Improving Data Capture

Mobility, Vision Processing (MDAAS Capture), Integration

Scott Smith, PE, CRL
Director Reliability & Asset Mgmt

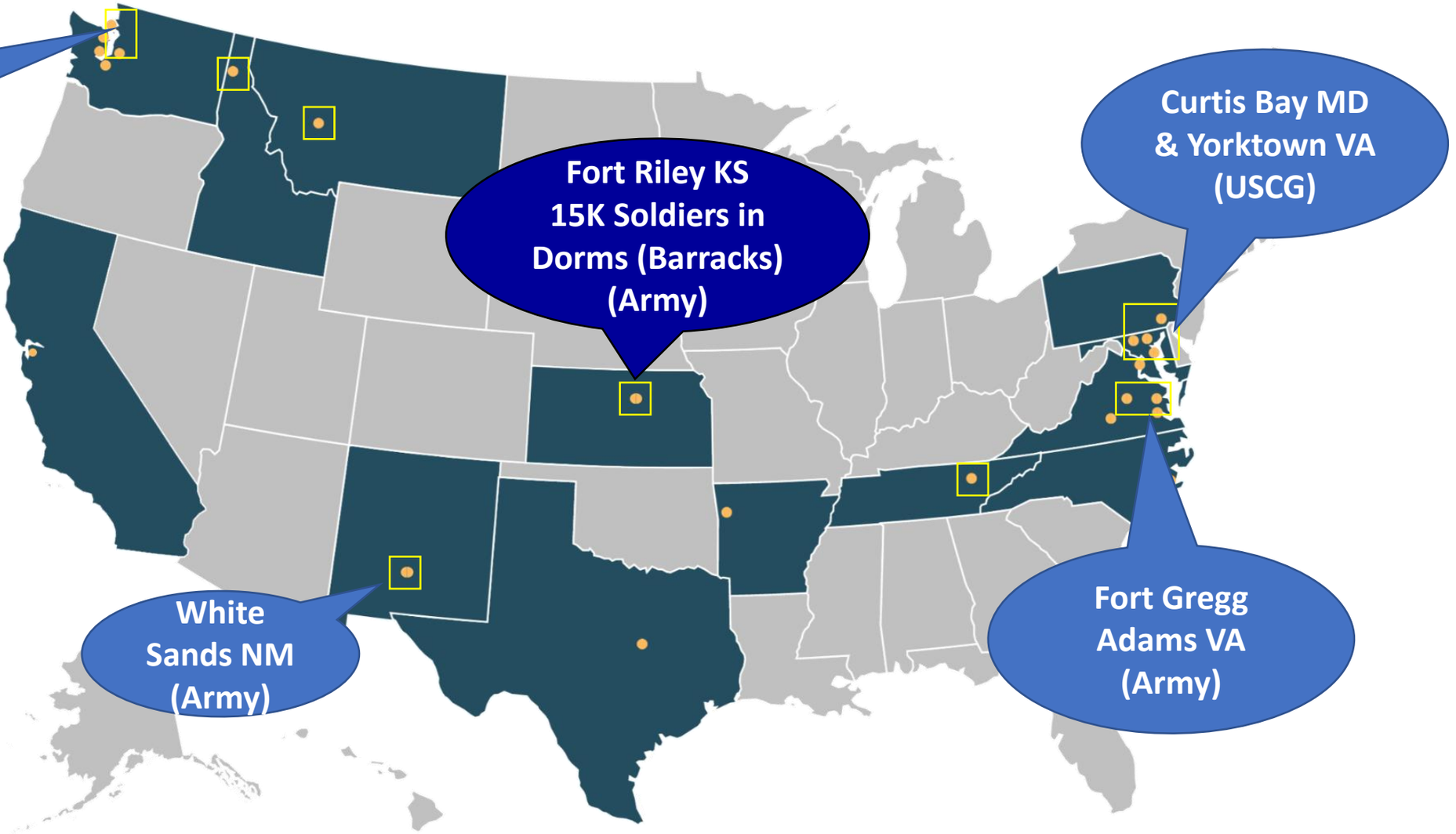
About Skookum

- **Top Tier AbilityOne Contractor**
  - **Non-Profit, Employ People with Disabilities, Veterans**
  - **Competitive contracts – AbilityOne & Commercial**
  - **Leveraging Best Practices and enabling systems is critical**
- **National Footprint -** 1,400 employees at 25 sites
  - **Infrastructure (10 sites)** – Facilities, Utilities, Environmental
  - **Fleet, Janitorial, Grounds, Warehousing, Aerospace (15 sites)**
  - **~ 600 Maximo Users**: ***240 "Desktop", 360 Mobile (all Techs)***
- **Maximo & Mobility Evolution**
  - **2013 –** Stand-up of central Maximo and Mobility
  - **2016 –** Paperless Work Mgmt (replicated for all sites)
  - **2017 to 2021 –** Advanced capabilities deployed at lead sites
  - **2021 to Present –** "Standardize" across all sites

2017 Uptime Award – Best Work Execution System (Skookum Fort Lee)

2021 MaximoWorld Award
Best Partnership – Interpro & Skookum

Major Infrastructure Sites



Business Lines

- Infrastructure
- Janitorial
- Grounds
- Fleet
- Warehousing
- Manufacturing

Why is “accurate Asset Data” Important?

United States Government Accountability Office

GAO

Report to Congressional Requesters

November 2018

FEDERAL REAL PROPERTY ASSET MANAGEMENT

Expert Opinion

“In a more practical sense, collecting data may be a big challenge for many organizations. Collecting data is one component of asset management and requires the measurement of many factors that may not have been measured before. It is difficult to collect these data and to combine and apply them in a way that is useful. This process can feel overwhelming to people within organizations.”

Source: GAO interviews with asset management experts. | GAO-19-57

Impacts of Poor Asset Data

- What assets do we own?
- Maintenance Strategy?
- Defined PM and Job Plans?
- Spare parts, linked docs?
- How do we maintain?
- How do we improve?

Maintenance & Reliability

- Condition & Age?
- Breakage cost?
- Are PM’s effective?
- Funding alignment
- Repair or Replace?

