

To be Smarter or Just Faster

Adapting to the Digital Future



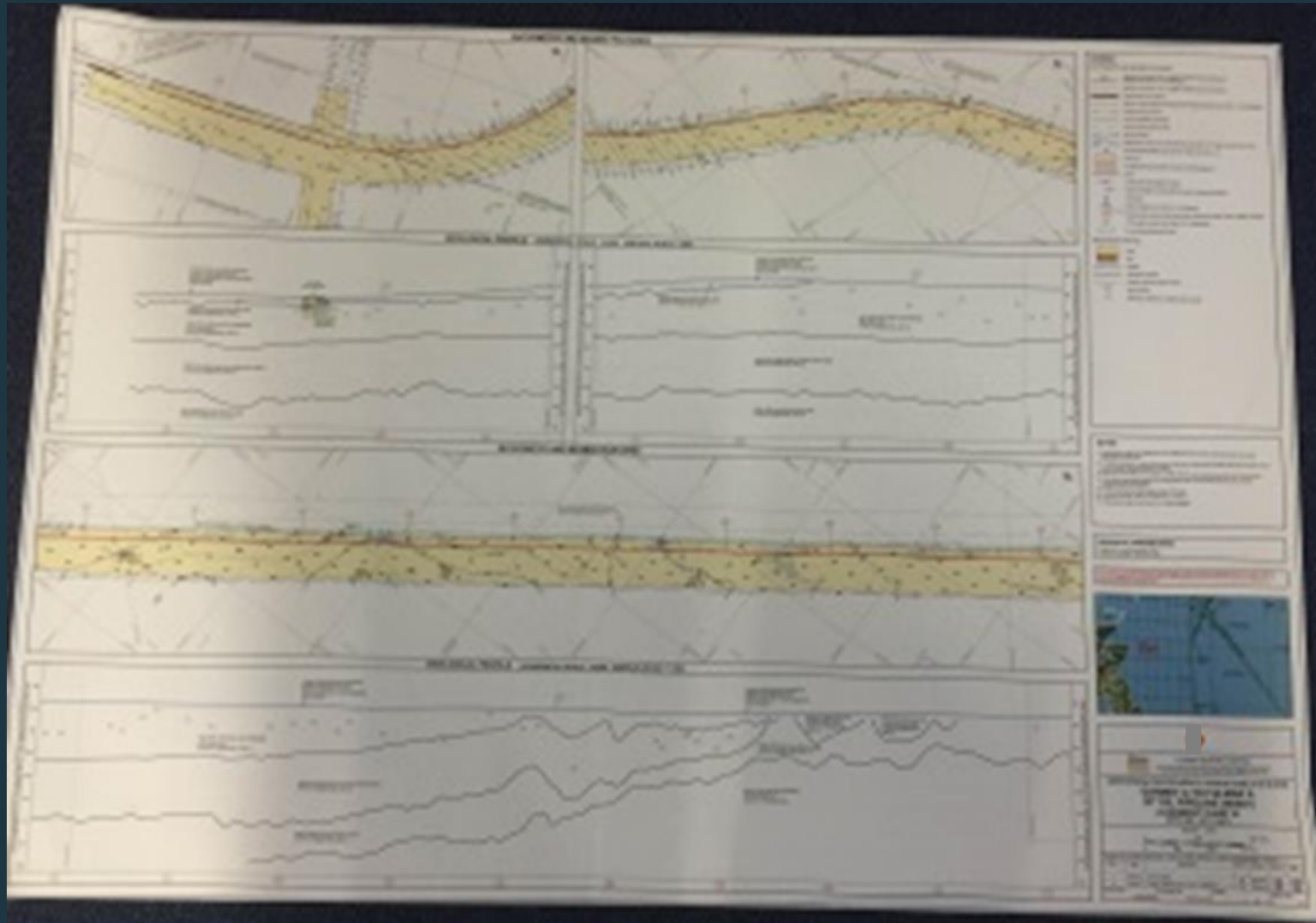
Summary

- Faster or Smarter ?
- Smarter Now
- Smarter in future

Ever faster vehicles in 20th and 21st Centuries



Deliverables for the 18th Century





How about Smarter

- Consider how we look at Safety
 - We identify a hazard
 - We can mitigate the hazard and reduce the risk
 - We can eliminate hazard and remove the risk
 - Doing the same process but faster is a mitigation
 - Remove the process by being smart is a winner

