PII Pipeline Solutions

a GE Oil & Gas and Al Shaheen joint venture

Panel 3: Pipeline Cracking Detection Technology Developments

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In line inspection is a process

which enables pipeline life extension

TO IMPROVE THE HEALTH OF INDUSTRY.

The best technology is grounded in knowledge

Intelligent Machines

Technology & experience combined is necessary

If operators can predict, they can prevent

Advanced Analytics

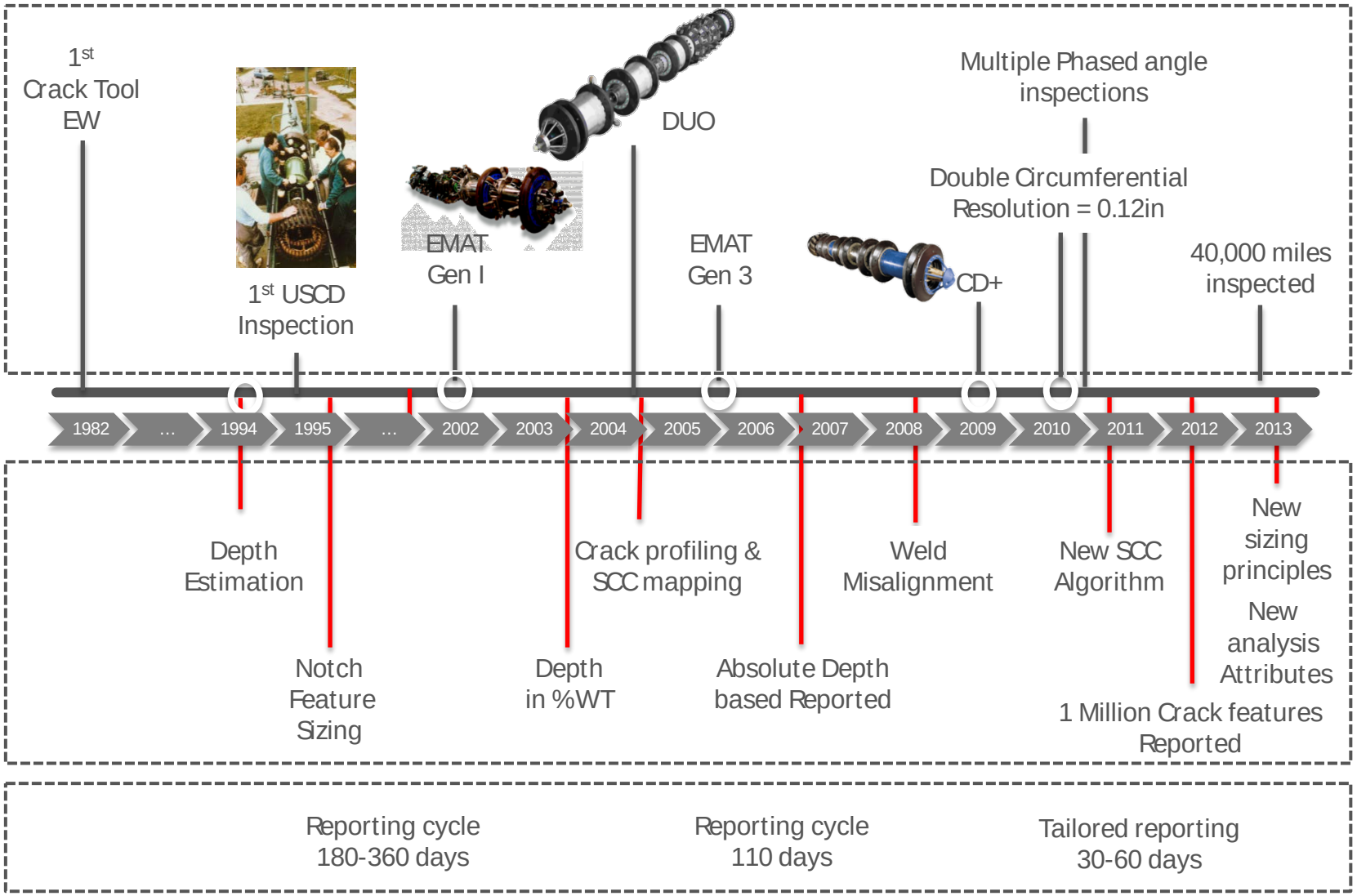
Software algorithms & sizing models

Dependable reports drive solutions

People at Work

Highly trained analysts to deliver accurate data

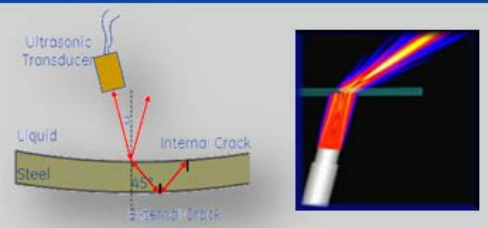
Evolution of Crack Detection



Existing Capabilities

Crack Inspection Ultrasonic Technologies

Shear Wave

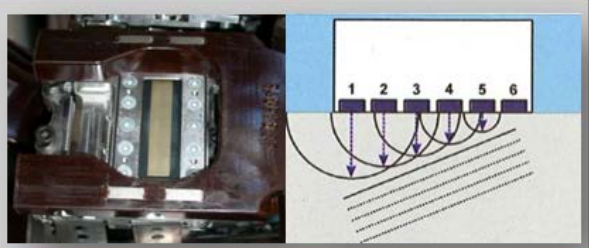


Ultrascan CD

21,752

Miles inspected

Phased Array

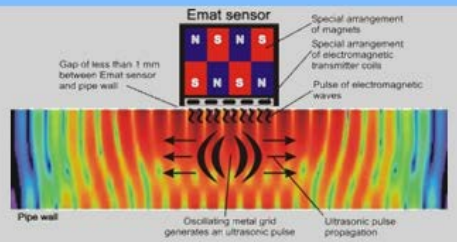


Ultrascan Duo

13,255

Miles inspected

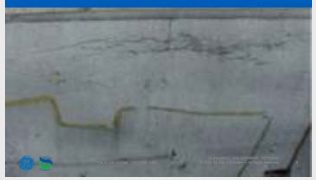
EMAT



EmatScan

