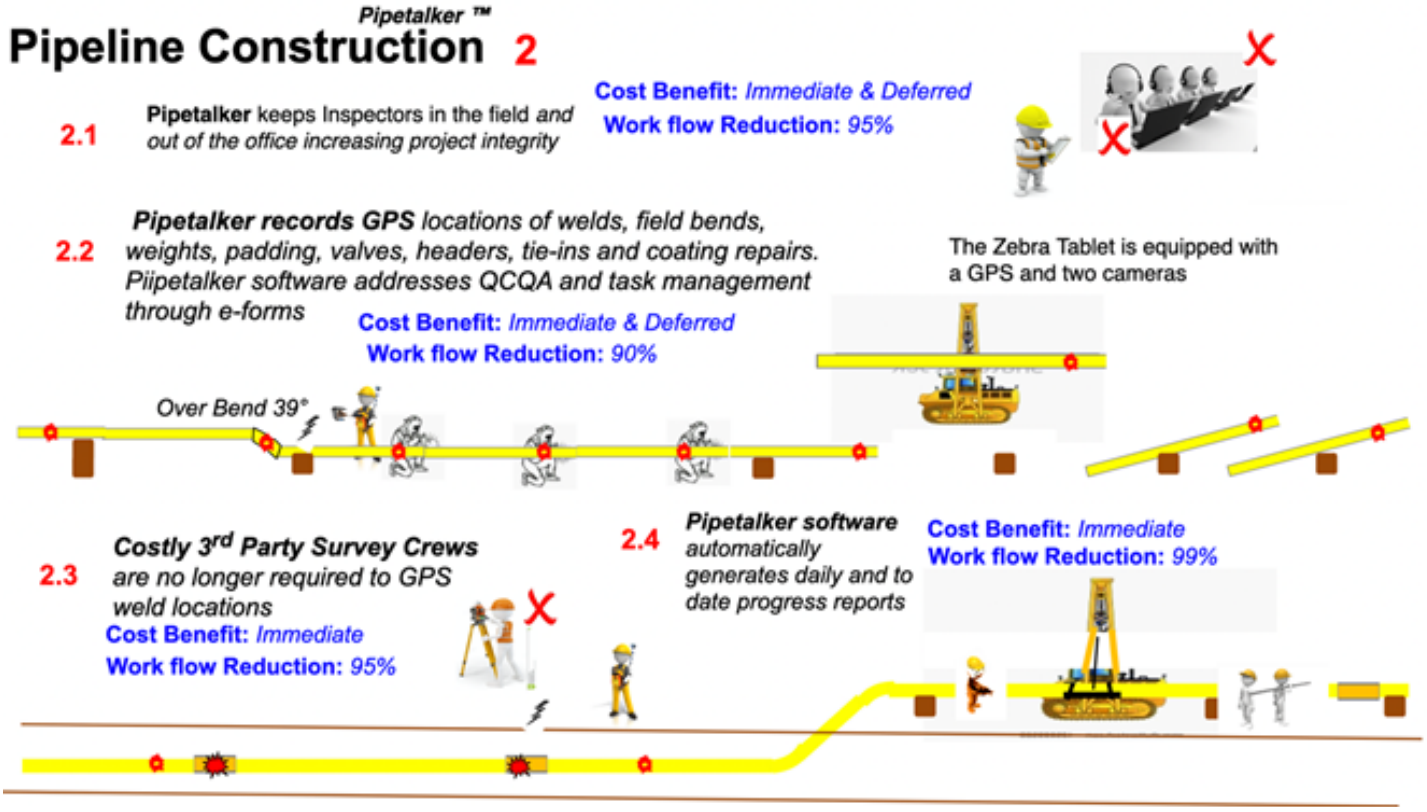
1.6. Managers can monitor and control movement of their assets in real time from anywhere in the world. This can lead to errors and oversights and schedule delays being avoided. ***Cost Benefit: Deferred***

1.7. Millions of dollars are consistently wasted on project surplus pressure containing items because their specifications cannot be verified. One x 55′ long x 20″ pipe joint costs roughly $16,000. One $3 RFID tag can provide this information. ***Cost Benefit: Deferred***

