

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



Major Infrastructure Sites

Naval Air Station
Whidbey Island
(Navy)

Fort Riley KS
15K Soldiers in
Dorms (Barracks)
(Army)

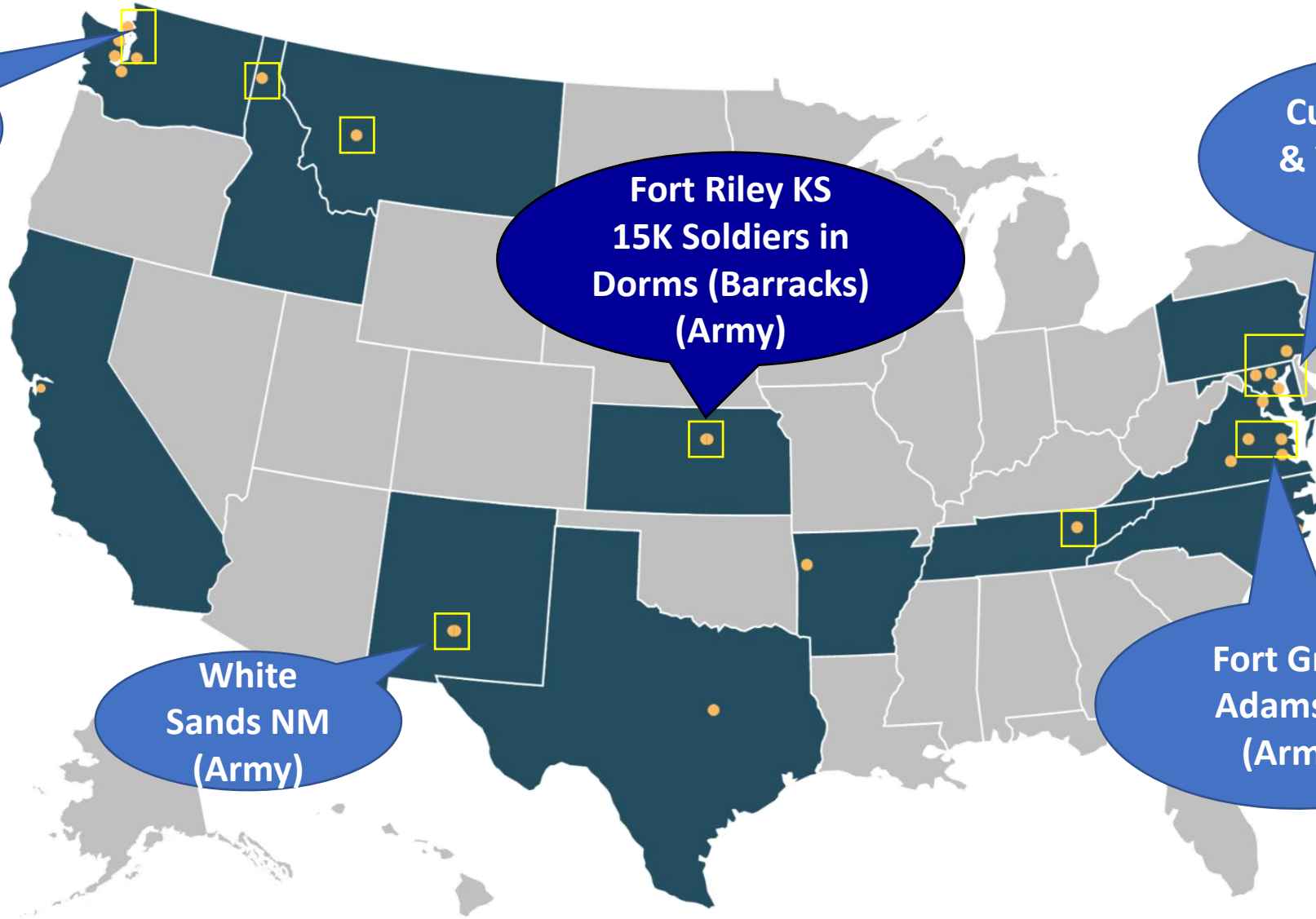
Curtis Bay MD
& Yorktown VA
(USCG)

Business Lines

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

White
Sands NM
(Army)

Fort Gregg
Adams VA
(Army)



Why is “accurate Asset Data” Important?



United States Government Accountability Office
Report to Congressional Requesters

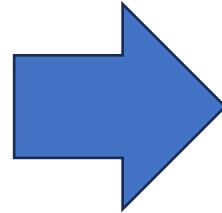
November 2018

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

**Maintenance
& Reliability**

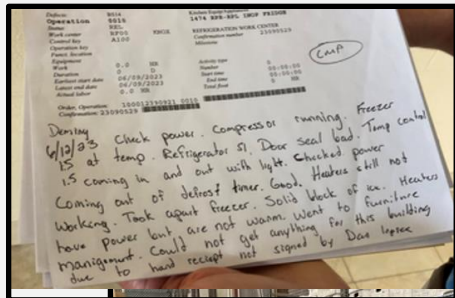
**Asset
Management
(ISO 55001
principles)**

Three Data Capture “Strategies”