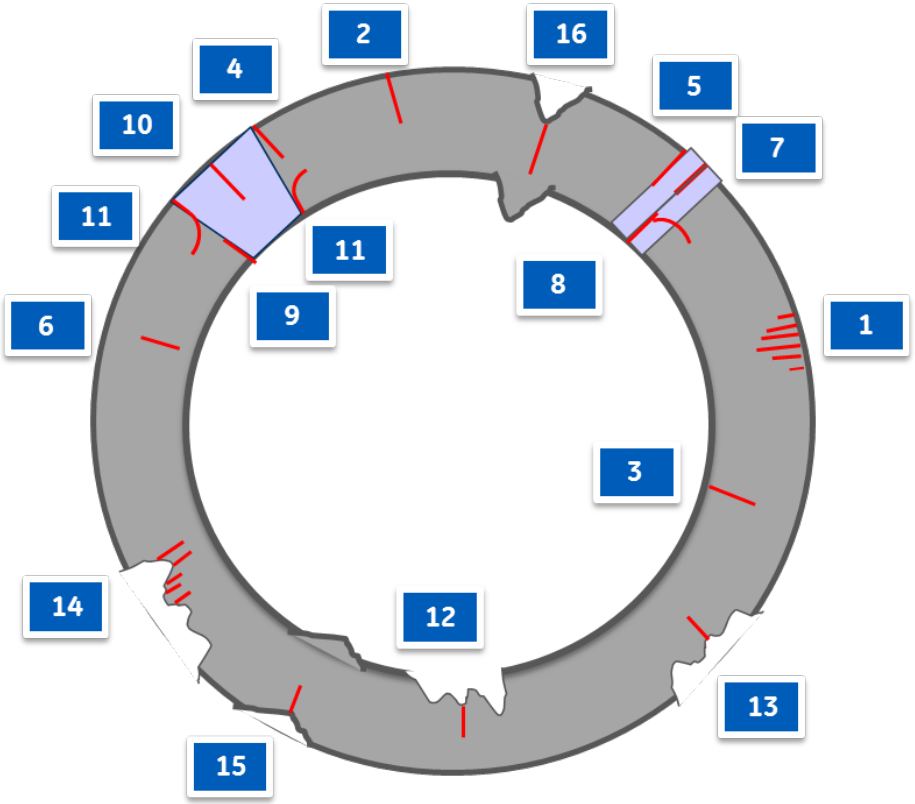
2,408

Miles inspected

SCC Colonies	Shrinkage	Lack of Fusion	Hook Cracks	Fatigue	Dents & Cracking
					

Crack Morphology

Various Crack Types



Cross section of pipe with both SAW and ERW Long seams depicted for graphics only

Current Capabilities

	Detection	Sizing
1.	Stress corrosion cracking	
2.	Singular axial crack in the body of the pipe (ext.)	
3.	Singular axial crack in the body of the pipe (Int.)	
4.	Singular axial crack at SAW	
5.	Singular axial crack at ERW	
6.	Singular axial crack mid wall	
7.	Lack of fusion in ERW	
8.	Hook crack in ERW	
9.	Lack of fusion at SAW	
10.	Singular axial crack in SAW	
11.	Hook crack at SAW	
12.	Singular axial crack in internal corrosion	
13.	Singular axial crack in external corrosion	
14.	Stress corrosion cracking in external corrosion	
15.	Singular axial crack in a shallow dent	
16.	Singular axial crack in a deep dent	

Meets current specific tool(s) specification
Some capability outside of the specific tool(s) specification
No Capability