1.8. To read 700 RFID tagged items in a few seconds the reader only needs to be pointed in the general direction of the material whereas the barcode portion must be read by line-of-site, one item at a time. The upside to the barcode is that it can be interrogated by a smart phone. It no longer has to take hours or longer searching for specific items. The PIPETALKER™ system contributes to reducing schedule interruptions and cost overruns. ***Cost Benefit: Deferred Workflow Reduction: 80%***

1.9. The developers of PIPETALKER™ understand that clients have spent a considerable amount of time and money developing software in-house so we have designed the PIPETALKER™ system to integrate smoothly with clients' and suppliers' software, including SAP and PODS. ***Cost Benefit: Deferred***

1.10. Material e-forms use a standardized procedure to enter material data into the e-form via a handheld computer and the e-forms provide a detailed account of the asset's history.
Cost Benefit: Immediate and Deferred & Workflow Reduction: 80%



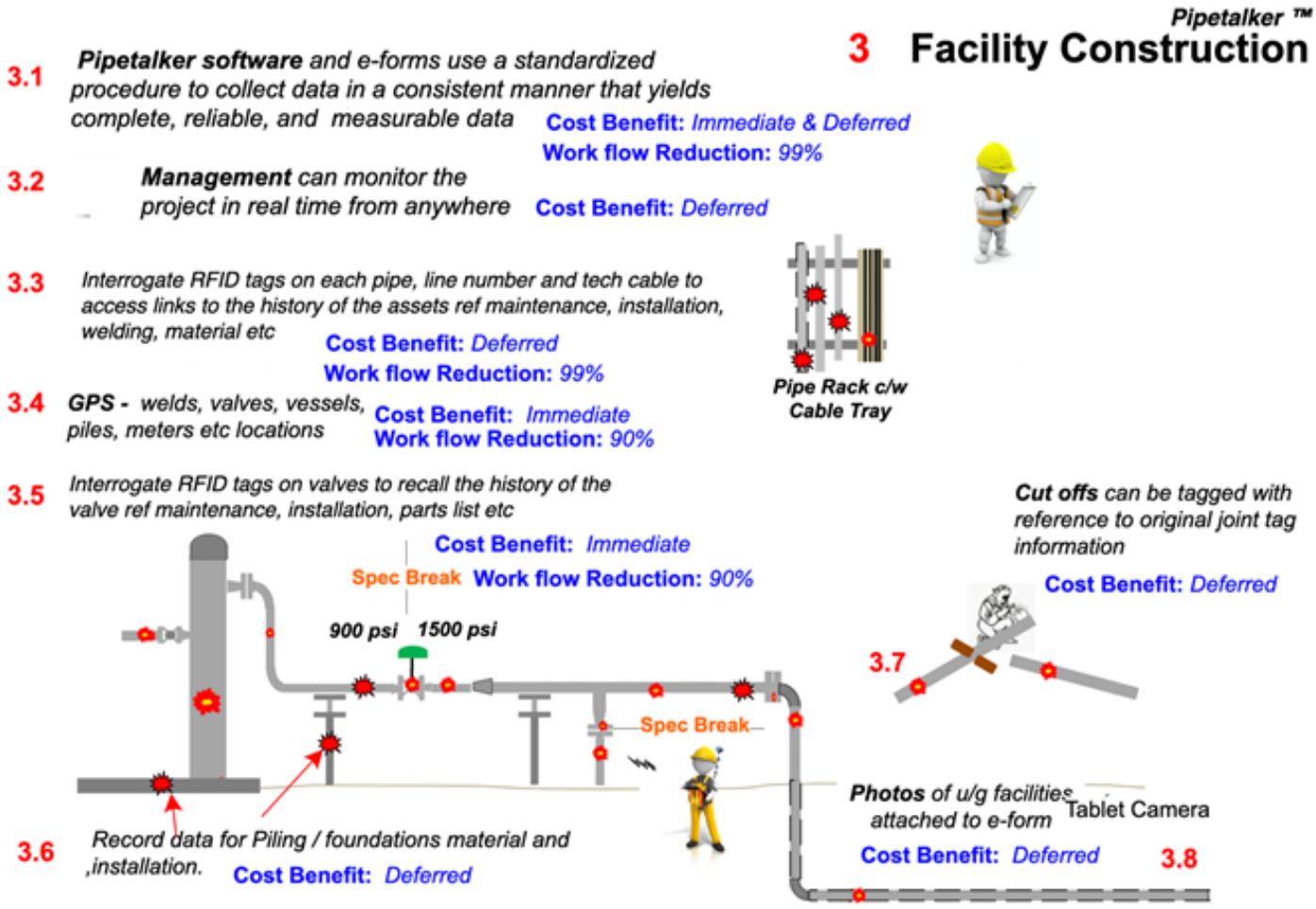
Pipeline Construction Workflow

2.1. Keeping inspection in the field is essential for complete and accurate chronicling of the project and integrity assurance. Presently, the inspection can be overwhelmed with the amount of work, much of which requires an office and support staff for data entries and progress reports. With the PIPETALKER system all the work is completed by the inspector on the job and in the field using The Zebra L10 Android Rugged Tablet.
Cost Benefit: Immediate and Deferred & Workflow Reduction: 95%

2.2. The digital system of collecting data is fast, easy to use and provides consistency between pipeline spreads and projects. The software automatically calculates daily and accumulated progress in real time. e-forms are designed for every pipeline and facility task and ask relevant questions with answers chosen from drop down menus. An incredible time and cost saver.
Cost Benefit: Immediate and Deferred & Workflow Reduction: 90%

2.3. Survey crews are an extremely costly entity to be employed just to GPS weld locations. The cost saving of using the inspector to do this during the lower in procedure alone justifies the utilization of PIPETALKER™. The L10 Android Rugged Tablet has GPS capability. Employment of survey crews can and often does impede the lowering in process and interrupting the schedule. An Inspector with GPS capability ensures workflow continuity and no schedule interruptions. ***Cost Benefit: Immediate & Workflow Reduction: 95%***