Requires major 3rd party data and IoT effort

Paper Capture

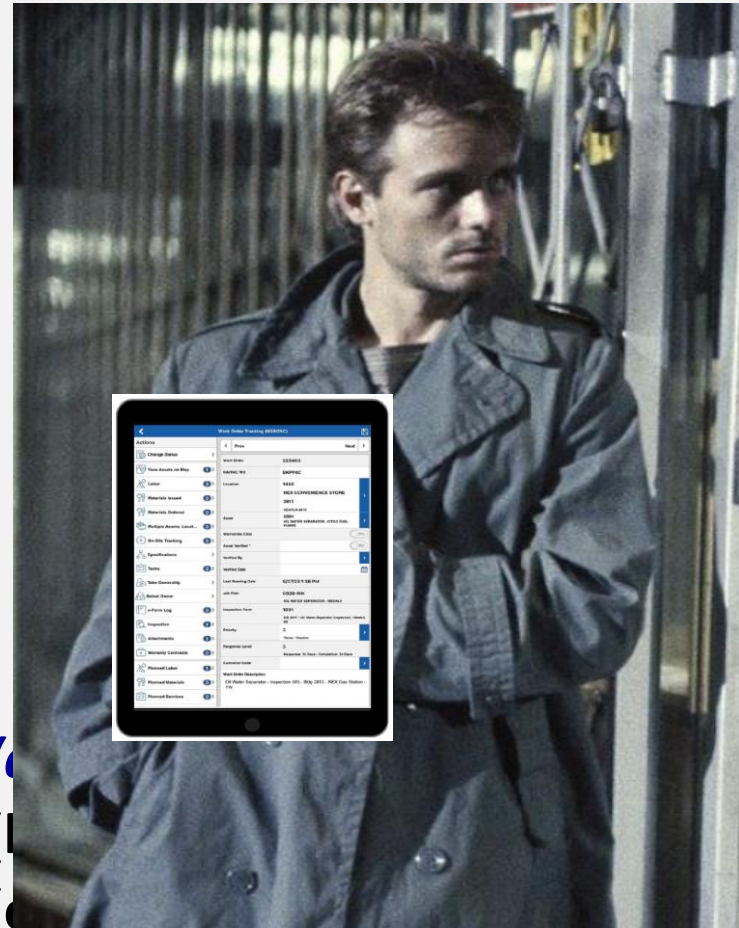
Poor data quality, 20%+ Efficiency Loss



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

Mobility 4.0

Kyle Reese with effective Mobility



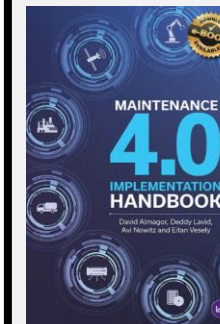
Maintenance 4.0

Sensors, AI, ML, Robotics... Technicians?

“Smart Base”