Asset Management (ISO 55001 principles)

Three Data Capture “Strategies”

Requires major 3rd party data and IoT effort

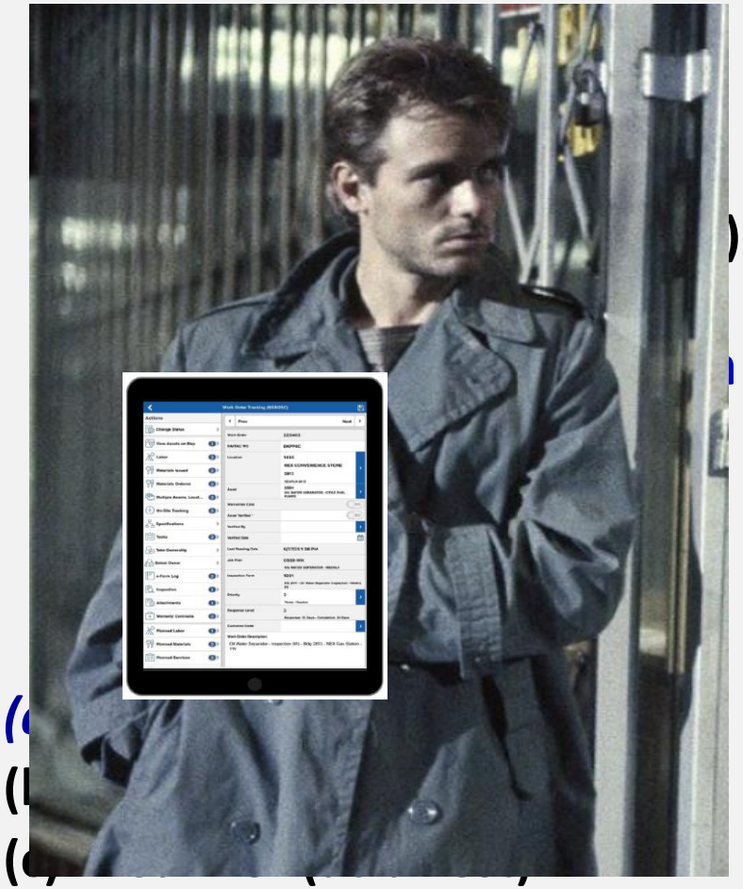
Paper Capture

Poor data quality, 20%+ Efficiency Loss

Typical Base - $5B plant value, 50K+ assets

Mobility 4.0

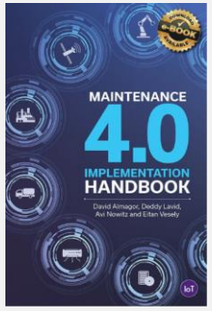
Kyle Reese with effective Mobility



Maintenance 4.0

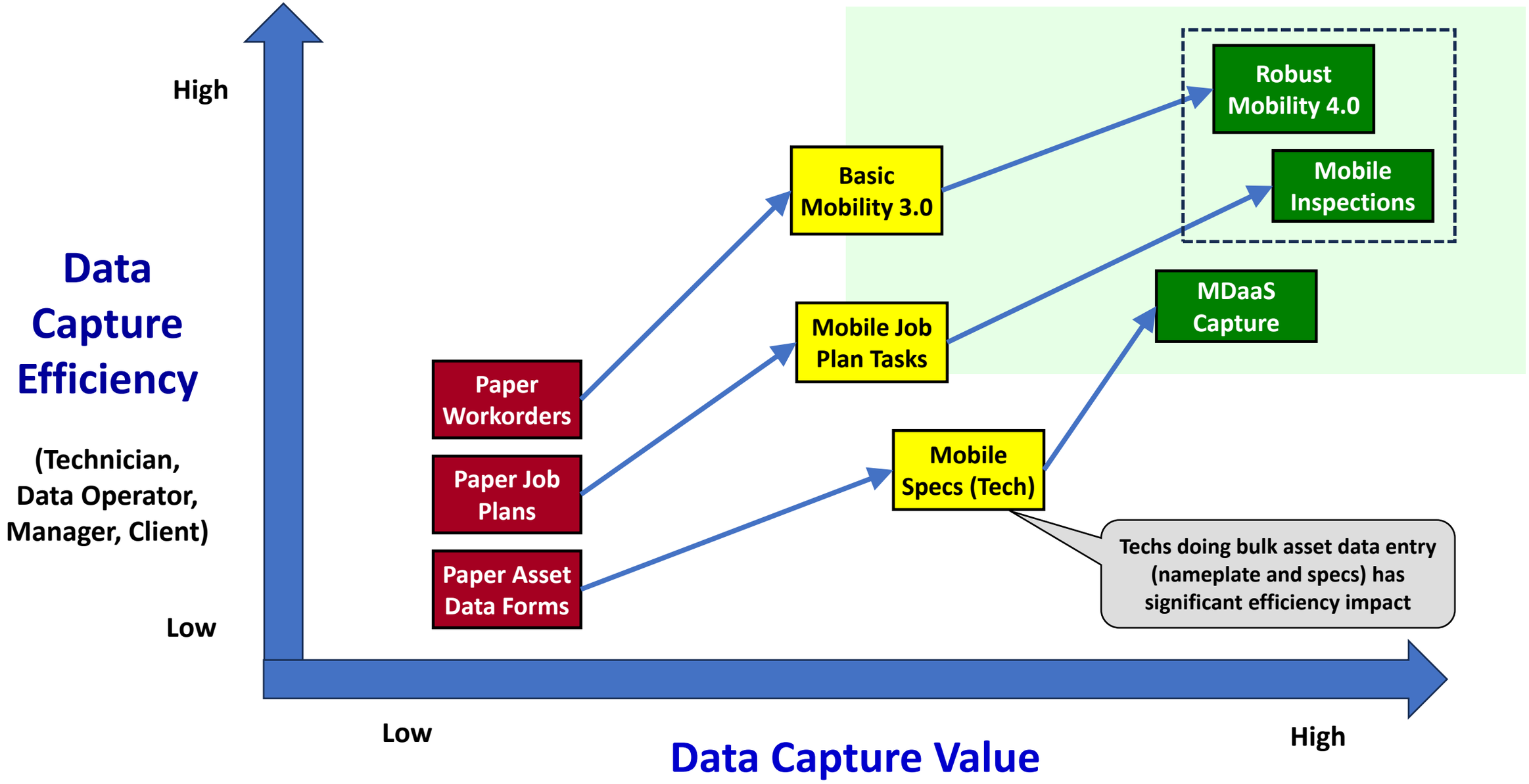
Sensors, AI, ML, Robotics… Technicians?