2.4. Keeping track of progress of each process (stringing, welding, lower-in, etc.) is essential. It informs project management where the project is in terms of the schedule, allowing changes that may be required for adjustment of the commissioning date, approval for expenditure (AFE) amendments, or material acquisition that can be assessed ahead of time. Accurate and timely process footages are necessary for contractor progress payments. This generally takes much of the inspector's time when their attention should be focused on field responsibilities. Having the software automatically and accurately calculating footages in real time is an important advancement in project accountability; it reduces costs by eliminating errors or contractual disputes and lessens inspection burden. The system also tracks all unit price items such as ditch padding, rock shield, weights etc. ***Cost Benefit: Immediate Workflow Reduction: 99%***



Facility Construction Workflow

3.1. The use of e-forms, for each process for facility, pipeline and material ensures data collection in a consistent manner and in real time that presents complete, reliable, and measurable data. Each data entry is date and time stamped, supported by metadata and leaves little room for procedural, quality or professional standards to be questioned or disputed by anyone.

Cost Benefit: Immediate and Deferred & Workflow Reduction: 99%

3.2. Project supervisors and all levels of management regardless of the global location including those offshore, can monitor the progress of the project in real time. Management can manage who may monitor the project and restrict access levels to only certain transaction types, (create, edit, view).
Cost Benefit: Deferred

3.3. RFID tags in a facility setting are extremely useful in identifying individual line numbers and linking them to the construction e-form which has the entire history of that line. Often prints are lost or unattainable holding up process or fail an audit causing the asset to be shut down. Tags can also be incorporated to provide the same function for tech cables. RFID tag identification saves significant time in locating and identifying pipe and cable and enhances safety by making asset attributes transparent.
Cost Benefit: Deferred & Workflow Reduction: 99%