Smarter Now



**SAFETY ALWAYS
MATTERS**



REAL-TIME



COST EFFECTIVE



**LEAN OFFSHORE OPERATIONS
REMOTE AND AUTOMATED**



Remote Operations
>100.000 project hours

Starfix OARS > 1501113_Explorer_VR250_2A > Map - Starfix OARS

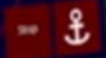
- Focus Vessel
- Map navigation icons

Vessel: 250ft Radius
Heading: 0.00° N
SMG: 0.0kn
CMG: 0.00° T

Vessel: DeltaClipper
Heading: 54.43° T
SMG: 0.0kn
CMG: 180.29° T

Vessel: EpicExplorer
Heading: 130.93° T
SMG: 0.1kn
CMG: 65.55° T

Name	State	AHV	Fairlead to Anchor	Fairlead to Proposed	Anchor to Proposed
117B	Laid	EpicExplorer	2,408.718LJS@67.79° T	2,430.568LJS@69.66° T	82.878LJS@143.40° T
25B	Laid		1,854.288LJS@180.22° T	1,900.588LJS@160.75° T	46.568LJS@181.34° T
35S	Laid	DeltaClipper	1,768.118LJS@253.30° T	1,776.788LJS@253.24° T	7.878LJS@240.12° T
41S	Laid		2,292.938LJS@351.34° T	2,270.798LJS@351.71° T	26.438LJS@138.49° T