- Sensor everything
- Integrate everything
- Autonomous AI

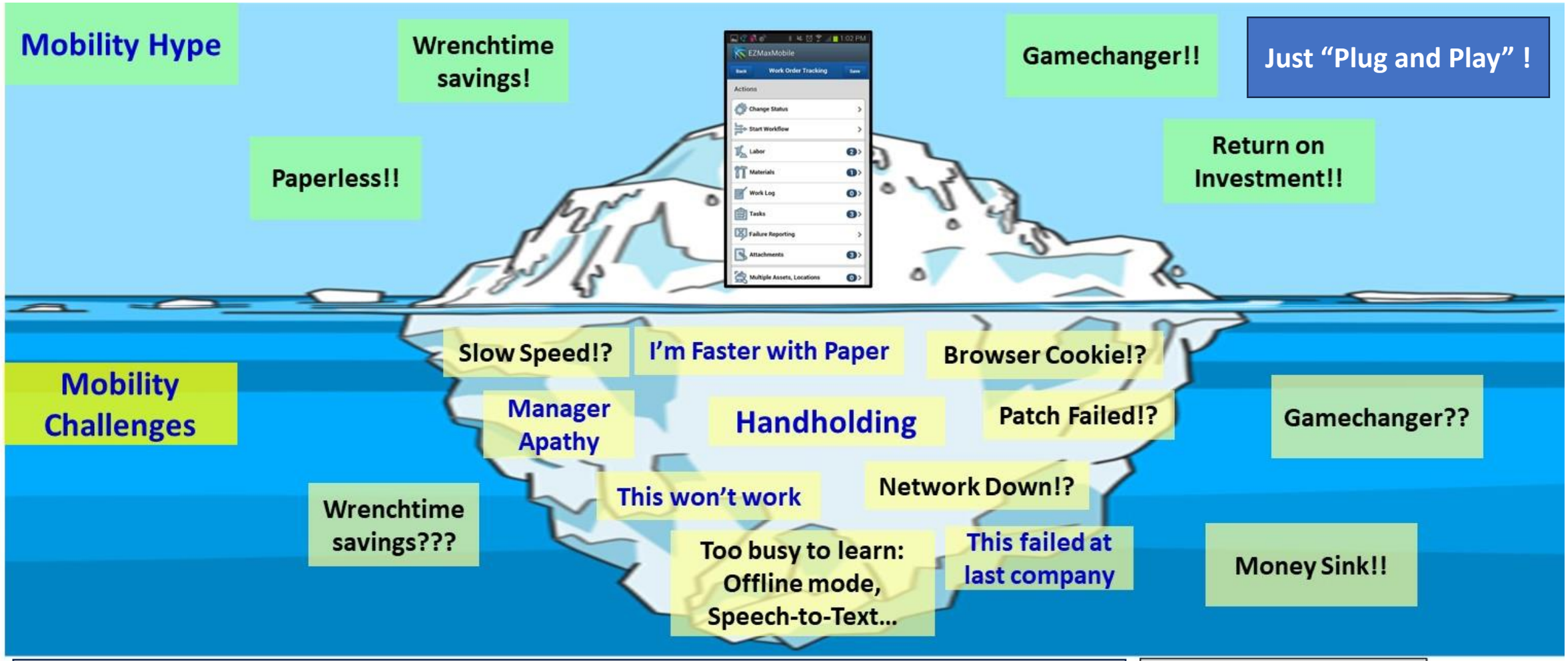


- Failure Detection (ML)
- Auto Failure Reporting
- Auto Scheduling
- Auto Parts Mgmt
- Robotics Assisted Repair
- Drone/Robot Inspection

Asset Data Capture – Maximo-centric Evolution



Mobility "Hype vs. Reality" – Success requires 'All Hands on Deck'



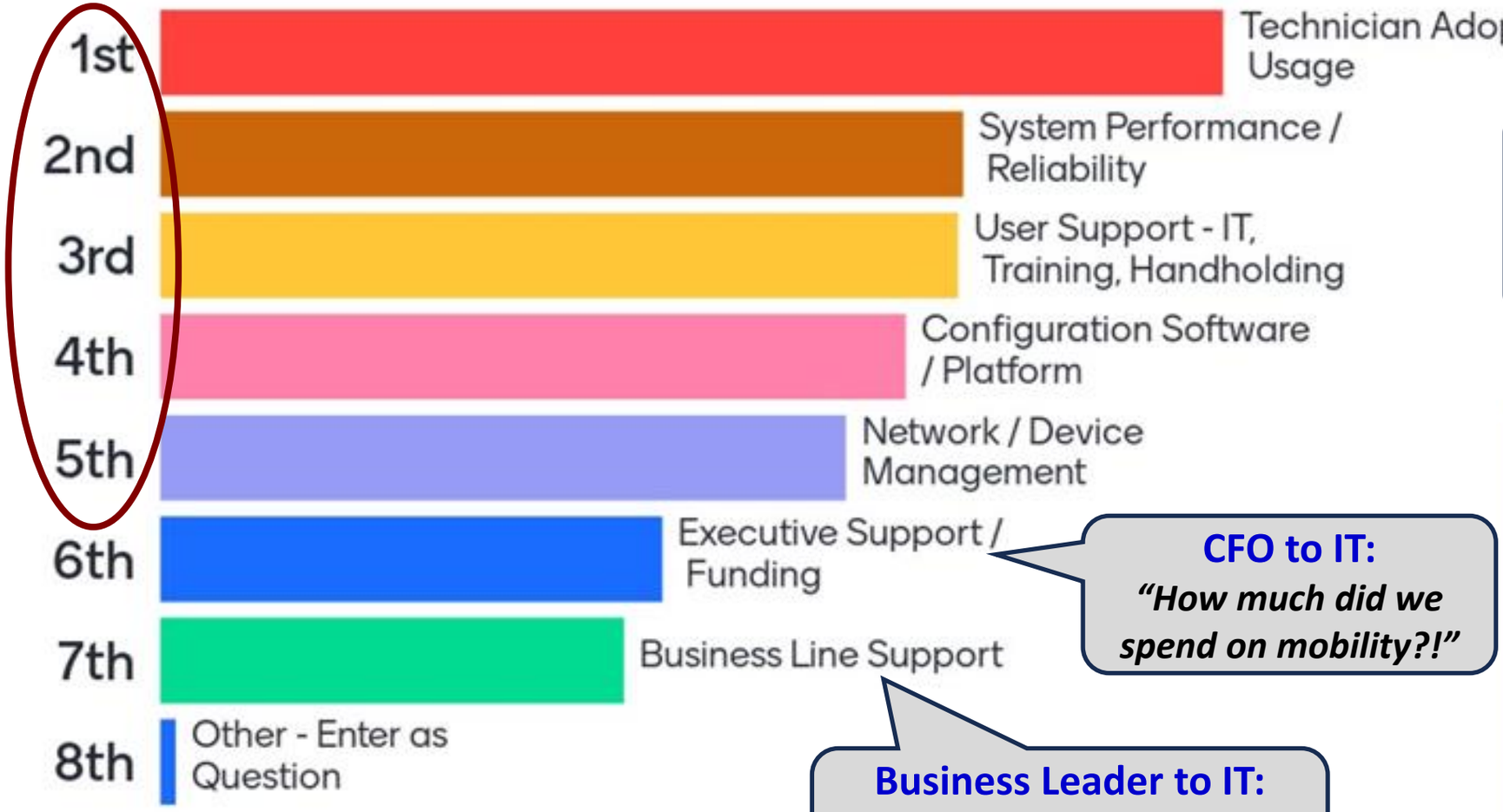
Power of Proven Pilot, Configurable Platform, & Site Leadership…

… New Site standups are "easier" (Fort Riley)

Metric: "How many smashed IPADs?"