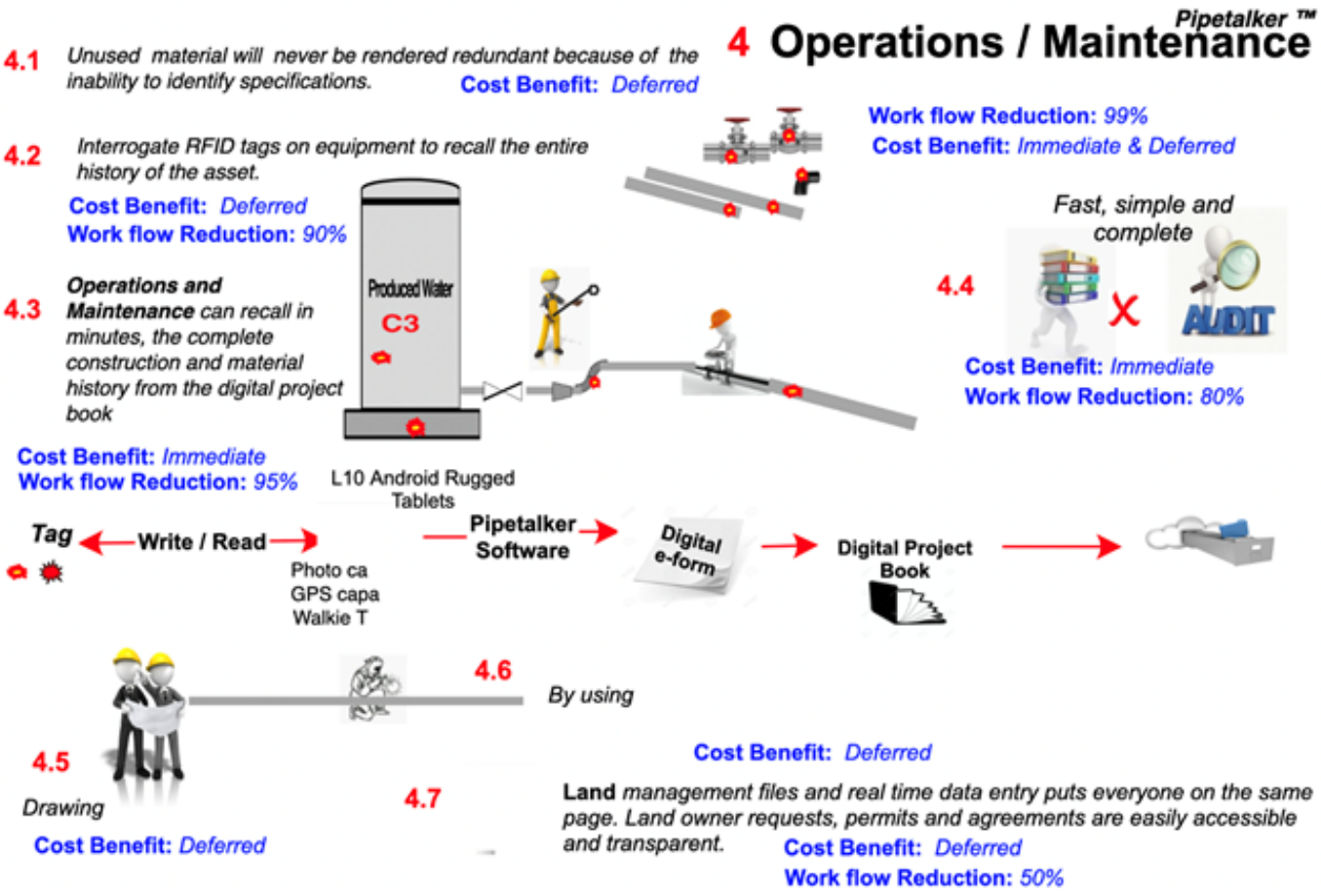
3.4. Tags and GPS combine to mark and identify welds, spec breaks, tank internals, vessels, meters, instrumentation, inlet and outlet headers, valves and ESD valves. This enhances regulatory confidence, safety and allows regulators questions to be answered immediately and accurately. The tags and GPS make it easy and quick to ascertain the history of the items listed above.
Cost Benefit: Immediate & Workflow Reduction: 90%

