ZPRO
SOLUTIONS

**Integrating Evolving Asset Management Technology
Into Transportation Organizations**

- New Ways of Doing Business -
& Leveraging Resources

Presenter: Stefan Oberthuer

- **Transportation World Has Changed**

  - ✓ **Transition to BEB's Well Underway, Providing Opportunities & Challenges**
  - ✓ **Introduction of New Technologies**

- **Asset Management Transition Support**

  - ✓ **Maintenance Management**
  - ✓ **Business Processes**
  - ✓ **Condition-Based Monitoring**
  - ✓ **Cloud-Based Solutions**

- **Opportunities For Change**

  - ✓ **Longstanding Workplace Practices**
  - ✓ **Predictive Maintenance**

- **Stakeholder engagement as a continuing improvement element**
  - ✓ **Collaborations with local trade schools/Technical High Schools**
  - ✓ **Labor – Management (Labor Relations or Other Process?)**
  - ✓ **Community Stakeholder Engagement**

- **Pilot Program Assessments/Lessons Learned**
  - ✓ **Have Opportunities Been Missed**
    - ➢ **Other investments introducing new - evolving technology**
      - ❖ **Enterprise Asset Management**
      - ❖ **Handheld Devices**
      - ❖ **Procurement**
      - ❖ **Inventory**

Data As Key Facilitator

Holistic Approach in Managing Transit

- **Metrics**
  - **Real Time Dashboards**
    - ✓ **Electric Charging Usage**
    - ✓ **Health Benefit Metric –By Line**
    - ✓ **Electric Charging Cost By Location**
    - ✓ **Metrics By Job Function/Location**

Data As The Key Facilitator

**Holistic Approach in Managing Transit**

METRICS

- **Real-Time Opportunity To Implement Enhanced EAM Tools For BEB Transition Process**

- **Major Transition Focus Areas**
  - ✓ **Fleet**
  - ✓ **Facilities**
  - ✓ **Workforce**
  - ✓ **Capital Investments**
  - ✓ **Operating Budget Controlling Moving Forward**

Maximo EAM
Enterprise Asset Management

BEB Transition Process

BATTERY THERMAL MANAGEMENT SYSTEM

INVERTER

CONTROLLER

BATTERY

IN-HUB ELECTRIC MOTORS
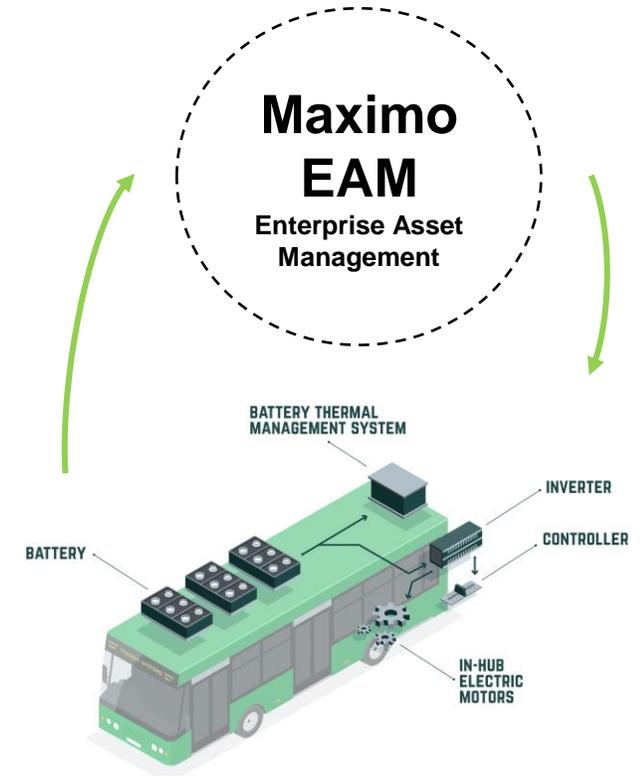
A Phased-In Transition Approach

- **Phased-In Approach**

  ✓ **Realistic**

  ✓ **Permits Smooth Transitioning To EAM**

  ❖ **Lessons Learned From Previous Phases**

  ❖ **Enhanced Capability To Manage Challenges and Technology Iterations**

  ❖ **Enterprise–Wide Information Flow**

Phase I	Phase II	Phase III	Phase IV
• Learning & Scale • Small Pilots • *EAM Foundation (Fleet, Facilities, Workforce)*	• Expanding Fleet, Facilities • Operational Challenges • *EAM Ramps Up (BEB Fleet & Facilities)*	• Ramping Up/Growing • *Fully Embedded EAM System Requirements and Supporting Operations For BEB's*	• Completing The Process • Realized Goal & Gains • *Expanding Fully Embedded EAM System Requirements and Supporting Operations Throughout Entire Bus Fleet Organization*

Maximo (MAS) 8 Enhanced Full Suite of Resources

- ✓ **Captures Evolving Advanced Bus Health Monitoring Systems (Remote Data Transmission).**

- ✓ **Expanded EAM Capability Assures Full Benefits Utilizing Available Information**

- ✓ **Closes The Loop Between EAM and New Bus Technology**

- ✓ **Usage of data sources as IOT sensors (Motion, Vibration and Acoustic Sensor), Camaras, GPS**

ZPR₂ SOLUTIONS

Common Maximo Functions

- Administrative Control
  - O&M Budget Control
- Asset Management
- WO Management
- Job Plan Creation
- Preventive Maintenance Planning
- Inventory
- Workforce Management

When introduced in parallel with new BEB fleets, immediately gain MAS 8-EAM benefits