Remote Operations





Augmented Reality



0.25°



Unmanned Surface Vessels



Artificial Intelligence

Roames Review

REVIEW PIPE INSPECTION MARINE DEV PROJECT - ENAGAS-SOG-P1W-KP0-15
ADJUST POSITION OF ANY INCORRECT PIPE NODES

OPERATOR STEVE BERTRAM

NAVIGATION

TOOLS

MODIFY PIPE

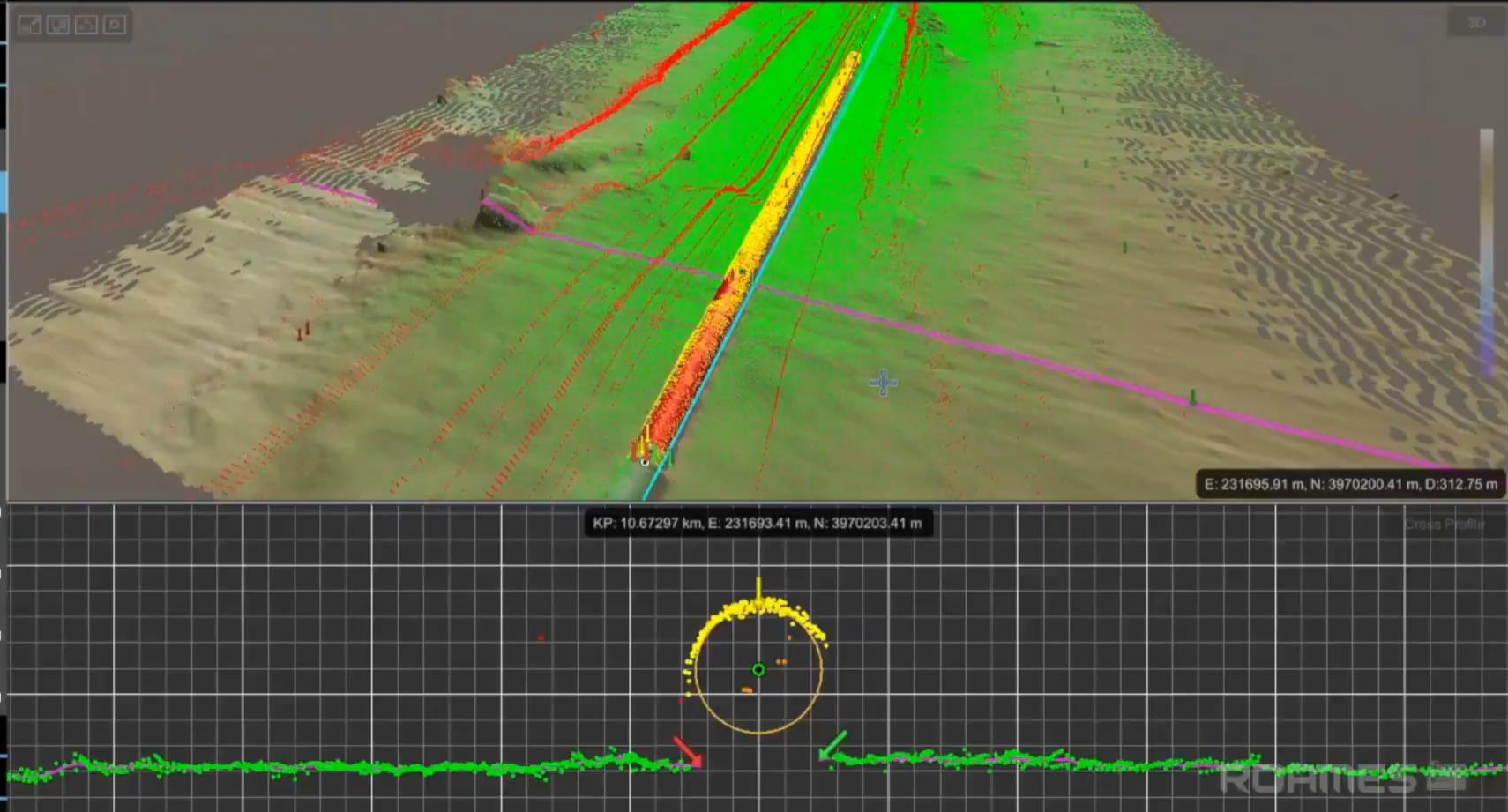
- INSPECT PIPE
- ADJUST PIPE**
- ADD PIPE NODE
- REMOVE PIPE NODE
- ADJUST SPT LIST