3.5. RFID Tags on a valve can be interrogated as to the valves last inspection date, maintenance completed and a parts list specific to that valve. The tag links you to the construction e-form for the complete history.
Cost Benefit: Immediate & Workflow Reduction: 90%

3.6. Tags can be placed on each pile and linked to the e-form that describes the required information of the pile's characteristics and installation. Extremely useful on piles that support rotating or vibrating equipment. Cost saving benefits are not immediate but have the potential to be of value for further pile installation in the same area and for due diligence proof in the event of regulator request or audit.
Cost Benefit: Deferred

3.7. One of the greatest sources of wasted material and money is the waste of pipe cut-offs. Once a piece has been cut off and the piece moved, it cannot be used unless properly identified. If the pieces are immediately tagged the joint cut-offs can be used or stored, QC requires the marking of pipe with different colors of paint; sometimes that happens, sometimes it doesn't, the piece cut-off has no paint, or the paint wears off or painted over. It doesn't take many pieces of pipe footage rendered useless to add up to significant cost. Joining short pieces has to be weighed by welding cost vs. pipe cost.
Cost Benefit: Deferred

3.8. Below grade piping, cable, thrust and anchor blocks can be photographed with the Zebra tablets built in camera and linked to the corresponding e-form.
Cost Benefit: Deferred



Operations and Maintenance Workflow

4.1. Unused material can be safely stored for the next project, future modifications or repair. The items once tagged will never be redundant because the specifications are lost.

Cost Benefit: Deferred

4.2. Operational equipment that have been tagged by construction, such as vessels, tankage, line heaters, inlet separators, flare knockout (FKO) drums, etc. will no longer be needed to be put out of service because of a lack of information. The tag is linked to the construction or material e-form listing the complete history of that item complete with photos. Companies have spent millions because they could not identify the specifications or because of lost name plates, obscured identification and lost paperwork. Engineering will not have to enlist operations time or hire a contractor to search for equipment information.

Cost Benefit: Deferred & Workflow Reduction: 90%

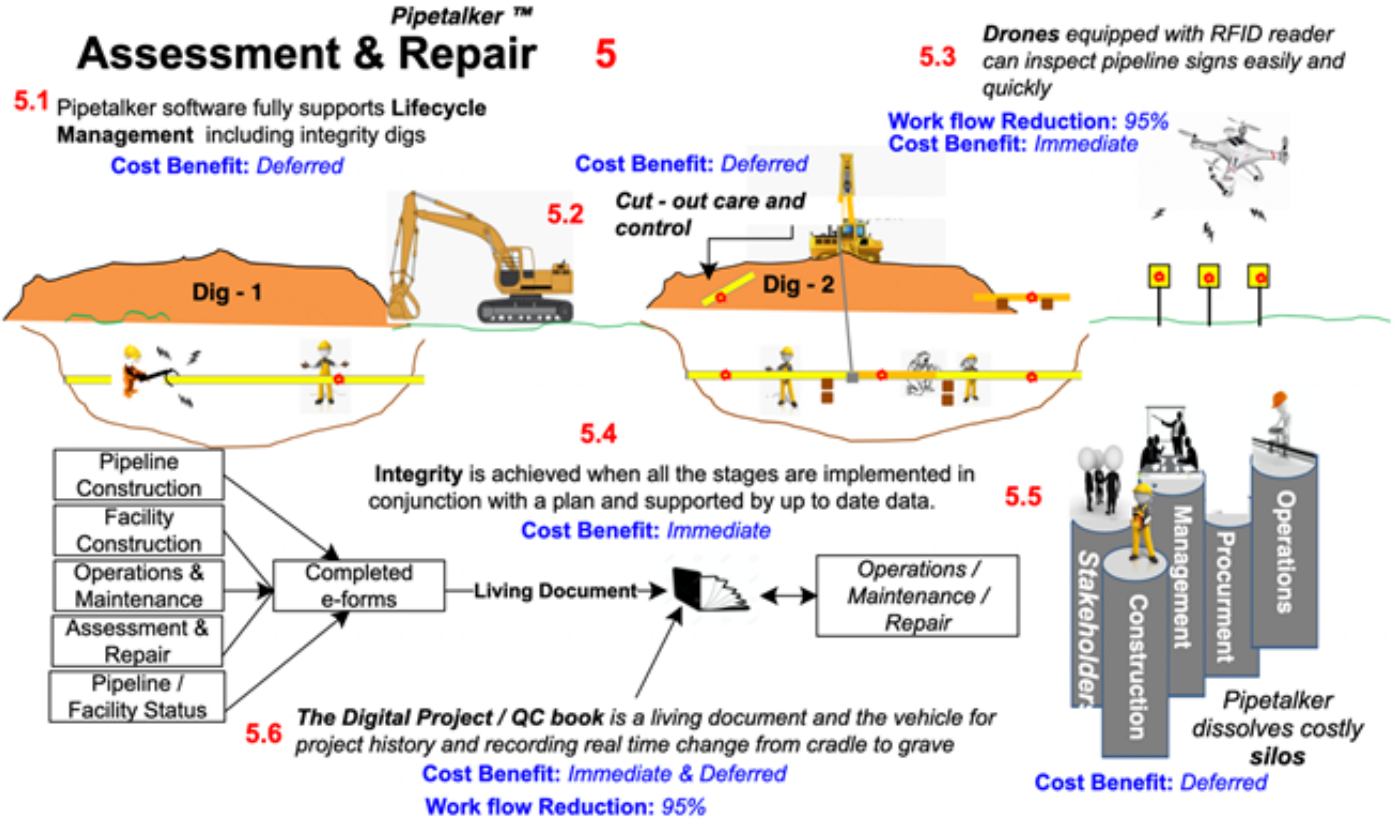
4.3. The construction initiated digital project book is a digital reference for operators and maintenance crews. Data required carrying out work quickly and safely by operations or maintenance is available instantly. Operation and maintenance modifications and repairs are entered into the project book in real time. The project book is a living document. This capability can save time and enhance safety and efficiency.
Cost Benefit: Immediate Workflow Reduction: 95%