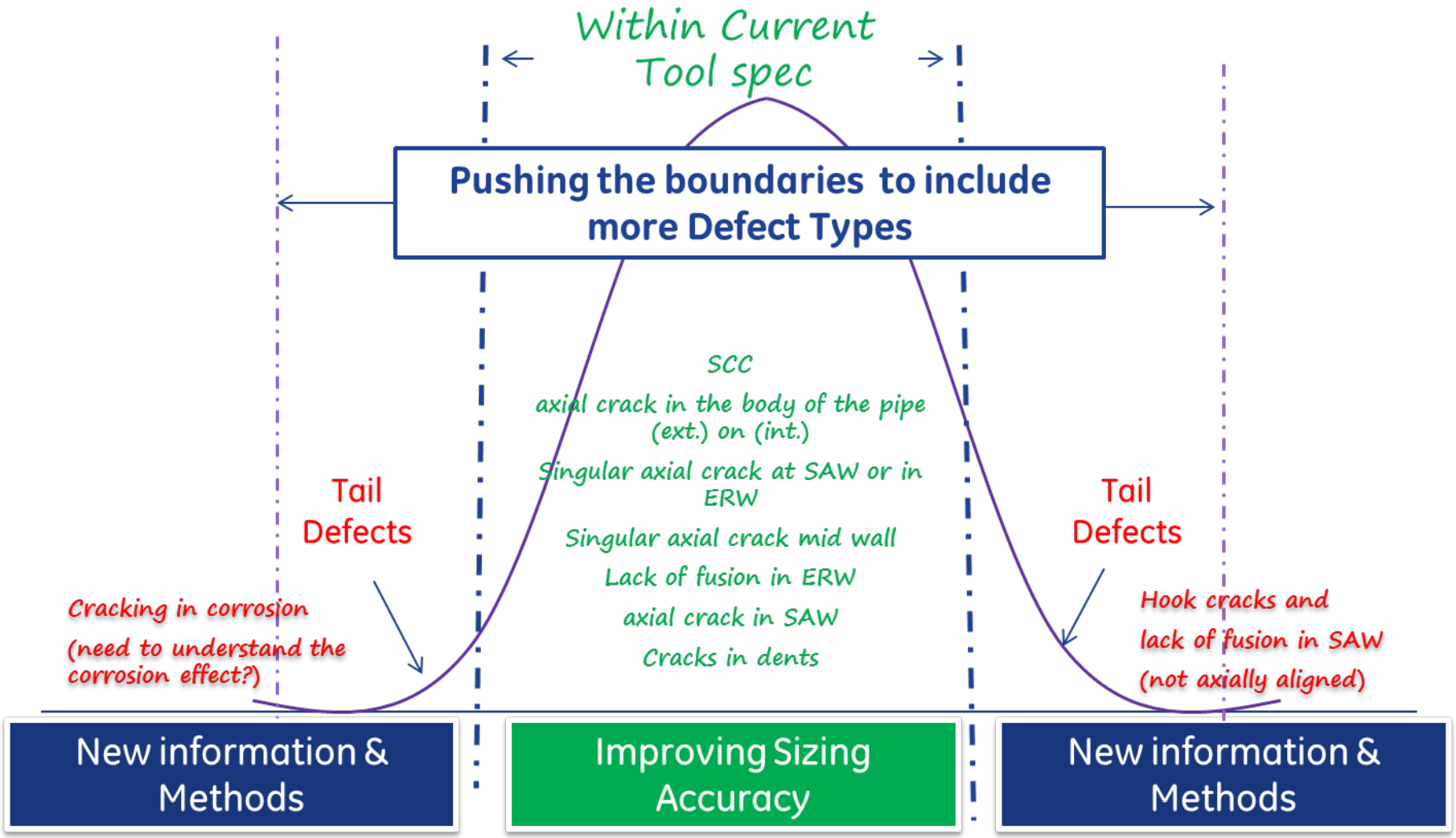
Capabilities Table

Technology Type	Preferred Product	POD	POI	Sizing	Minimum Detection
USCD	Liquid	90%	90%	Absolute Depth	1” (L) X .04” (D)
USCD DUO	Liquid	90%	90%	Absolute Depth	1” (L) X .04” (D)
EMAT	Gas or Liquid	90%	80%	Absolute Depth	2” (L) X .08” (D)

Over 37,400 miles of trained analyst experience in crack inspection
> 1,000,000 cracks reported

Where are we going next?

developments for improved sizing……..



What is needed…

to achieve better capability.

1. Investing in development …*Industry & Government Funding for research in sensing modes development for cracking features that are not axially aligned.*
2. Increase usage of crack inspection technology…*< 10% of inspections utilize crack technology*
3. Dig feedback – *essential to build sample size/confidence for specification improvement*
4. Test pipe samples (Real)…*complex cracking features & non axially aligned features for testing with new sensing set ups and modes.*

Invested over $100M in crack technology but usage is relatively low

Thank you