Question 1: "What are the top "Mobility Implementation Challenges" ?

Maximo Utilities Working Group Survey (April 2023) – 75 inputs



CFO to IT:
"How much did we spend on mobility?!"

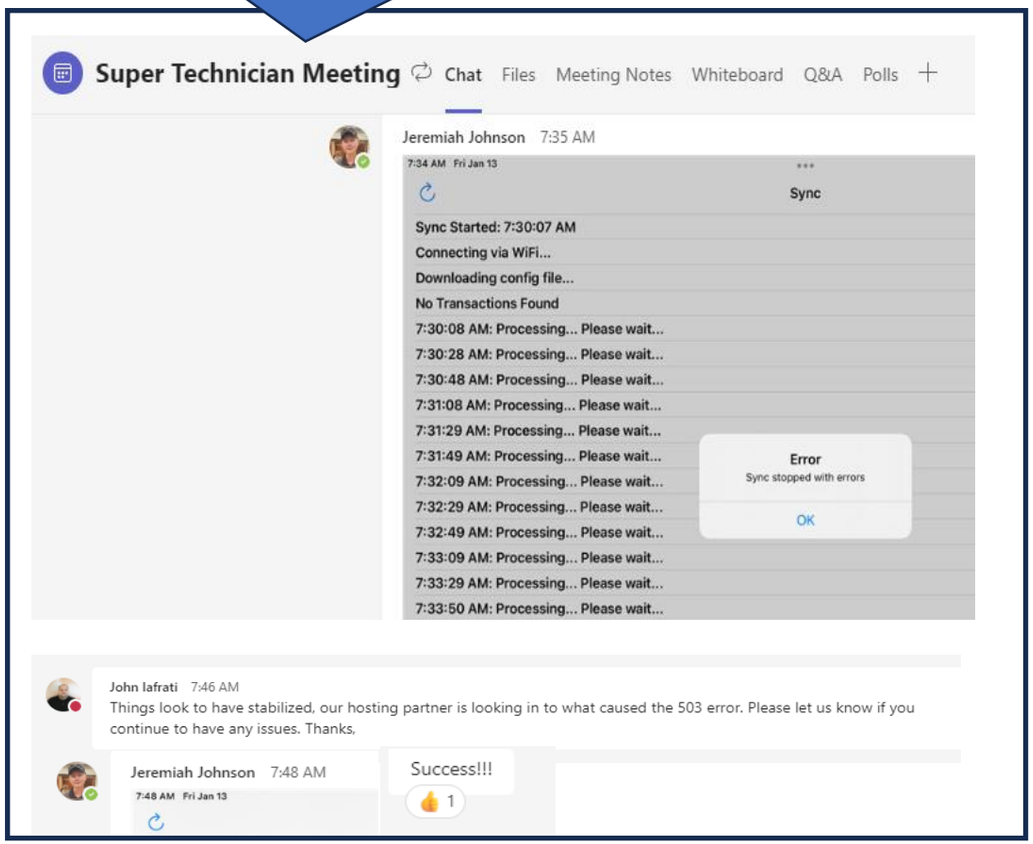
Business Leader to IT:
"We can't afford to use mobility… turning in iPADs"

Tech: Mobility doesn't work!
I am faster with paper
Slow… Outages… Support?

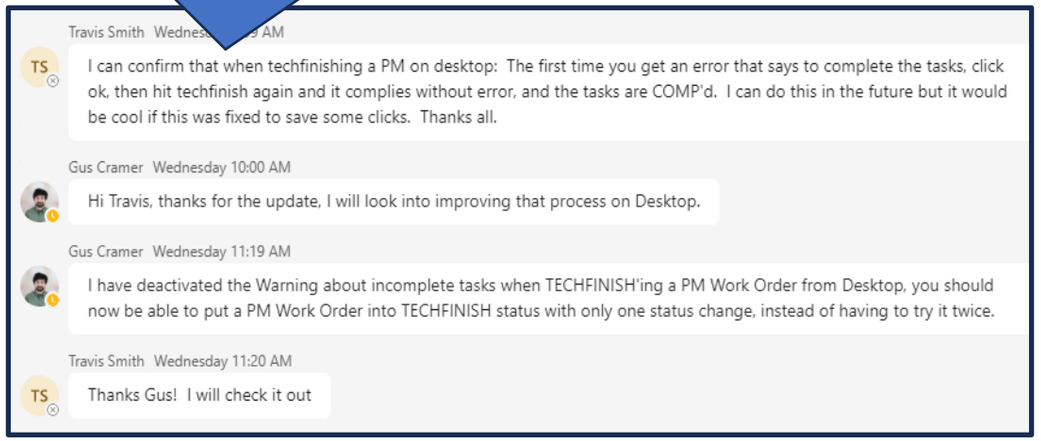
Why “Leadership at all levels” and “Collaboration? “Things Happen”

Large Site – 15 minute weekly sync… Site Manager, ‘Super Techs’, IT, Maximo Team
Leverage MS Teams to post/resolve issues at “near real time”

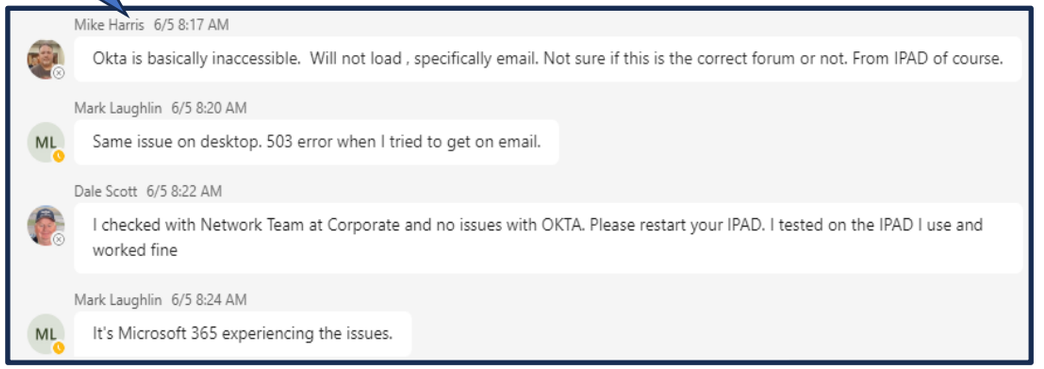
Tech reports slow mobile performance w/screenshot…
Resolved in 11 minutes via server restart