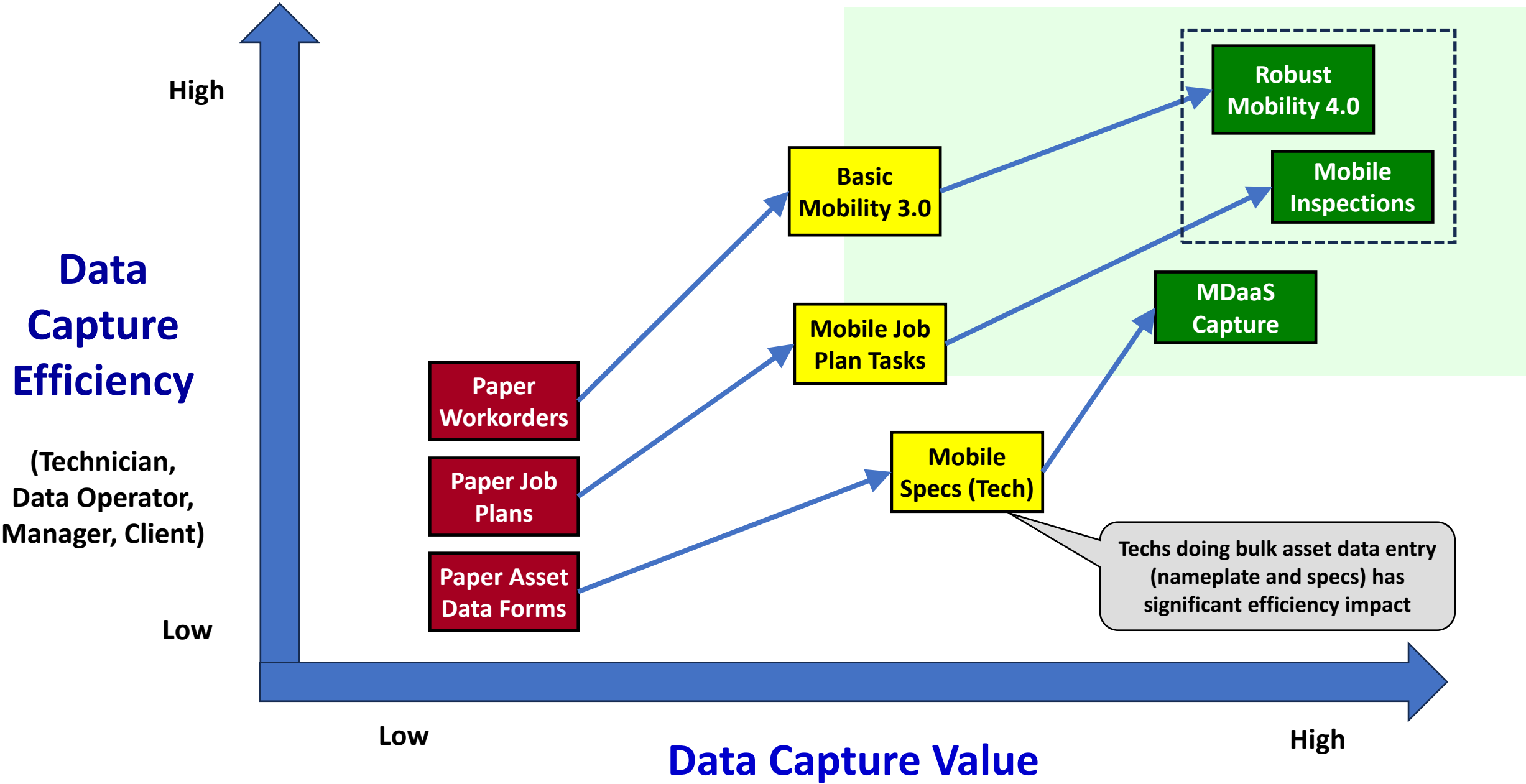


- Sensor everything
- Integrate everything
- Autonomous AI

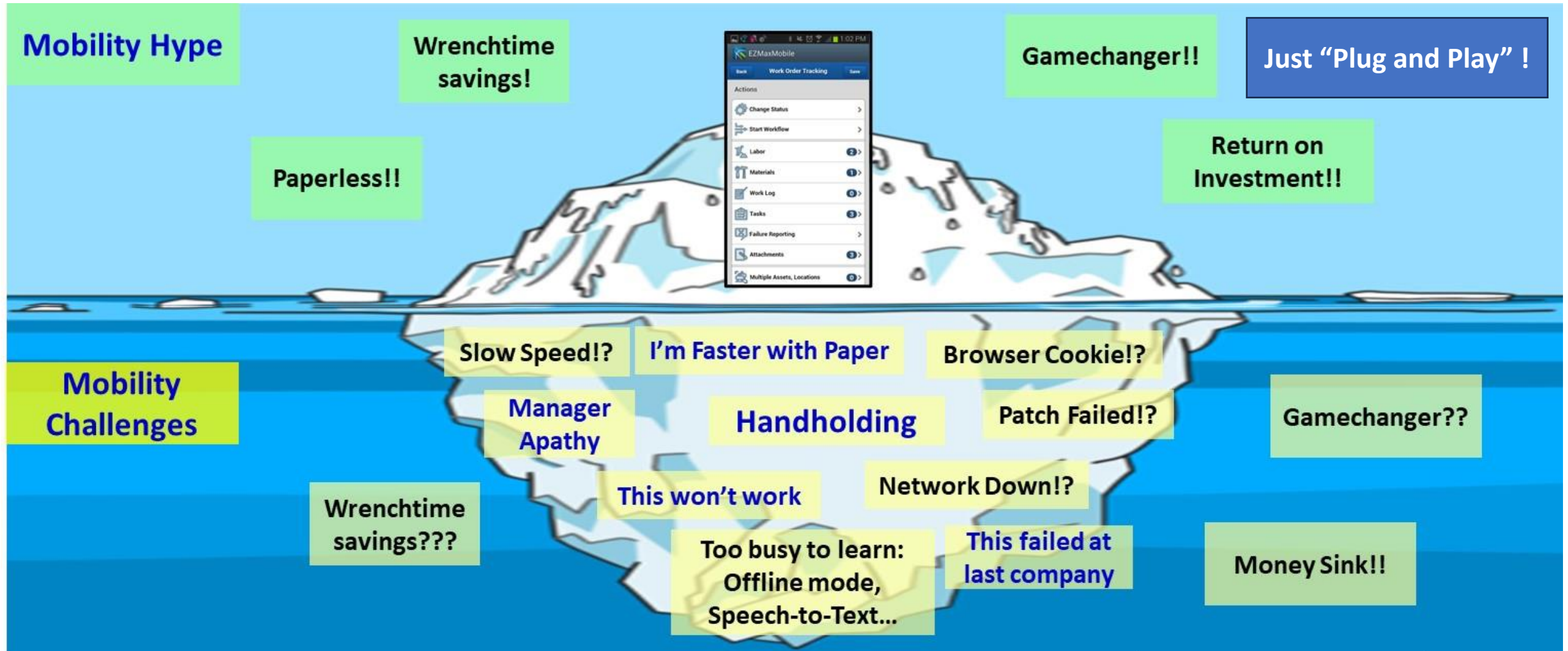


- Failure Detection (ML)
- Auto Failure Reporting
- Auto Scheduling
- Auto Parts Mgmt
- Robotics Assisted Repair
- Drone/Robot Inspection

Asset Data Capture – Maximo-centric Evolution



Mobility “Hype vs. Reality” – Success requires ‘All Hands on Deck’



