Advance Asset Condition Assessment

Koos Kunneke – MMIS Analyst
Corne Engelbrecht – Maintenance Engineer
WiFi Implementation

WiFi Signal Coverage Work Shop Area
WiFi Signal Coverage Staging Yard Area
Wi-Fi / RFID Implementation

Wi-Fi

Raw Data – TCMS

TCMS Data
- Propulsion Monitoring
- HVAC Monitoring
- Door Monitoring
- Brakes Monitoring
- Bogies Monitoring
- Data Monitor (Train KM, Energy Cons)
- Etc.

Wi-Fi Server

Train Unit Delta KM

Orbita UK Data Center

Train Unit Total KM

Orbita UK Data Center

AVI Site Server

RFID Server

RFID Tag

Train Zone Position

RFID Train Identification and Position in 3 Zones

Maximo

AVI Site Server

Internal Network

VPN Access

Internet

Bombardier Orbita

Orbita

Gautrain

FOR PEOPLE ON THE MOVE
AVI – Advance Vehicle Inspection

AVI Measurements
- Wheel Profile Monitoring System
- Brake Pad Monitoring System
- Brake Disc Monitoring System
- Axle End Temperature Monitoring
- Wheel Damage Monitoring System
- Video Inspection System
- Pantograph Wear Monitoring System

AVI Site Server

Wi-Fi Site Server

Orbita UK Data Center

Users

Image Files

TCMS Data

VPN Access

Internal Network

Internet

Maximo Integration

Maximo

IBM maximo

Bombardier Orbita

GAUTRAIN

FOR PEOPLE ON THE MOVE
Orbita UK Data Center

- **Orbita** is a **capability**: a set of people, processes and tools brought together to
  - enhance transportation asset management
  - deliver new value to Bombardier Transportation, its customers, partners and suppliers

**Diagram**:
- **Raw Asset Data**
- **Data Processed in IT Systems**
- **Active Knowledge Management**
- **Dynamic Decision-Support Capability**

Data gathering, transmission and storage
Data processing and visualisation
Deriving and automating knowledge
Delivering tailored, dynamic decision-support information
Orbita UK Data Center

The Control Centre: a Key Element of Bombardier Orbita

- The Control Centre is where key personnel are brought together to turn raw data into useful, actionable information
- Bombardier’s Control Centre Engineers, aided by powerful, automated data processing and visualisation tools, review the data as it arrives
- With the support of Systems Engineers, the data is turned into specific, tailored advice
Orbita Tools

**Speed against distance**

**Traction energy against distance (cumulative over journey sections)**

**Braking energy against distance (cumulative over journey sections)**

**Resistance energy against distance (cumulative over journey sections)**

- Journey No.1
- Journey No.2
- Journey No.3
- Journey No.4
- Journey No.5
- Journey No.6
- Journey No.7
- Journey No.8
- Journey No.9
- Journey No.10
Maximo Integration

Orbita UK Data Center

- Process Events, Perform Trend Analysis and raise alerts
- Send Web Service Event Message
- Create Service Request
- Send Service Request Number
- Engineer Analyze and Create Work Order
- Send Work Order Number
- Close Work Order
- Send Work Order Close Status
- Close Incident

Maximo Server

Network Access
- Internet
- Orbita Process
- Maximo Process
AVI Benefits

• Optimizing Life Cycle Cost
  – Reduction in the use of Material (Brake Pads, Discs, Panto Strip)
  – Staff productivity improvements
  – Optimized Preventive Maintenance (Frequency)

• Improve Safety
  – Added Camera Inspections
  – More Information on Wheels and Brake Pads

• Improve System Reliability
  – Performing Predictive Maintenance
  – Identify problems on other systems (OCDS / Track)

• Improved System Availability
  – Having more train set available to customer
System Integration Plan

- MRX Site A Server
- MRX Site B Server
- Workshop WiFi Transceiver
- Wheel Damage Measurement
- Wheel Damage Measurement
- Brake Pad, Wheel Profile, Disc, Pantograph Measurement
- MRX Switch 192.168.0.5 through 25
- Train WiFi/RID Server 10.157.59.8
- MRI Site Access
- MRI Main Server
- BMC Core Gateway located in EER room 10.157.60.1/23
- Maximo Application Server
  - Http://10.157.59.31 or http://bmmaxapp
  - Contingency incident @ bombardiers.co.za POP3
  - From: Orbita SR Trigger Message Send to: RJM
  - From: Orbita Reset Message Send to: http://17.26.181/v
  - To: Orbita AVI Measurement Info
  - To: Orbita Train Number
  - To: Orbita TPMS Data
  - To: Maximo Total Kilometers
  - To: Maximo A Kilometers
- Fiber Optic Cables
- Cat 6 Network Cable
- Maximo
- MRX
- Orbita
- Wi-Fi/RID
- Gautrain Ethernet

Japanese

- Main Router 172.16.10.0/30
- Data Pro Firewall
- Attenda Firewall
- From: MRI Site A Server
  - Info: All AVI Measurements
  - Info: Total Kilometers
  - Info: A Kilometers
- From: MRI Site A Server
  - Info: TPMS Data
  - Info: User Access
  - Info: Measurement Data

Alert Notification
<table>
<thead>
<tr>
<th>System</th>
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<tbody>
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AVI Detail
AVI Detail
AVI Detail
Thank You!