4.4. Government audits are demanding, costly and time consuming and rarely does a company come out of one vindicated or unscathed. PIPETALKER™ patented digital system has changed the audit experience. The digital project book contains the completed e-forms and information required by an audit. The questions asked by the audit or auditor are easily recalled and answered. Example: you can recall a weld number listed in the welding e-form and find who welded it, the date and time it was welded, what pass the welder made and what quadrant, electrode type, heat control and type of line-up clamp used, date and time. The NDE report is attached. The welder's credentials and test weld data can be queried as well.
Cost Benefit: Immediate & Workflow Reduction: 80%

4.5. Even with proper revision and control over drawings issued, costly errors are made. PIPETALKER™ makes revision and control uncomplicated and error free.
Cost Benefit: Deferred

4.6. Often modifications and repairs to the system design are either not approved or approved but not documented. Any change in the engineering design of the system is required to be approved and documented in the project / QC binder. Documenting such changes is often neglected or incorrect, leaving the company open for heavy fines and possibly serious operational problems. The digital project book makes it uncomplicated and the change is immediately documented because the project book is a living document.
Cost Benefit: Deferred

4.7. The affirmation of changes and issuances of permits and land entry permissions are instant from land management, and informs field supervisors instantly of land owner requests, land issues and of any change. The PIPETALKER™ system prevents costly mistakes and saves time and minimizes errors.
Cost Benefit: Deferred & Workflow Reduction: 50%



Assessment and Repair Workflow

5.1. PIPETALKER™ is a system that is a tool for the reinforcement of integrity and lifecycle management. The data collected throughout the construction, operation and maintenance phases of the asset assists in the planning, execution and documenting of modifications, repairs and abandonment.
Cost Benefit: Deferred

5.2. Pipe cut-outs should be cared for properly and readied for shipment so that the failed or affected area is not altered or contaminated during transportation. The better the cut-out is cared for the more accurate the examination by a metallurgist will be. If the cut-out is from a pipe failure, then it could be used as forensic evidence so care and control will include a chain of custody procedure. Cut-out procedure is listed in the e-form on steps to follow.
Cost Benefit: Deferred