Tech requests simple enhancement – added by remote programmer/analyst

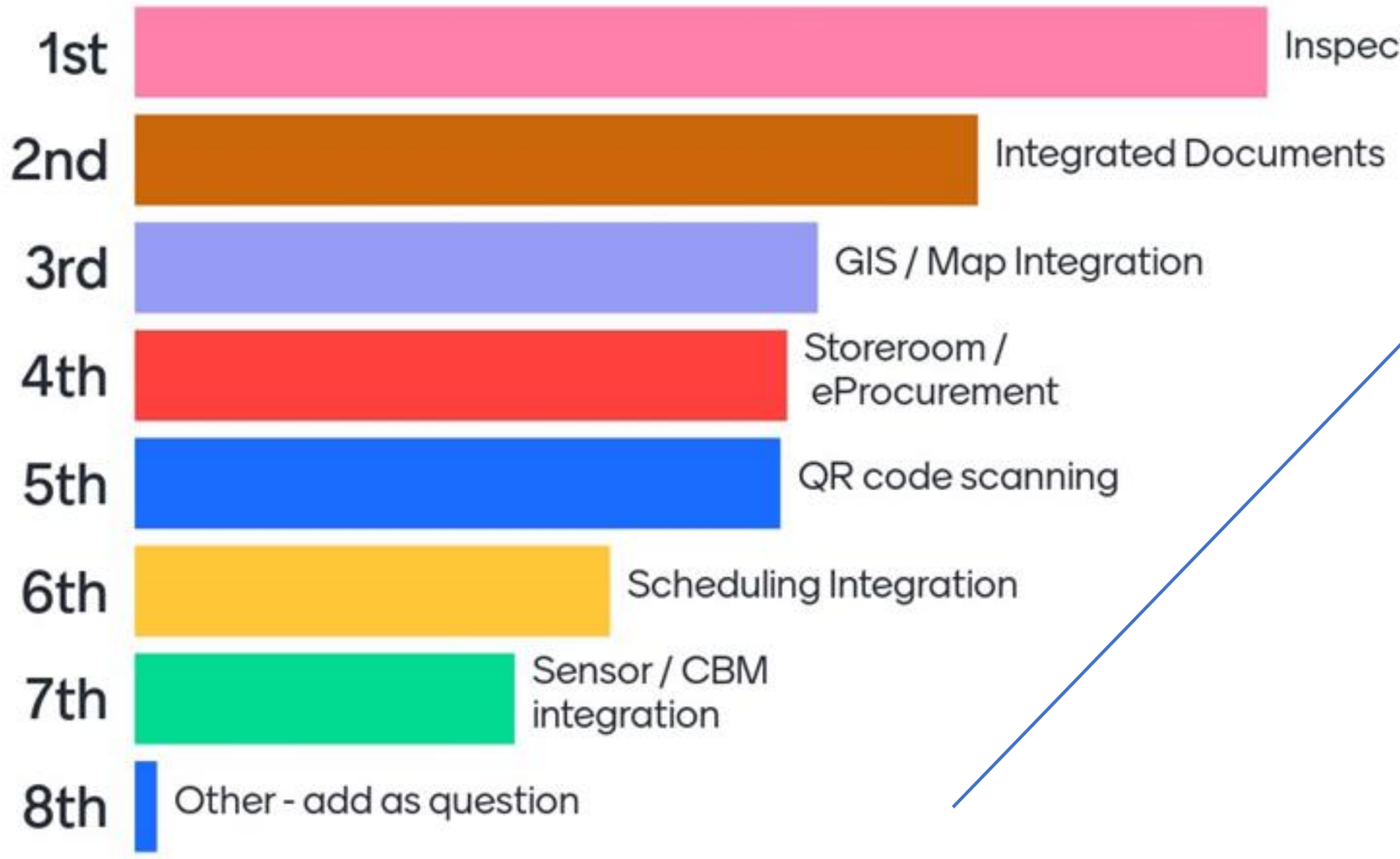


Okta not working… IT confirmed Microsoft Cloud issue



Question 2: Your top "Advanced Mobility needs" ?

Maximo Utilities Working Group Survey (April 2023) – 54 inputs



Mobility 4.0

Getting to Mobility 4.0 - *Crawl, Walk, Run* (will differ by needs)

Crawl

- Solid Maximo Platform
- Mobility Sponsorship
  - CXOs & Business Lines
  - CIO/IT as Partner
- Mobility Setup
  - Easy, Configurable
  - Reliability, Performance
- Mobility Pilot
  - Get it right
  - 'Faster than paper'
  - Significant ROI
  - "Techs like it"…

  … Mobile Sells itself

Walk

- Core Capability - all Sites
- Work Mgmt
  - Basic asset data – MDAAS option
  - Digital CMs and PMs
  - Rept and BI automation
- Material Mgmt
  - Storeroom Automation
  - eProcurement
- Intermediate Capability
  - Project Module
  - Inspections
  - Auto-Alerts – Bldg Mgr…

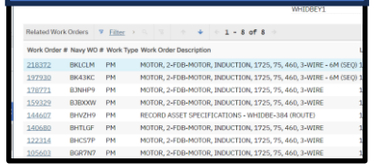
Run

- Enrich Asset Data
  - Nameplate, Total costs…
  - Condition, Tech notes…
  - Linked Docs, e.g. O&M
- Reliability
  - BI Bad Actor views…
  - Define critical assets
  - Link sensor & CBM data
- Advanced
  - BI Dashboards
  - Integrate systems (RPA)
  - Practical Digital Twin
  - Vendor integration

Mobility 4.0 – A "Two Way" Relationship

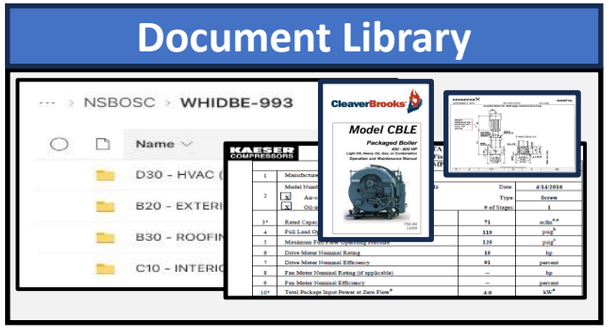
Tech: "What data do I get?"