MODIFY POINTS

- ACCEPT POINTS
- REJECT POINTS
- THRESHOLD NOISE: 0.50
- PIPE THICKNESS
- NOISE ABOVE PIPE
- NOISE BELOW PIPE

MODIFY EVENTS

VISIBILITY



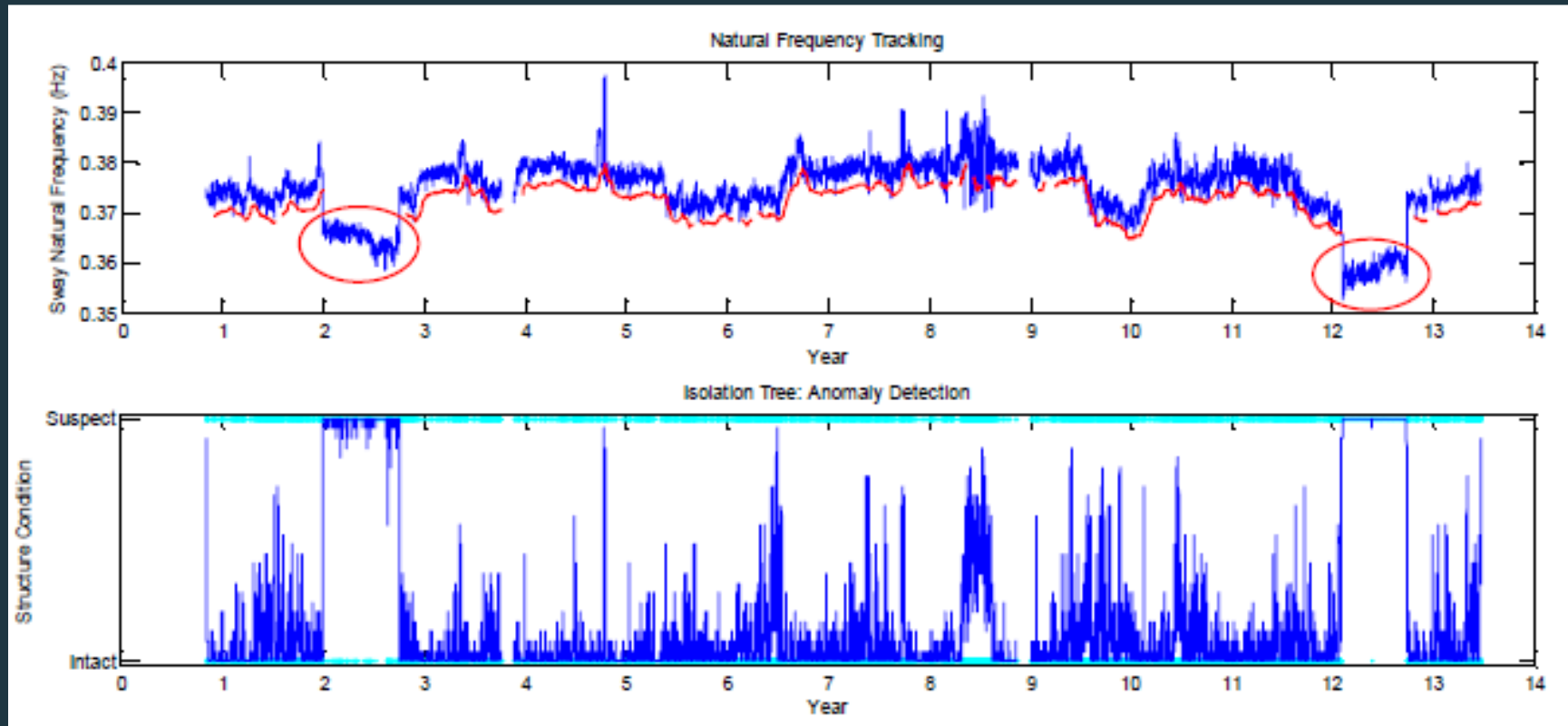
E: 231695.91 m, N: 3970200.41 m, D: 312.75 m