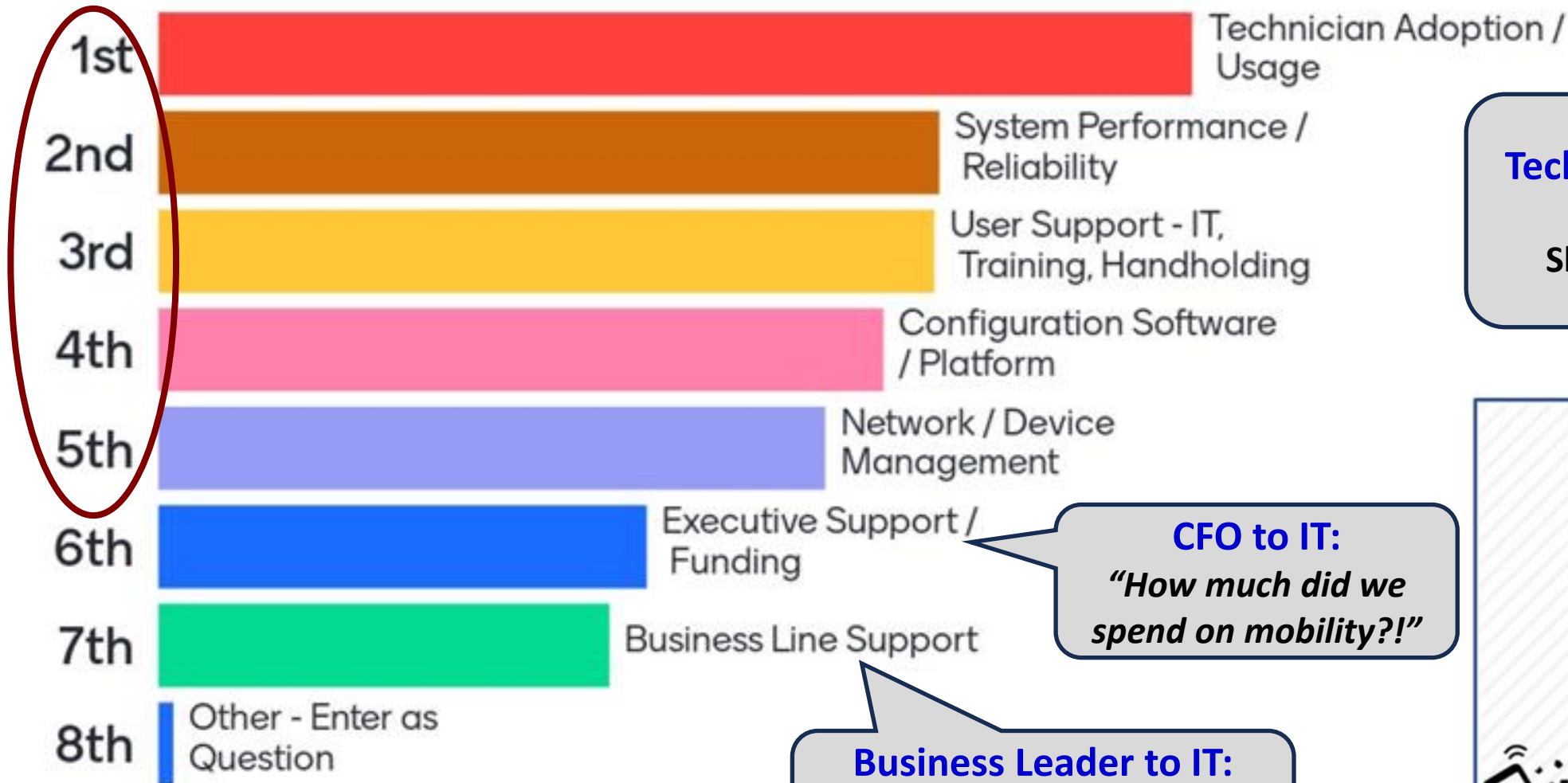
Power of Proven Pilot, Configurable Platform, & Site Leadership...
... *New Site standups are “easier” (Fort Riley)*



Metric: “How many smashed IPADs?”

Question 1: “What are the top “Mobility Implementation Challenges” ?

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



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

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

Business Leader to IT:
“We can't afford to use mobility... turning in iPads”



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

Super Technician Meeting Chat Files Meeting Notes Whiteboard Q&A Polls +

Jeremiah Johnson 7:35 AM

7:34 AM Fri Jan 13

*** Sync

Sync Started: 7:30:07 AM
Connecting via WIFI...
Downloading config file...
No Transactions Found
7:30:08 AM: Processing... Please wait...
7:30:28 AM: Processing... Please wait...
7:30:48 AM: Processing... Please wait...
7:31:08 AM: Processing... Please wait...
7:31:29 AM: Processing... Please wait...
7:31:49 AM: Processing... Please wait...
7:32:09 AM: Processing... Please wait...
7:32:29 AM: Processing... Please wait...
7:32:49 AM: Processing... Please wait...
7:33:09 AM: Processing... Please wait...
7:33:29 AM: Processing... Please wait...
7:33:50 AM: Processing... Please wait...

Error
Sync stopped with errors
OK

John Iafrafi 7:46 AM
Things look to have stabilized, our hosting partner is looking in to what caused the 503 error. Please let us know if you continue to have any issues. Thanks.

Jeremiah Johnson 7:48 AM
Success!!!
👍 1

Okta not
working... IT
confirmed
Microsoft
Cloud issue

Tech requests simple enhancement –
added by remote programmer/analyst

Travis Smith Wednesday 9:59 AM

TS I can confirm that when techfinishing a PM on desktop: The first time you get an error that says to complete the tasks, click ok, then hit techfinish again and it complies without error, and the tasks are COMP'd. I can do this in the future but it would be cool if this was fixed to save some clicks. Thanks all.

Gus Cramer Wednesday 10:00 AM

Hi Travis, thanks for the update, I will look into improving that process on Desktop.

Gus Cramer Wednesday 11:19 AM

I have deactivated the Warning about incomplete tasks when TECHFINISH'ing a PM Work Order from Desktop, you should now be able to put a PM Work Order into TECHFINISH status with only one status change, instead of having to try it twice.

Travis Smith Wednesday 11:20 AM

TS Thanks Gus! I will check it out

Mike Harris 6/5 8:17 AM

Okta is basically inaccessible. Will not load , specifically email. Not sure if this is the correct forum or not. From IPAD of course.

Mark Laughlin 6/5 8:20 AM

ML Same issue on desktop. 503 error when I tried to get on email.