Work History

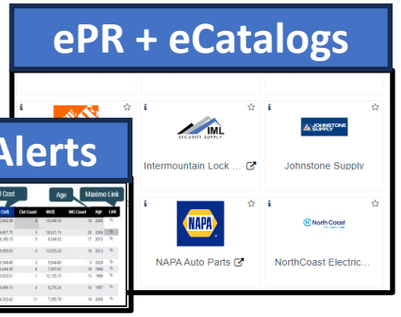


Training Videos

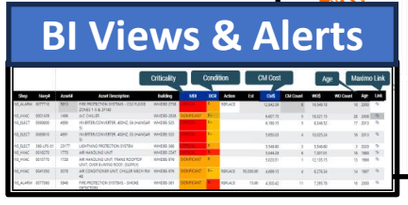
Document Library



ePR + eCatalogs



BI Views & Alerts



CBM Data & Alerts

Workorder – Inspect Oil/Water Separator

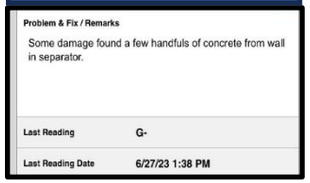
Manager: "Enter this data!!!"

"Inspections"

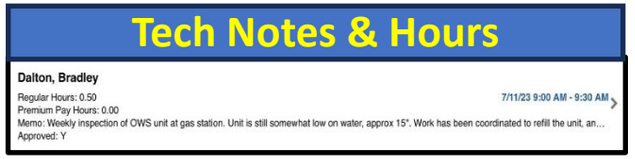
Job Plan Tasks

Tech Photo

Meters



Tech Notes & Hours



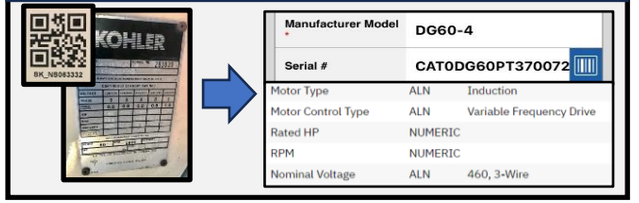
Manual Processes:

- Follow-up Workorder
- Alert Supervisor…

"MDaaS Capture"

Asset Verification

QR Tag, Nameplate -> Data/Specs



Power of Inspections – Oil Water Separator example

Maximo Work Plan Tasks
Generic… granular inputs?

Task	Description
10	REMOVE SLUDGE AND OIL
20	REMOVE DEBRIS FROM BAFFLES, WEIRS
30	CLEAN AND REMOVE DEBRIS FROM HOPPERS, HOLDING TANKS AND SUMP PITS
40	FILL OUT MAINTENANCE RECORD/REPORT
50	CHECK FOR BROKEN OR MALFUNCTIONING PARTS
60	RECHARGE WITH WATER AND MAKE PROPER ADJUSTMENTS REQUIRED FOR PROPER OPERATION
70	INSURE UNIT HAS BEEN INSPECTED AN MAINTAINED AS PER APPLICABLE PERMITS

Detailed "Paper Inspection" Form
Hey, you told me "paperless"

Facility:_____ Inspected By:_____

Separator ID#:_____ Date:_____

Separator Location:_____

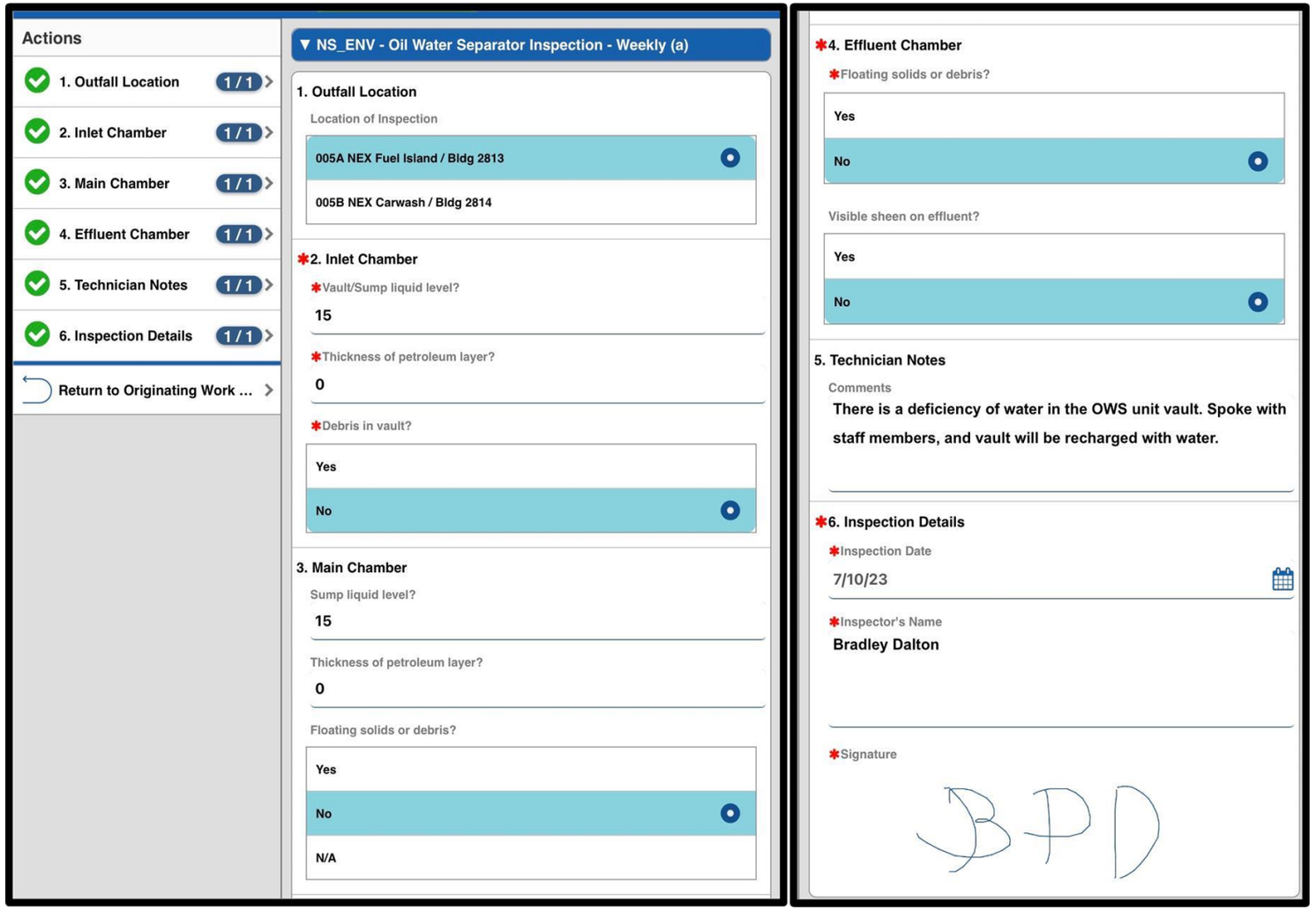
Oil Water Separator
- Depth of accumulated oil _____ (inches)
- Depth of accumulated sediment _____ (inches)