KP: 10.67297 km, E: 231693.41 m, N: 3970203.41 m

Cross Profile

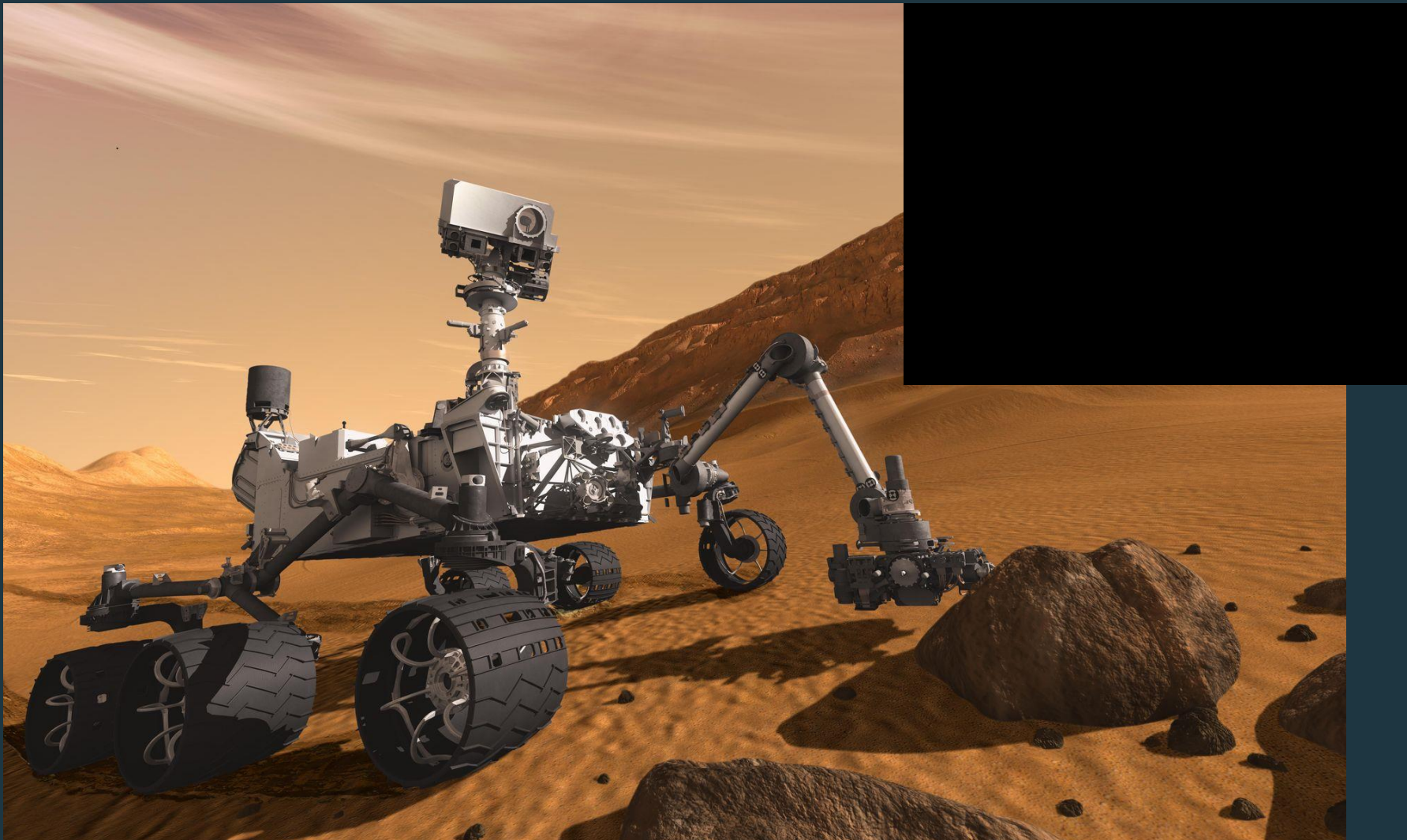
ROAMES

Machine Learning



- On-Line Monitoring with retro fitted equipment.

Where next - Autonomous Artificial Intelligence



Where next - Digital Twins?



“With the digital revolution blurring the boundaries between our physical products and the services we provide, we see a future where our engines are connected, contextually aware and even comprehending. A future where we design and test engines digitally, service them remotely and manage them through their digital twin. ”

Pioneering the Digital Engine

Rolls Royce Aero Engines

<https://www.rolls-royce.com/products-and-services/civil-aerospace.aspx>



Where next - Smart Structures?

‘The Leading Edge of Value Based Subsea Inspection’:
Predictive management is potentially far more cost effective. (Astrimar)

