



From Field Data to Solutions

Utilities face daunting challenges when managing field data, prioritizing asset, and developing plans and schedules for their wastewater and stormwater assets. Argon (formerly SCREAM) was created to help utilities overcome these challenges by enhancing their ability to process and prioritize vast collections of condition data.

Argon has been used for over a decade on almost 100 projects and has been installed on utilities' networks around the country. Over the years, Argon has been refined with engineering logic and AI and has been ground-truthed to provide accurate condition and risk scores for pipe prioritization. Argon can be customized for each utility to create tailored recommendations. Argon's AI analysis targets defect combinations with a higher likelihood of failure enabling utilities to implement proactive intervention strategies. Argon is a state-of-the-art, EPA-highlighted sewer and storm management system to help you stay on top of your assets.

- Argon calculates robust condition scores, designed for prioritization.
- Argon estimates assets' remaining useful life and calculates risk scores based on detailed asset data and GIS
- Argon incorporates work order history then recommends and schedules future work orders for both maintenance and structural purposes.
- Finally, Argon estimates immediate and life-cycle costs of repair, replacement and rehabilitation and chooses the optimal methodology for corrective action.

Armed with insights from Argon, utilities can create informed, data-driven re-inspection, maintenance, and rehabilitation plans. Utilities can use Argon for a snapshot of their system or can install Argon to generate weekly work assignments and work orders.



The Argon Steps

The Argon process has five distinct steps to help utilities manage data and prioritize assets. Utilities may use some or all the steps.



Score Calculate condition scores

Argon's condition scores provide accurate asset prioritization. Argon assigns defect scores based on defect code, defect extent, pipe material and aggregates scores by defect families (like cracks, roots, or corrosion) which have distinct pipe failure mechanisms.

AI Trigger Target defect combinations using AI

Argon's artificial intelligence (AI) model analyzes defects, pipe attributes and pipe location, targeting the pipes with combinations of defects and attributes that are more likely to fail.

Risk Calculate risk scores (bottom up) using AI

Argon uses a risk-based, information driven, bottom-up approach to identify the Consequence of Failure (Cof) and Likelihood of Failure (LoF) risk matrices on an asset-by-asset basis. Utilities can use their own risk scoring process in place of Argon Risk. Argon Risk can also be used on its own without the other Argon steps.

Next Step Create Plans and Schedules

Condition scores, risk scores, and work order history are input into Argon's logic matrices to recommend next steps for each pipe (e.g., should it be rehabilitated or monitored). Each pipe is given both structural and maintenance next steps which are then scheduled to create lists of recommend work orders.

- Re-inspection plans and schedules
- Maintenance plans and schedules
- Rehab plans (for CIP)

Costing Rehab and Maintenance Costs

Calculate remaining useful life (RUL), immediate and life-cycle costs.

Argon Costing calculates the cost of repairs, replacement, rehab and continued maintenance over time. Argon estimates short-term and life-cycle costs for each methodology and chooses the optimal methodology for addressing the utilities' priority assets. Cost estimates are ideal for budgeting purposes.

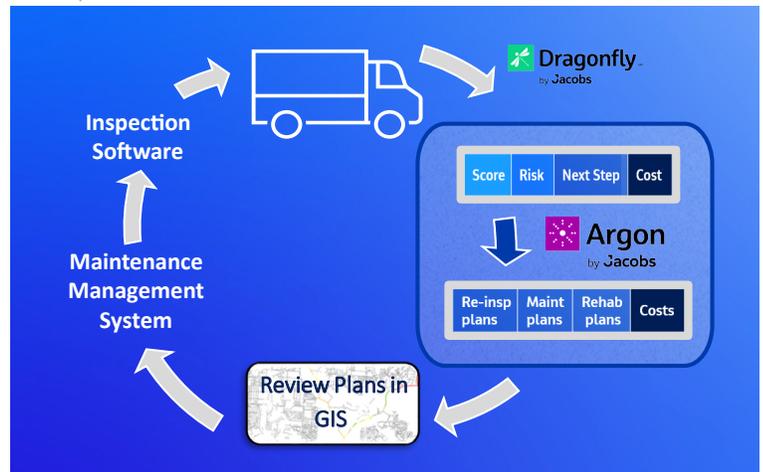
Argon is used three different ways:

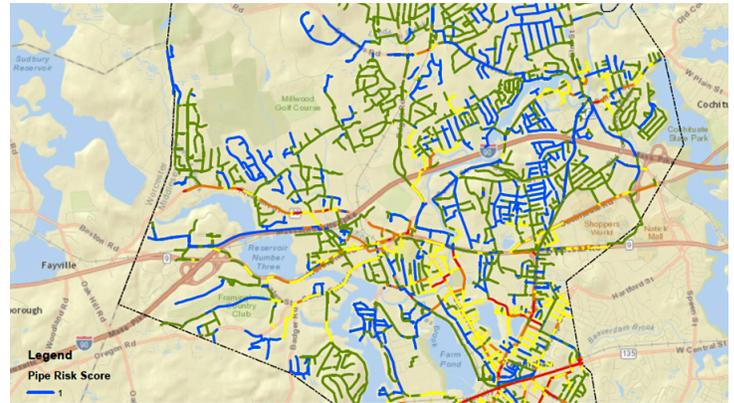
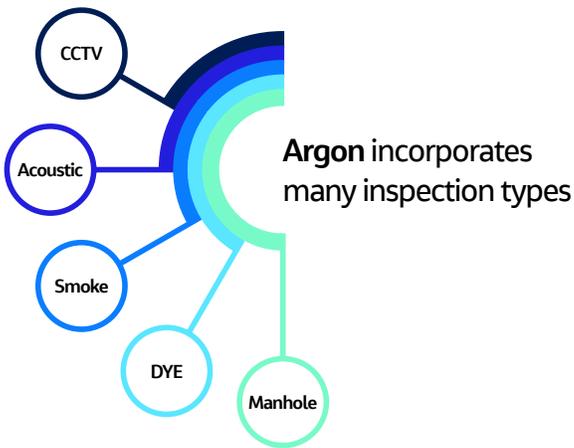
- As a short-term solution to perform analyses for Jacob's projects
- As part of Jacob's web-based Dragonfly software, analyzing the PACP results
- As a continuous management system, installed on a utilities' network

When Argon is installed on site, it is integrated with the utilities' maintenance management system, inspection software and GIS. Argon is then scheduled to run (typically nightly) so results are up to date and assets are managed seamlessly.

Argon's goal is to complete the inspection to work order cycle, integrating with your existing software systems

Argon integrates with and complements your existing CMMS and Inspection software





Example Argon Grades displayed in GIS

Diameter Large/ Small	Latest Inspection Type	High Defect Acceleration	Risk COF Grade	Structural Grade					
				0	1	2	3	4	5
Small	CCTV	No	1-2	0	1	2	3	4	5
			3-4	0	1	2	3	4	5
			5-6	0	1	2	3	4	5
			7-8	0	1	2	3	4	5
			9-10	0	1	2	3	4	5
			Unknown	0	1	2	3	4	5

Arrows in the table point from 'No' High Defect Acceleration to '7-8' Risk COF Grade, and from '7-8' Risk COF Grade to '4' Structural Grade, which is labeled 'CCTV 18 months'.

Example Portion of Argon Next Step Structural Logic

Replace Immediate Costs		
	Option 1	Option 2
	Trench	Tunnel
Costing Factor	1.25	1.00
Num laterals total	7	7
Lateral reinstate unit cost (\$ per lat)	1,355	1,355
Replace unit cost (\$/ft)	415	2,124
Total cost	\$151,351	\$589,550
Selected Option	Trench	
Selected Option Cost	\$151,351	

Repair Immediate Costs		
	Option 1	Option 2
	Trench	Internal Spot Repair
Costing Factor	1.25	1.00
Num laterals in trenches	2	2
Lateral reinstate unit cost (\$ per lat)	1,355	1,355
Replace unit cost (\$/ft)	816	220
Feet of trench costed as point	10	10
Num trenches	2	2
Total cost	\$21,233	\$6,705
Selected Option	Internal Spot Repair	
Selected Option Cost	\$6,705	