Dale Scott 6/5 8:22 AM

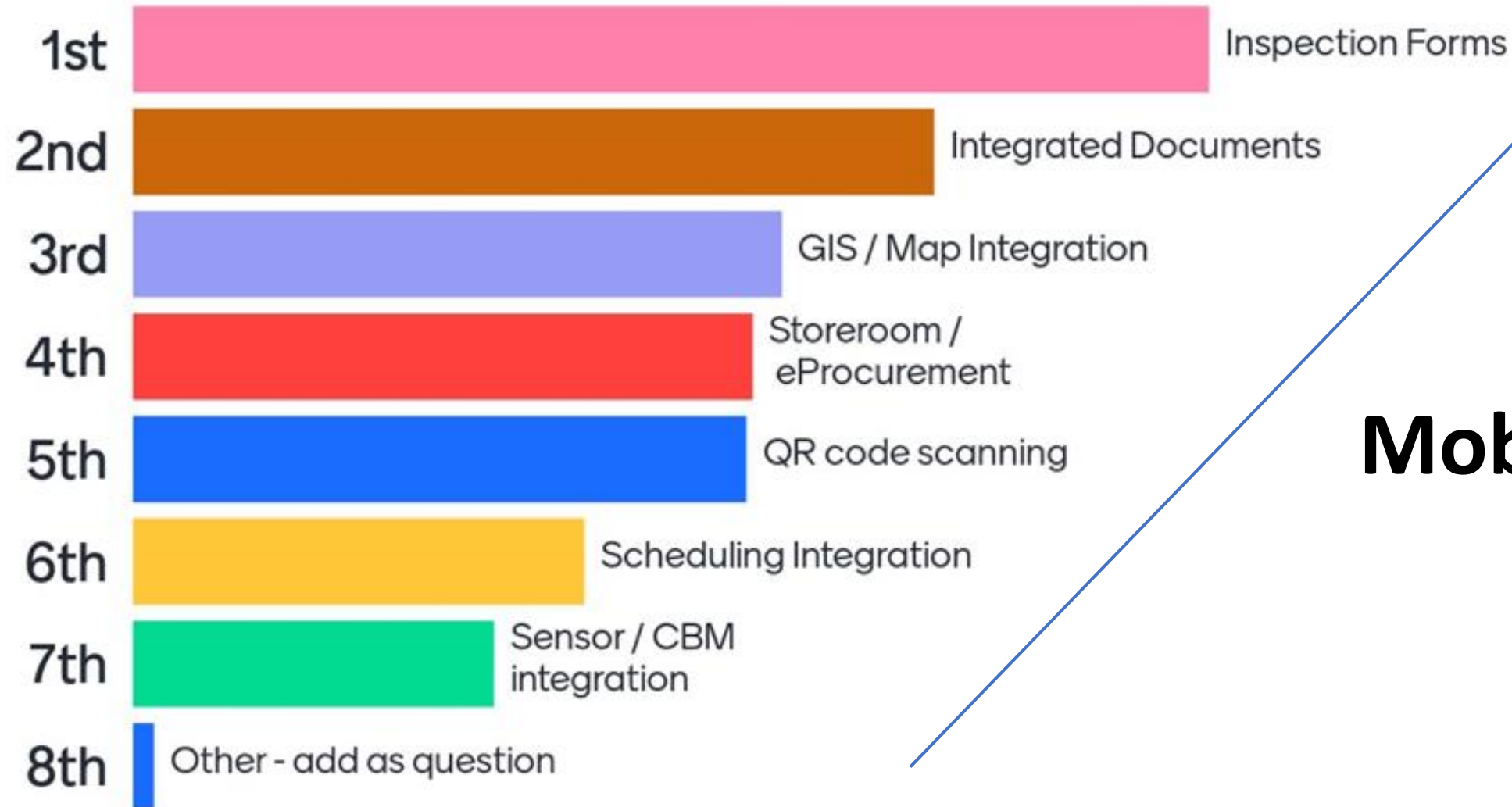
I checked with Network Team at Corporate and no issues with OKTA. Please restart your IPAD. I tested on the IPAD I use and worked fine

Mark Laughlin 6/5 8:24 AM

ML It's Microsoft 365 experiencing the issues.

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

Work Order #	Asset	Work Type	Work Order Description
212372	3K434C	PM	MOTOR, 2-FDB-MOTOR, INDUCTION, 1725, 75, 460, 3-WIRE - 4M (SBO)
212322	3K434C	PM	MOTOR, 2-FDB-MOTOR, INDUCTION, 1725, 75, 460, 3-WIRE - 4M (SBO)
212321	3K434C	PM	MOTOR, 2-FDB-MOTOR, INDUCTION, 1725, 75, 460, 3-WIRE - 4M (SBO)
212322	3K434C	PM	MOTOR, 2-FDB-MOTOR, INDUCTION, 1725, 75, 460, 3-WIRE - 4M (SBO)
212322	3K434C	PM	MOTOR, 2-FDB-MOTOR, INDUCTION, 1725, 75, 460, 3-WIRE - 4M (SBO)
212322	3K434C	PM	MOTOR, 2-FDB-MOTOR, INDUCTION, 1725, 75, 460, 3-WIRE - 4M (SBO)
212322	3K434C	PM	MOTOR, 2-FDB-MOTOR, INDUCTION, 1725, 75, 460, 3-WIRE - 4M (SBO)
212322	3K434C	PM	MOTOR, 2-FDB-MOTOR, INDUCTION, 1725, 75, 460, 3-WIRE - 4M (SBO)
212322	3K434C	PM	MOTOR, 2-FDB-MOTOR, INDUCTION, 1725, 75, 460, 3-WIRE - 4M (SBO)
212322	3K434C	PM	MOTOR, 2-FDB-MOTOR, INDUCTION, 1725, 75, 460, 3-WIRE - 4M (SBO)



Document Library

NSBOSC > WHIDBE-993

Model CBLE

Model CBLE

Model CBLE

Model CBLE

ePR + eCatalogs

BI Views & Alerts

Intermountain Lock ...

Johnstone Supply

NAPA Auto Parts

NorthCoast Electric...

CBM Data & Alerts

Visible Light/Acoustic Image

Graph showing sensor data over time.

Workorder – Inspect Oil/Water Separator

Change Status

View Assets on Map

Labor

Materials Issued

Materials Ordered

Multiple Assets, Locat...