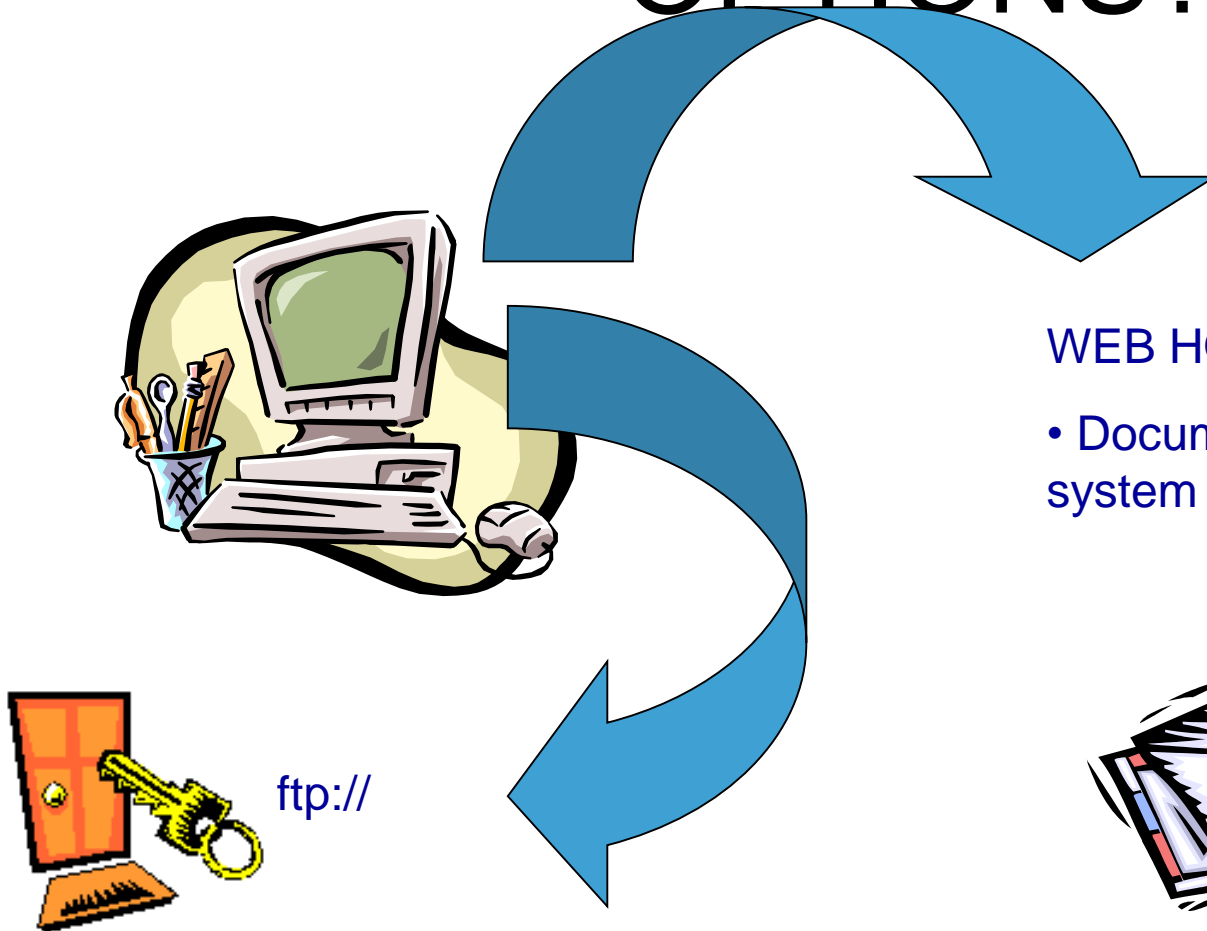
- Future: What we really want is;
 - Most likely change in status
 - Could it or will it fail?
 - Recommendations for action
- Why not build smart structures from the get go, rather than inspect?



Data Lakes v Data Puddles?

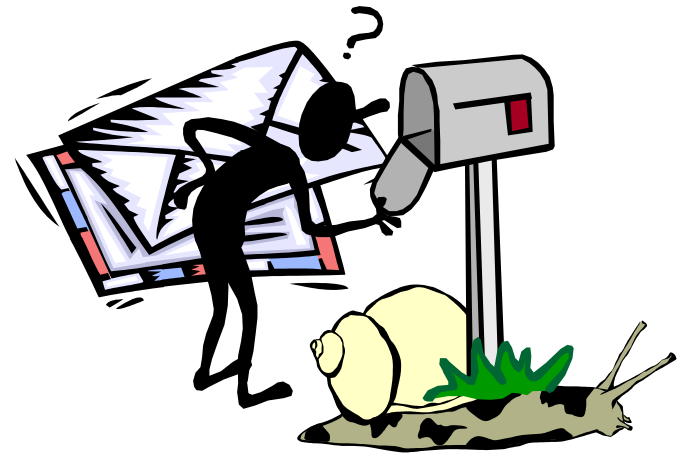
- For AI/Machine Learning to work you need data sets that provide a broad education for the AI
- Data Lakes not isolated puddles
- Look at how quickly China is catching up with the USA on AI development. The vast data available allows for quicker learning
- Do the needs of the many outweigh the needs of the few?
- The IRM future won't be about how and with what equipment that data is collected, Smarter will be what you get from that data.

OPTIONS?