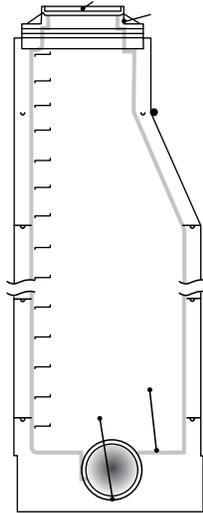
Rehab Immediate Costs			
	Option 1	Option 2	Option 3
	CIPP	Slipline	Shotcrete
Costing Factor	1.00	1.00	1.00
Num laterals in trenches	1	1	1
Lateral reinstate unit cost (\$ per lat)	200	200	200
Replace unit cost (\$/ft)	127	253	10,000
Feet of trench costed as point	10	10	10
Num trenches	1	1	1
Total cost	\$41,662	\$76,007	\$2,737,859
Selected Option	CIPP		
Selected Option Cost	\$41,662		

Argon Costing for an Example Pipe includes estimates for rehab, repair and replacement. life-cycle costing is also available for four different options

Other Argon Capabilities

Manholes And Special Structures:

The Argon steps are available for manholes and other special structures. Argon Scoring, Next Step and Costing gives utilites the ability to better prioritize and pinpoint assets needing reinspection, cleaning rehab or repair. Argon incorporates MACP inspections and can be configured for other inspection types.

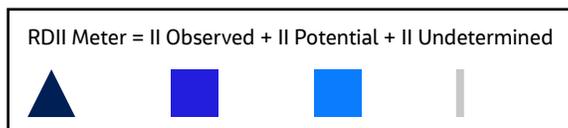
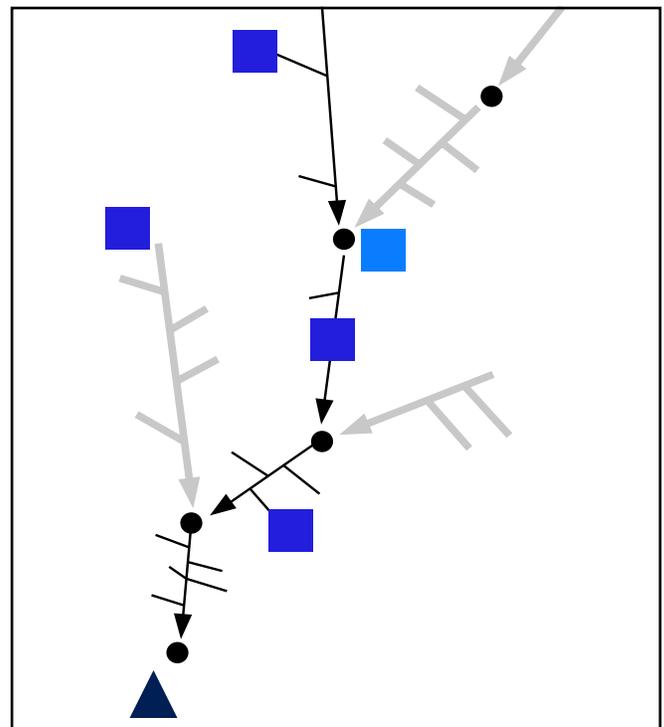


Argon Macp Inspections

Component	Struct Grade	StructII Grade	Corrsn Grade	Quick Fix Needed
Cover and Frame	3	3	0	Yes
Seal	0	0	0	No
Chimney	1	2	1	No
Cone	0	1	0	No
Wall	0	1	0	No
Bench	0	0	0	No
Steps	0	0	0	No
Channel	0	0	0	No
Drop	0	0	0	No

Infiltration And Inflow:

Argon's infiltration/inflow (II) balancing module compiles both observed and potential sources of II from multiple inspection types then allows users to balance the flow using metering data.



Argon's Infiltration/Inflow (II) Balancing Module