5.3. Signs are required to be checked once a year for maintenance or replacement which is a costly and time-consuming exercise for those companies that have hundreds of signs. However, by attaching a RFID reader to a drone, the drone can fly the Right-of-Way and in a very short time to identify if and where signs are missing. This can be a significant cost saving for a company, especially in the midstream and downstream sectors. RFID tags attached to pipeline warning signs enhance the safety as third party strikes to pipelines are the leading cause of pipeline incidents. Pipeline signs are an excellent place to attach tags so the tag can be interrogated to learn more about the buried pipeline such as, operational status, to and from, substance and critical pipeline attributes. ***Cost Benefit: Immediate & Workflow Reduction: 95%***

5.4. Integrity is achieved when the construction phase is completed and documented followed by operations, maintenance and system status entries. Construction lays the foundation with the digital Project/QC book; operations and maintenance use the digital book for reference and entering changes, recertification's and upgrades to the system making the book a living document.
Cost Benefit: Immediate

5.5. PIPETALKER™ dissolves the silos formed by departments or groups within the organization who choose not to share information or allow for knowledge to be exchanged. For instance, the miscommunication between construction and operations that in the past has cost the industry billions of dollars in errors, poor design, unauthorized changes and safety violations could have been avoided. This characteristic of PIPETALKER™ (transparency) is a clear-cut cost saver and cure for silos in the future.
Cost Benefit: Deferred

5.6. The digital project book replaces the paper project book and is a living document that accepts new data and shares data on demand. Paper project manuals could range from one to hundreds of binders making data storage and recall costly and difficult. There is only one digital project book.
Cost Benefit: Immediate& Deferred & Workflow Reduction: 95%

6. How does PIPETALKER™ Compare Against your existing Project Book?

Now that you have seen how PIPETALKER™ can enhance your existing workflows and reduce your overall FBLM costs, let us compare the capabilities of its Project Book to a conventional version. In the following table we have use a series of project requirements for evaluation.

	Material Traceability					Equipment	
	Tagging Process Difficulty	**Personnel Support Required**	**Reference an Assets Location**	**Complete Asset History Available**	**% Verifiable**	**Tablet c/w GPS & Meta Data**	**Pen / Paper/ Laptop**
Current System (Conventional) Project Book	There is no Tagging	N/A	"Difficult" Physical Search Required	MTR's searched for even then Minimum data if located	15%		✓
PIPETALKER™ System (Digital) Project Book	No Difficulty & Quick	1 to 2	Location of asset is instant	100% Instant asset information "Cradle to Grave"	100% Verifiable	✓	

	Data Collection					Equipment	
	Are Questions Prompted	**100% Complete Construction History**	**Are questions Relevant**	**Data Collected is Verifiable**	**Data Collection Support Required**	**Tablet c/w GPS & Meta Data**	**Pen / Paper/ Laptop**
Current System (Conventional) Project Book	No	No	N/A	Some	Yes		✓
PIPETALKER™ System (Digital) QCQA Binder	Yes, and answers provided	Yes	Yes	Yes 100%	No	✓	

	Data Retention		Data Recall			Equipment	
	Method of Retention	**Reliability**	**Recall Simplicity**	**Recall Reliability**	**Audit Simplicity**	**Tablet c/w GPS & Meta Data**	**Pen / Paper/ Laptop**
Current System (Conventional) Project Book	Binders on site / off site storage	Poor	Could take days/weeks or much longer	Poor / 50/50 Binders will be located	Time consuming, Incomplete Expensive		✓
PIPETALKER™ System (Digital) QCQA Binder	Server / Cloud	Excellent (100%)	Excellent / Instant Recall	100% Reliable	Simple, quick and complete	✓	

7. Learning More and Taking Next Steps

The PIPETALKER™ system has been custom designed by a team of seasoned oil and gas industry professionals to address a problem that has plagued the industry for years. We have prepared two specific programs to help you learn more about the solution and how your organization could benefit from an implementation.