Enhanced Functions with new technology

- BEB Health Monitoring
- Connecting to handheld devices for improved maintenance
- Telematics for system data analytics
- Alerts based on system condition
- Predictive Maintenance
- System Safety Control as Smoke detectors or gas detectors for batteries

Manage	**Monitor**	**Health**	**Predict**	**Visual Inspection**	**Assist**	**Safety**
Intelligent Asset Management	Monitor and Detect Anomalies	360 View of Assets	Predictive Failures	AI-Powered Insights	Prescriptive Assistance	Actionable Insights for Worker Safety
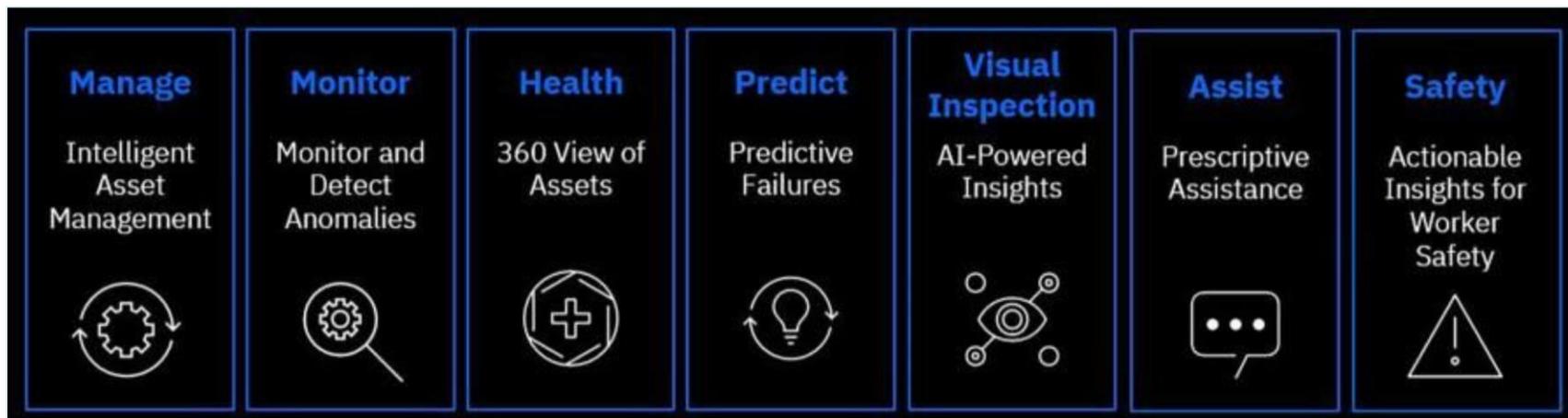
Building In New Technology During Transition / Digital Twin

Digital Twin is a virtual model designed to accurately reflect a physical object

May be applicable for the operation of the facility

Usage of **Real data** as:
- Design Documents
- How many buses are assigned to the depot
- Maintenance Activities
- Washing and refueling
- Service and Repair
- Bus Scheduling

Virtual model can be used to
- Run simulations
- Study Performance
- Generate possible improvements

Goal of generating valuable insides which can be applied back to the original physical object

Maximo's Data Enterprise-Wide Approach provides a complimentary working relationship for financial management and risk mitigation

- **The needed framework to understand where decisions need to be prioritized**

- **Provides similar data across the organization to all users and decision makers**

- **Supports Capital Planning decisions and needed information for ongoing procurement, budgeting and administrative cost controls**
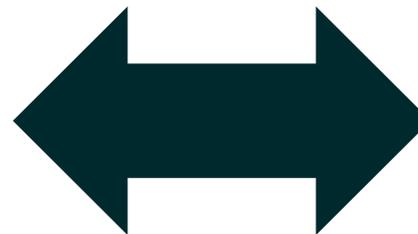
- **Assets are monitored in real time for their likelihood of failure**

- **Assets can be managed to avoid disruption to operations based on their consequence of failure**

Maximo as an Integrator

Maximo for fleet and facility

Asset Management

- Control the assets of the fleets
- Applicable for legacy and new fleets
- Maintenance Planning
- Running Maintenance
- Spares
- Overhauls
- Campaigns

Integrator

- Collect data from different data sources (diagnostic systems, energy sources, sensors, cameras, Oil & Vibration Analysis)

Monitoring and Prediction

- Asset Condition Monitoring (Health Management)
- Collecting historical field data
- Use field data to predict failure sequences (Reliability Analysis)

Communication

- Data is available in control center, remote locations, Maintenance Engineering Department

Financials

- Fleet Procurement Strategy
- Procurements supporting fleet maintenance and operations (e.g., Maintenance Consumable, Spare Parts, Special Tools)

Thank You!

Zeeshan Tariq
Chief Executive Officer
ZPro Solutions Inc.
Phone: 239-785-6236
Email: zeeshan.tariq@zprosolutions.com

Wayne Galante
Senior Transportation SME
ZPro Solutions Inc.
Phone: (917) 939-4352
Email: wayne.galante@zprosolutions.com

Stefan Oberthuer
Senior EAM and Reliability Consultant
ZPro Solutions Inc.
Phone: +1 (201) 566-5043
Email: stefan.oberthuer@zprosolutions.com

ZPRO
SOLUTIONS

5270 Golden Gate Pkwy, Suite 104
Naples, FL 34116

WWW.ZPROSOLUTIONS.COM

(833) 326 - 9776
(833) EAM - ZPRO

INFO@ZPROSOLUTIONS.COM

Where Strategic Asset Management Meets EAM & Data Technology