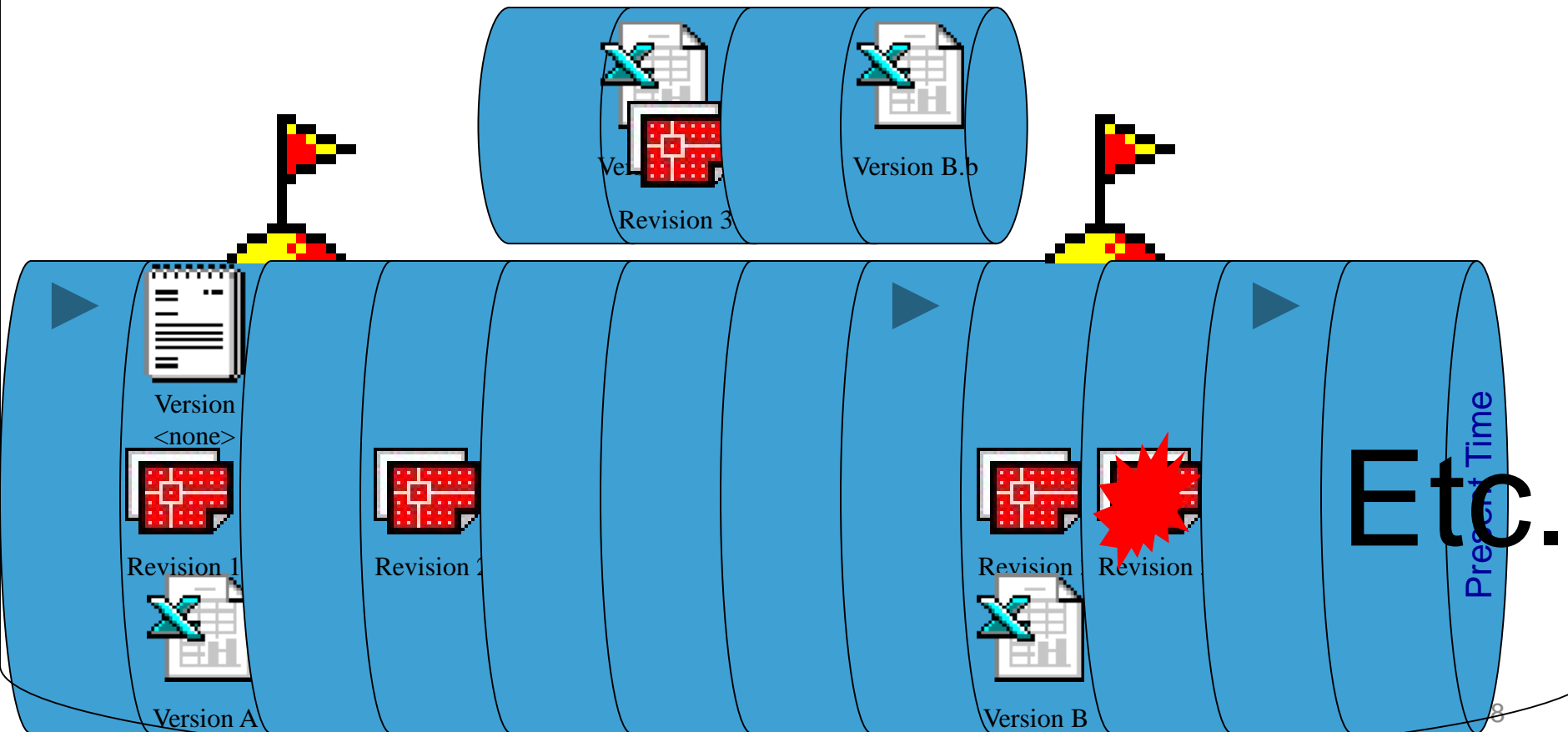
WEB HOSTED

- Document management system or similar





Where next – Back to the Future





Where next – New Business Models

- Current market is weak and companies need to find new ways to work
- Will digitalisation stall at what ever is achieved in next 5 years
- Will we need another downturn to get further advancement ?
- Could a paradigm shift come about - Rolls Royce Model? Printed Smart Pipes? ©



Thank You

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