

Initiatives in Rolling Stock related Automation

**6th May 2021
IRIM&EE**

How many probationers does the current Training Program have?

- A 48**
- B 49**
- C 50**
- D 51**



Which *amongst these* is your favourite cartoon?

- A Dilbert**
- B Calvin & Hobbes**
- C Dennis the Menace**
- D I have no time for cartoons**



Automation Initiatives – An Overview

Objective:

- Enhance Reliability, Safety and Availability of Rolling Stock

Focus Areas:

- Instrumentation, sensorization and machine-aided detection of important vehicle health parameters
- Use both Track-side and on-board solutions

Expected Outcomes:

- Advance and specific information about defects in a coach or wagon enabling targeted attention during maintenance
- Trending analysis of defects
- Attempt to move towards Predictive Maintenance and AI over time

Initiatives to Achieve this Aim:

- Group of complimentary Projects proceeding simultaneously
- Common Platform for integrating this information

How *many* of these terms make sense to you?

CMM OMRS RFID ATES
WILD FMM HAHW MVIS



- A 0**
- B 1 to 2**
- C 3 to 4**
- D 5 to 6**
- E 7 to 8**

Exploring a Few Systems

OMRS & WILD

Wheel Impact Load Detector (WILD):

- WILD uses strain gauges to measure the Wheel Impact load.
- Has 12 Channel and 18 channel systems

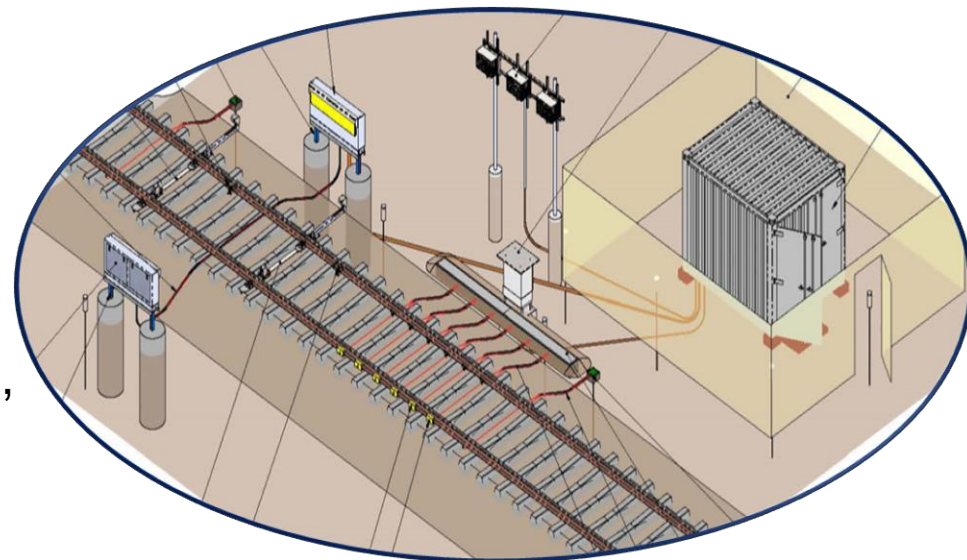
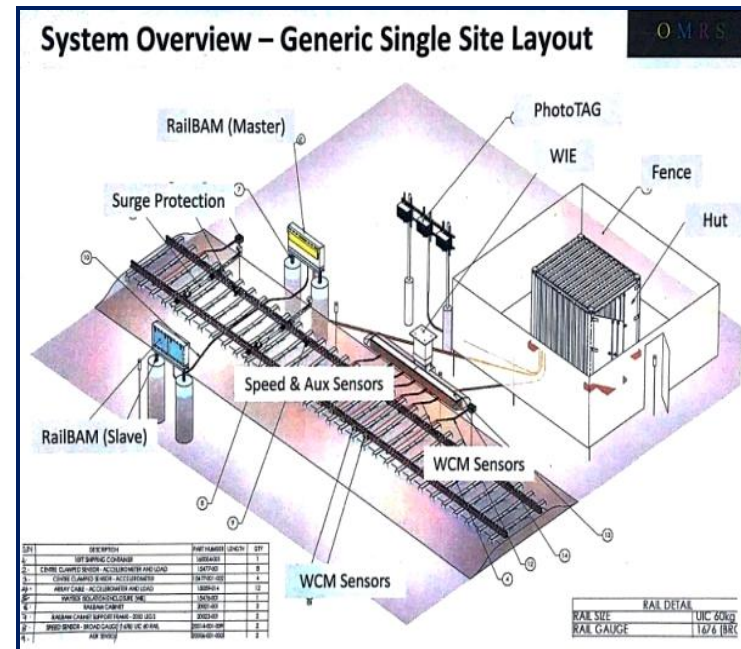
Online Monitoring System of Rolling Stock (OMRS):

OMRS is a way-side inspection system

- Acoustic Bearing Detector (ABD) and
- Wheel Condition Monitor (WCM) – The (WILD) equivalent.