Enter Meter Readings

Specifications

Tasks

Assigned Techs

Send Notification

e-Form Log

Inspection

Attachments

Warranty Contracts

Purchase Requisition (NSBO...

Create Follow Up

Work Order

NAVAC WO

Location

Asset

Warranties Exist

Work Order Description

Asbestos Hazard

Lead Hazard

Mold Hazard

Inspection Form

Primary Asset Details

Response Level

Share Point

Scheduling Information

Manager: “Enter this data!!!”

“Inspections”

Job Plan Tasks

Tech Photo

Meters

Tech Notes & Hours

Manual Processes:

“MDaaS Capture”

Asset Verification

QR Tag, Nameplate -> Data/Specs

Manufacturer Model

Serial #

Motor Type

Motor Control Type

Rated HP

RPM

Nominal Voltage

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...

Actions

- ✓ 1. Outfall Location 1/1 >
- ✓ 2. Inlet Chamber 1/1 >
- ✓ 3. Main Chamber 1/1 >
- ✓ 4. Effluent Chamber 1/1 >
- ✓ 5. Technician Notes 1/1 >
- ✓ 6. Inspection Details 1/1 >

Return to Originating Work ... >

▼ NS_ENV - Oil Water Separator Inspection - Weekly (a)

1. Outfall Location

Location of Inspection

005A NEX Fuel Island / Bldg 2813

005B NEX Carwash / Bldg 2814

*2. Inlet Chamber

*Vault/Sump liquid level?

15

*Thickness of petroleum layer?

0

*Debris in vault?

Yes

No

3. Main Chamber

Sump liquid level?

15

Thickness of petroleum layer?

0

Floating solids or debris?

Yes

No

N/A

*4. Effluent Chamber

*Floating solids or debris?

Yes

No

Visible sheen on effluent?

Yes

No

5. Technician Notes

Comments

There is a deficiency of water in the OWS unit vault. Spoke with staff members, and vault will be recharged with water.

*6. Inspection Details

*Inspection Date

7/10/23

*Inspector's Name

Bradley Dalton

*Signature

BPD

Integration – getting mobility data to others

Maximo / Mobility Solution

Integration
(Prioritize by ROI)

Technician



Backoffice Integration

Work Control
Scheduling
Projects (PMO)



Inventory
eProcurement



Safety
QC



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

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



Payroll

Client EAM Systems

Discounted eCatalogs

Procure to Pay (PTP)

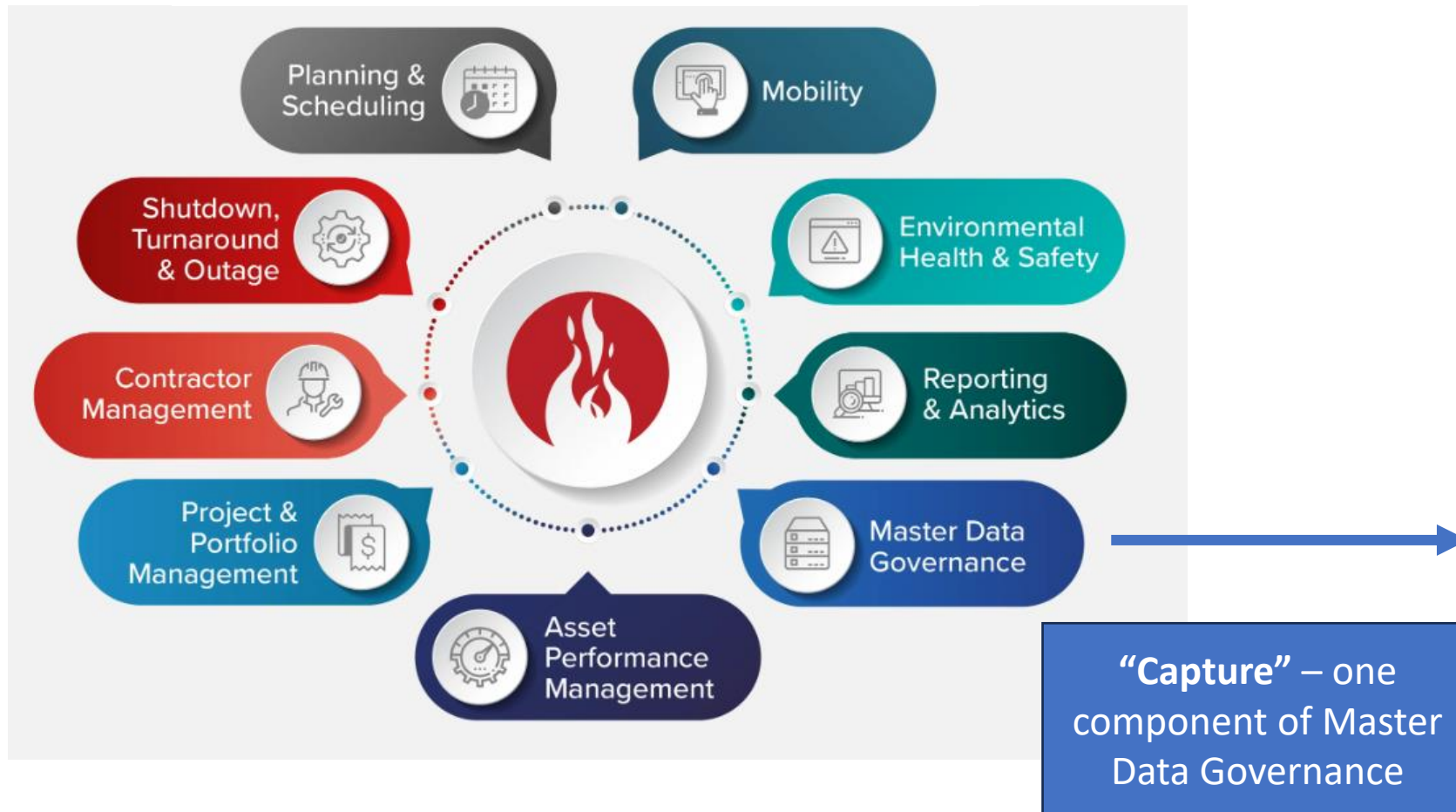
Bldg Mgrs & Subcontractors

MDaaS Capture

MDAAS Capture



PROMETHEUS GROUP



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

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



Images “parsed”
into data (vision
processing)



Nameplate data in Maximo?
Very Poor... Accuracy?