Grit Interceptor (if applicable)
- Depth of accumulated sediment/grit _____ (inches)

Deficiencies Noted:
- Piping: _____
- Vault Integrity: _____
- Structural Failure/Deformation: _____
- Access Cover/Vents: _____
- Other Comments: _____

Corrective Actions: _____

Inspection Form – single process, data entry streamlining… speak to text…
Value Lists, Digital Signature, Photo & Meter prompts, Alerts/Escalations…



Integration – getting mobility data to others

Maximo / Mobility Solution

Integration (Prioritize by ROI)

Technician

Complete Work data
Dates, Costs, Pictures, Notes, Tasks, Inspections...

Complete Equip data
Field Verified, Nameplate, Condition, QR Tag, Docs ...

Backoffice Integration

Work Control
Scheduling
Projects (PMO)

Inventory
eProcurement

Safety
QC

- Payroll
- Client EAM Systems
- Discounted eCatalogs
- Procure to Pay (PTP)
- Bldg Mgrs & Subcontractors

MDaaS Capture

MDAAS Capture

PROMETHEUS GROUP

"Capture" – one component of Master Data Governance

MDAAS Capture - Value and ROI

Major Challenge: **Need asset verification and core data… For any site but particularly for a new contract start-up**

- **Legacy verification & data is typically poor –** exists?, where?, specs?, install date?, nameplate info?, picture?...
- **Poor validation/data PREVENTS Maintenance, Reliability, and Asset Mgmt**

Options:

1 - "Hope". Close your eyes, muddle through it, complain about it…

2 – "AEC Firm". Pay company for full asset inventory… $1M+… out of date…

3 – "Techs with Mobile devices". Make part of the job… swap a pump, take photo of nameplate and send eSR to backoffice data operator. BUT, this does not work with bulk capture – too expensive

4 – Enter "MDAAS Capture"…

MDAAS Capture vs. Technician Entry

Technician Entry (either Tech direct entry or send nameplate photo)

- **Need technician familiar with equipment – understand nameplate**
- **Prep asset route list… Go to asset location**
- **Enter key data on IPAD: 15 minutes x 15K assets = 3.4 FTE**
  - **… or send photos to data operator for their entry… similar total time**

MDAAS Option

- **Only need general maintenance worker…**
  - **iPhone with Selfy Stick… Training is important – taking clear photos**
- **Prep asset route list… Go to asset location**
- **Take asset photos – nameplate, full view, tags… 2 mins x 15K assets = .45 FTE**
- **System performs vision processing on nameplate & geo-links photos**
- **Review results and update Maximo fields – SQL/script**
- **Link MDAAS folder/pictures to Maximo**

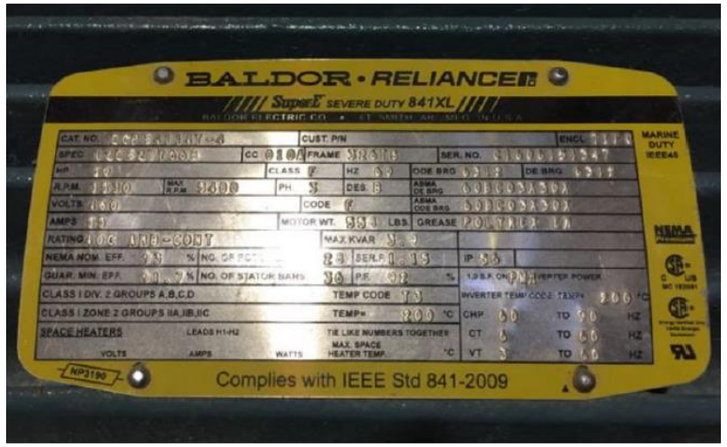
MDAAS Process

Asset Data Capture
Parsing by 3rd Party

Enrich Asset Data – SKUMAX 'Asset Library' and OEM websites

Tech takes photo(s) of asset tags & uploads to website

Images "parsed" into data (vision processing)



ATTRIBUTE	VALUE
Make	Baldor Reliance
Series	Super E Severe Duty 841 XL
Part Number	ECP84114T-4
Serial Number	C1505141347
Specification	12E626Y668
Power	50 HP
Speed	3,530 RPM
Frame	326TS
Voltage	460 V
Amps	55 A

SKUMAX Asset Library: Asset Type, PM/JPs…

Scrape NAVMAX – asset info, work history…

Later: OEM data and digitized Tech Library

Nameplate data in Maximo? Very Poor… Accuracy?

Load into Maximo 'Nameplate' & Specs

Specs?, O&Ms?, Parts?, Replacement Cost? …

"Ready Day 1"

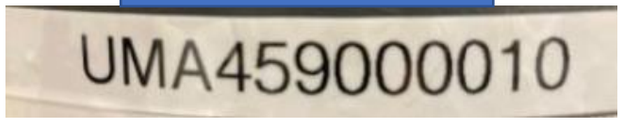
MDAAS Example – Steam Plant: Hot Well Motor-Pump

1) Take photos of nameplate and tags

Overall

Nameplate

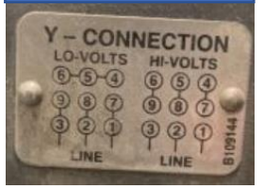
NAVFAC Label



Other

Skookum QR

Other



Geo Locate

2) MDAAS converts nameplate to text

Photo Type	All
Make	US ELECTRICAL MOTORS
Model	6587
Serial Number	R 05 7420576-0025 M 0001
Country	MEXICO
TAG No.	UMA459000010
Phase	3 PH
NEMA Design	B
Full Load Amps	19.8 / 9.9