Building a Business Case

This involves working with our executive team to review your existing solution and processes, identifying efficiencies and savings that could be realized from using EchoRFID's integrated FBLM system and preparing a business case for your management.

Planning a Pilot Implementation

A pilot project is an initial small-scale implementation of PIPETALKER™ that is used to prove the value of the solution, identify and mitigate risks and develop implementation requirements. These engagements are designed and implemented with the help of an EchoRFID system architect and a subject matter expert.

For more information about how EchoRFID can support your company's tracking and tracing needs, please contact **layne@echorfid.com** and **stevelouis@echorfid.com**.

8. About EchoRFID

EchoRFID is an asset management software company founded in 2011 and located in Grand Junction, Colorado and Kelowna, BC.

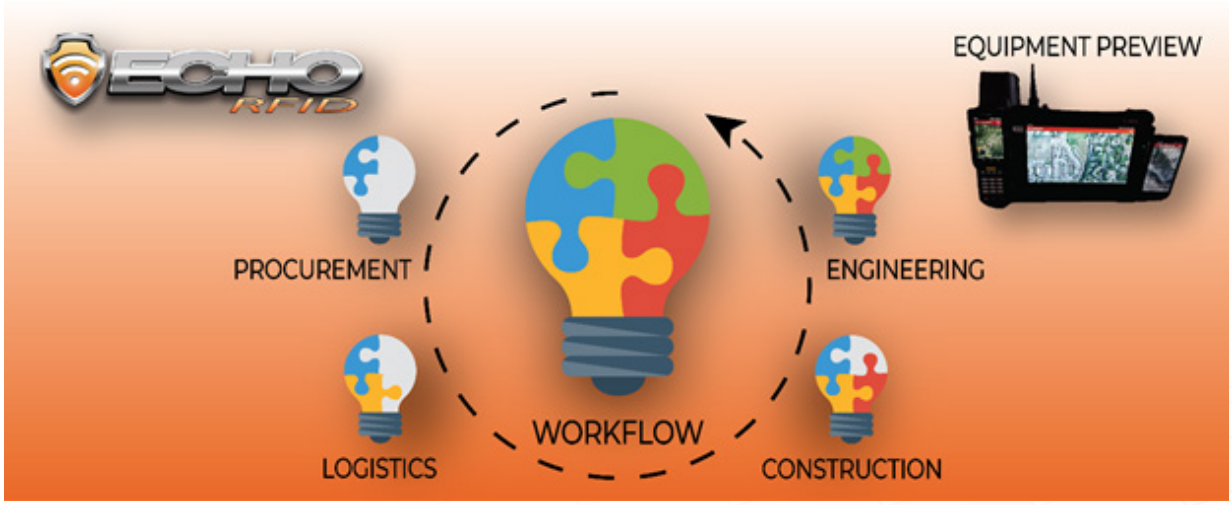
Founded and lead by industry veteran Layne Tucker, the company is focused on implementing his vision of improving employee safety and preventing damage to organizations' infrastructure through ground level asset management.

Layne Tucker (CEO & Founder) is a Tahltan indigenous, global RFID Board-certified Subject Matter Expert and initiator of 14 technology patents in the US and Canada, including the IP behind EchoRFID. Layne has extensive experience in pipelines having worked in the US, Canada, and in the Arabian Gulf and he successfully built and exited two pipeline and facility construction companies in Northern British Columbia and Northern Alberta, Canada.

Layne is also the Founder of two technology companies in Colorado which specializes in Pipeline Safety Environmental Protection compliance and operational excellence for the asset lifecycle. He is Advisor to three Universities and their Ph.D. students on the enhancement of RFID for the oil and gas industry, sponsored by DOT and PHMSA in the USA.

Layne currently resides in Colorado under a Native treaty written in 1776.

EchoRFID is supported by global industry experts Ronald J. Baker (P.Eng), Gordon Hockridge, Steve Louis (P.E.), and Robert Brook as well as several implementation and deployment specialists, chief inspectors, material managers, metallurgists, engineers, and project managers across the entire value chain. Combined, the organization has delivered on hundreds of projects both onshore and offshore guaranteeing our customer's continual success.



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