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

Load into Maximo
‘Nameplate’ & Specs

Enrich Asset Data – SKUMAX ‘Asset Library’ and OEM websites



SKUMAX Asset Library:
Asset Type, PM/JPs...

Scrape NAVMAX – asset
info, work history...

Later: OEM data and
digitized Tech Library

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

“Ready Day 1”

MDAAS Example – Steam Plant: Hot Well Motor-Pump

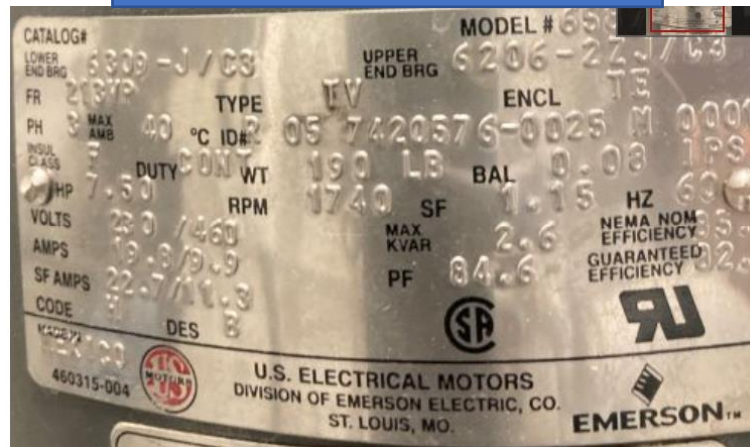
1) Take photos of nameplate and tags

2) MDAAS converts nameplate to text

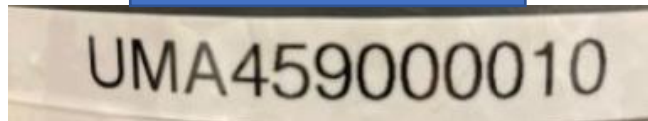
Overall



Nameplate



NAVFAC Label



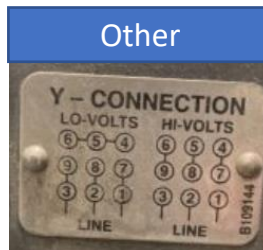
Other



Skookum QR



Other



Geo Locate

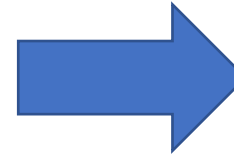


Photo Type	All	RPM	1740
Make	US ELECTRICAL MOTORS	Service Factor	1.15
Model	6587	Horsepower	7.50
Serial Number	R 05 7420576-0025 M 0001	Enclosure Type	TE
Country	MEXICO	Insulation Class	F
TAG No.	UMA459000010	Motor Frame Size	213VP
Phase	3 PH	Motor Voltage	230 / 460
NEMA Design	B	Frequency	60
Full Load Amps	19.8 / 9.9	Weight	190

MDAAS Example – Vision Process accuracy

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

Photo conversion

Photo Type	All
Make	US ELECTRICAL MOTORS
Model	6587
Serial Number	R05 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 H 0001



UMA459000010

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)



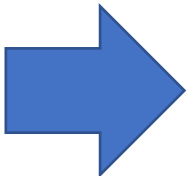
Asset:
8340  MOTOR, 2-HWP-MTR, INDUCTION, 1745, 7.5, 460/230, 3-WIF 

Photo Type	All	RPM	1740
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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