RPM	1740
Service Factor	1.15
Horsepower	7.50
Enclosure Type	TE
Insulation Class	F
Motor Frame Size	213VP
Motor Voltage	230 / 460
Frequency	60
Weight	190

MDAAS Example – Vision Process accuracy

Asset:
8340 MOTOR, 2-HWP-MTR, INDUCTION, 1745, 7.5, 460/230, 3-WI

Photo conversion

Photo Type	All
Make	US ELECTRICAL MOTORS
Model	6587
Serial Number	R 05 7420576-0025 M 0001
Country	MEXICO
TAG No.	UMA459000010
Phase	3 PH
NEMA Design	B
Full Load Amps	19.8 / 9.9

Maximo Data

US ELECTRIC MOTORS

6587

057420576-0025 H0001

UMA459000010

"M" or "H"

Installation Date:
1/1/08

Photo conversion

RPM	1740
Service Factor	1.15
Horsepower	7.50
Enclosure Type	TE
Insulation Class	F
Motor Frame Size	213VP
Motor Voltage	230 / 460
Frequency	60
Weight	190

Maximo Data

1,745.0

7.5

460/230, 3-Wire

Voltage Class 600.0

MDAAS Capture – Provides key fields for enrichment (db look-up, web crawl or manual)

Asset:
8340

MOTOR, 2-HWP-MTR, INDUCTION, 1745, 7.5, 460/230, 3-WI

Photo Type	All	RPM	1740
Make	US ELECTRICAL MOTORS	Service Factor	1.15
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Serial Number	R 05 7420576-0025 M 0001	Enclosure Type	TE
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Phase	3 PH	Motor Voltage	230 / 460
NEMA Design	B	Frequency	60
Full Load Amps	19.8 / 9.9	Weight	190

Manual search – found OEM info including Current model, O&M Manual, Spares

Model# FJ77

Catalog#	HT7P2BLE
HP	7.5
RPM	1800
Frame Size	213TP
Voltage	230/460
Type	TEFC Premium Efficient Vert
Motor Type	TUS
Web Type	Verticals
Web Brand	US Motors
Weight (lbs)	210

HT7P2BLE, 7.5HP, 1800 RPM, 230/460V, 213TP, 3PH, TEFC, Vertical Holloshaft

$2,438.00

MDAAS Capture – GeoTagged… See asset location with nearby assets

Map View

8340
MOTOR, 2-HWP-MTR, INDUCTION, 1745, 7.5, 460/230, 3-WIRE

Pin	Location	Asset	
A	0.00000 m		8339 MOTOR, 3-HWP-MTR, INDUCTION, 1745, 7.5, 460/230, 3-WIRE
B	0.67639 m		26598 INSTRUMENTATION, 1-BLR-LOW-ATOMIZ-AIR, SWITCH
C	0.96481 m		9579 TANK, SOFTENER-TANK-1, ELEVATED, FIBERGLASS, SOFTENER RESIN/WATER

MDaas Connect Image

Asset Visit (1): 10/11/2021 01:31 PM Asset Name: 8340

View all images for that asset

Linking Asset data to Maximo

Goal: Enable Tech, Maint Mgr and Client

Asset #: 8340

MOTOR, 2-HWP-MTR, INDUCTION, 1745, 7.5, 460/230, 3-WIF

Reference ID 1 (Skookum Barcode): SK_NS060518

Reference ID 2 (NAVFAC Maximo): UMA459000010

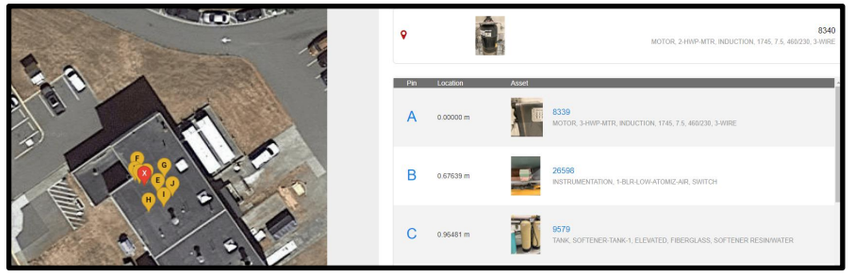
Manufacturer: US ELECTRIC MOTORS

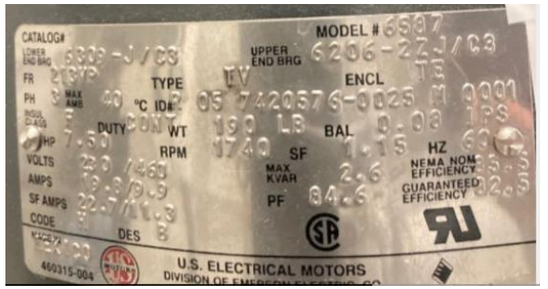
Replacement Cost: 7,093.00

Manufacturer Model: 6587

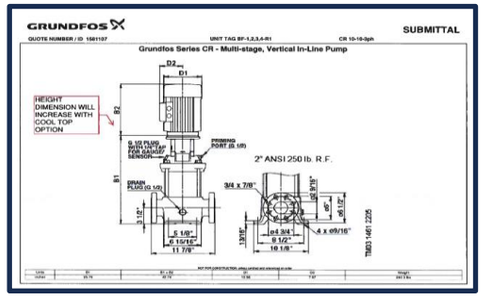
Serial #: 057420576-0025 H0001

MDAAS Geo & Images

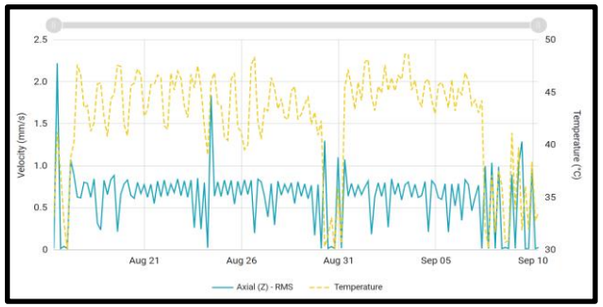


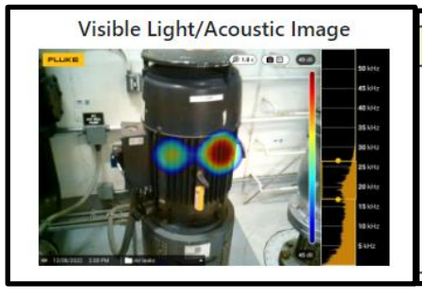


Linked Documents (OneDrive)



Sensors & CBM





Date (YYYY-MM-DD)	Camera
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