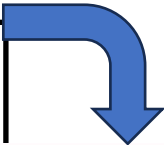




MOTOR, 2-HWP-MTR, INDUCTION, 1745, 7.5, 460/230, 3-WIRE

8340

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






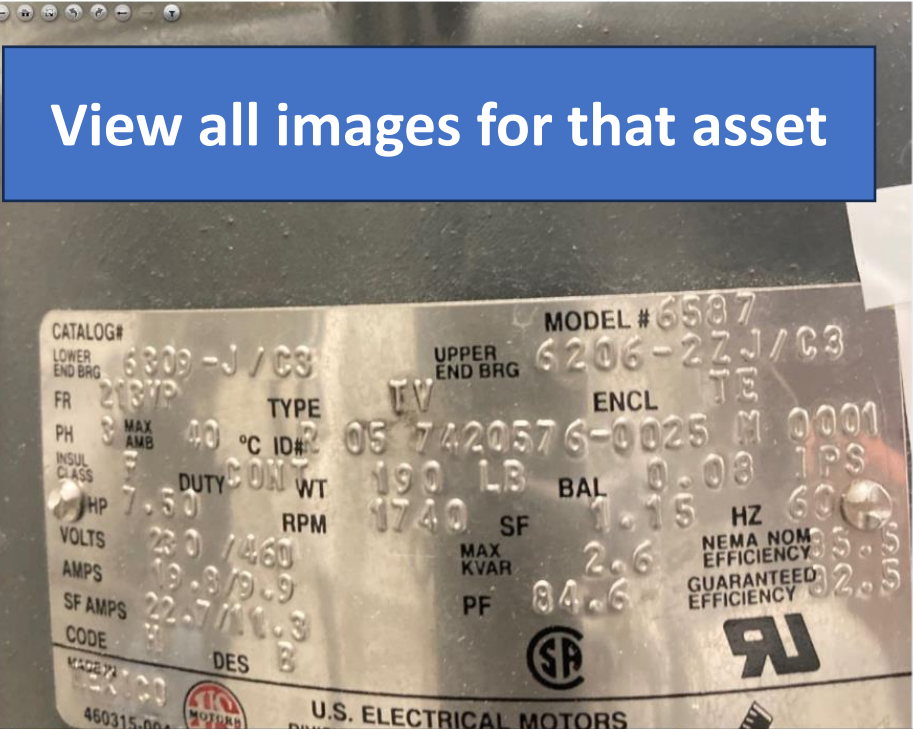


MDaas Connect Image

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

Asset Name: 8340

View all images for that asset



View all images for that asset

CATALOG# 6309-J/C3 MODEL # 6587
LOWER END BRG 218VP TYPE TV UPPER END BRG 6206-22J/C3
FR 3 MAX AMB 40 °C ID# 05 7420576-0025 M 0001
PH 3 INSUL CLASS 7 DUTY CONT 190 LB BAL 0.03 IPS
HP 7.50 RPM 1740 SF 1.15 HZ 60
VOLTS 230 / 460
AMPS 19.8/9.9
SF AMPS 22.7/11.3
CODE DES 2
NEMA NOM EFFICIENCY 85.5
GUARANTEED EFFICIENCY 82.5
PF 84.6
U.S. ELECTRICAL MOTORS
DIVISION OF CEMERSON ELECTRIC, CO.
ST. LOUIS, MO.
UMA459000010
B533059

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

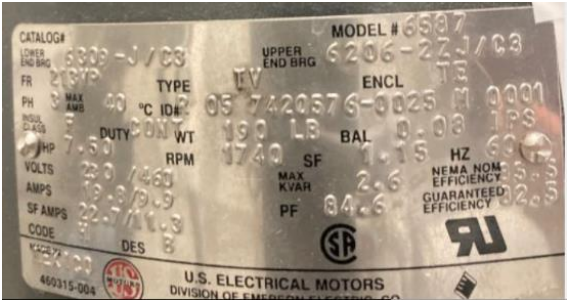
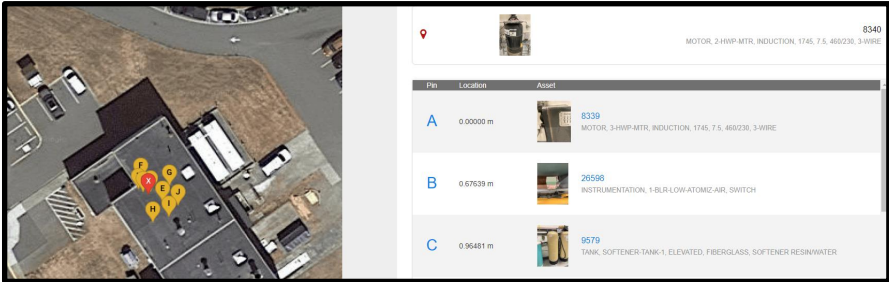


Reference ID 2 (NAVFAC Maximo): UMA459000010

Manufacturer: US ELECTRIC MOTORS
+ Replacement Cost: 7,093.00

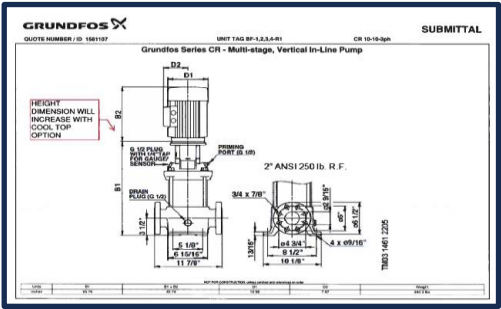
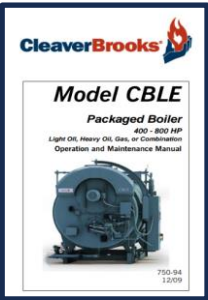
Manufacturer Model: 6587
Serial #: 057420576-0025 H0001

MDAAS Geo & Images

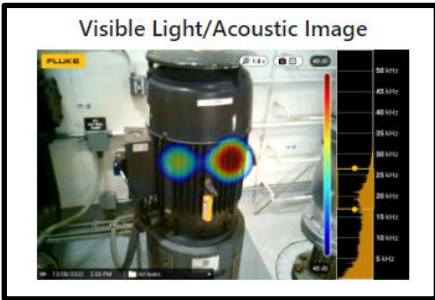
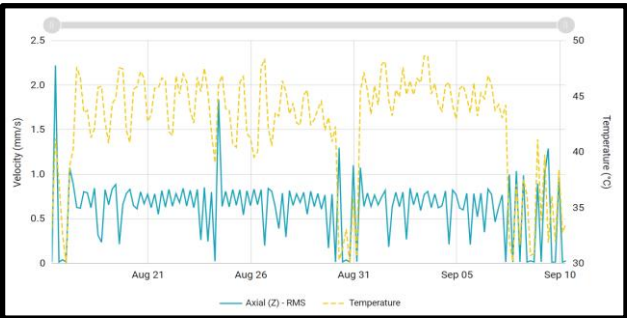


Linked Documents (OneDrive)

L10 - PRODUCTION (SYSTEM)
D50 - ELECTRICAL (SYSTEM)
D30 - HVAC (SYSTEM)
E10 - EQUIPMENT (SYSTEM)
D20 - PLUMBING (SYSTEM)



Sensors & CBM



Date (YYYY-MM-DD)	Camera
2022-12-08 21:00:55	ii910-56789541