Deployment:

- 2007 to 2011 – Wheel Flat detectors (**WILD**) at 15 locations
- 2018 -2020 – Acoustic bearing fault detector(**ABD**) and Wheel flat detector(**WCM**) together called OMRS, at 25 locations
- 2020 - Procurement of 121 OMRS systems underway



OMRS & WILD (SITE)

A WILD SITE



WILD SITE: 24 CHANNEL SYSTEM



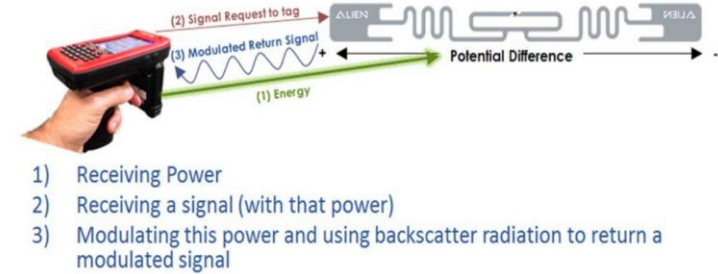
WILD SITE: 36 CHANNEL SYSTEM



Schematics, when translated on **Site** have many real world considerations that need to be factored in.

RFID

- Enables accurate machine identification of Rolling Stock on run.
- Basic platform and pre-requisite for machine aided defect detections and trending analysis.
- A “***Make in India***” initiative that has received Global Recognition and significantly cut costs.
- Fixed “Read Only” readers while on the run.
- Portable “Read-Write” readers in the yards



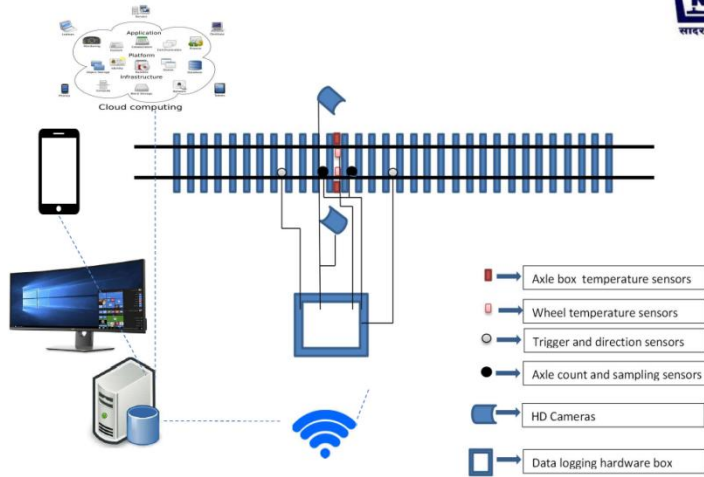
RFID tagging of Rolling Stock



ATES & HAHW

Automatic train Examination System & Hot Axle Hot Wheel Detector

General Layout of ATES



Dr. Deepak Tripathi, Chief Mechanical Engineer,
Konkan Railway Corporation Limited

Layout of ATES Components

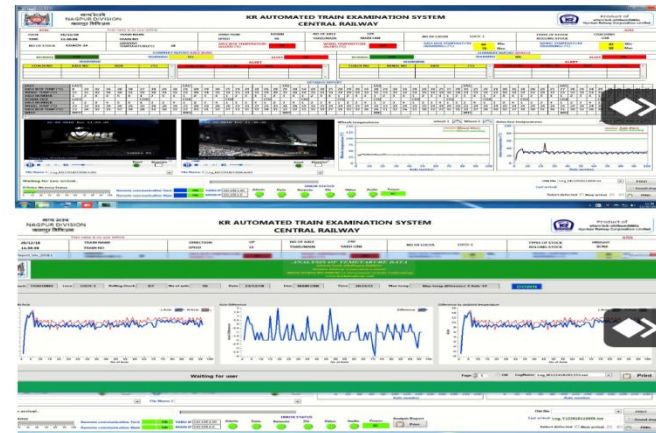


ATES Trackside Installation



ATES SITE AT VERNA

Real Time Video and Data Analytics

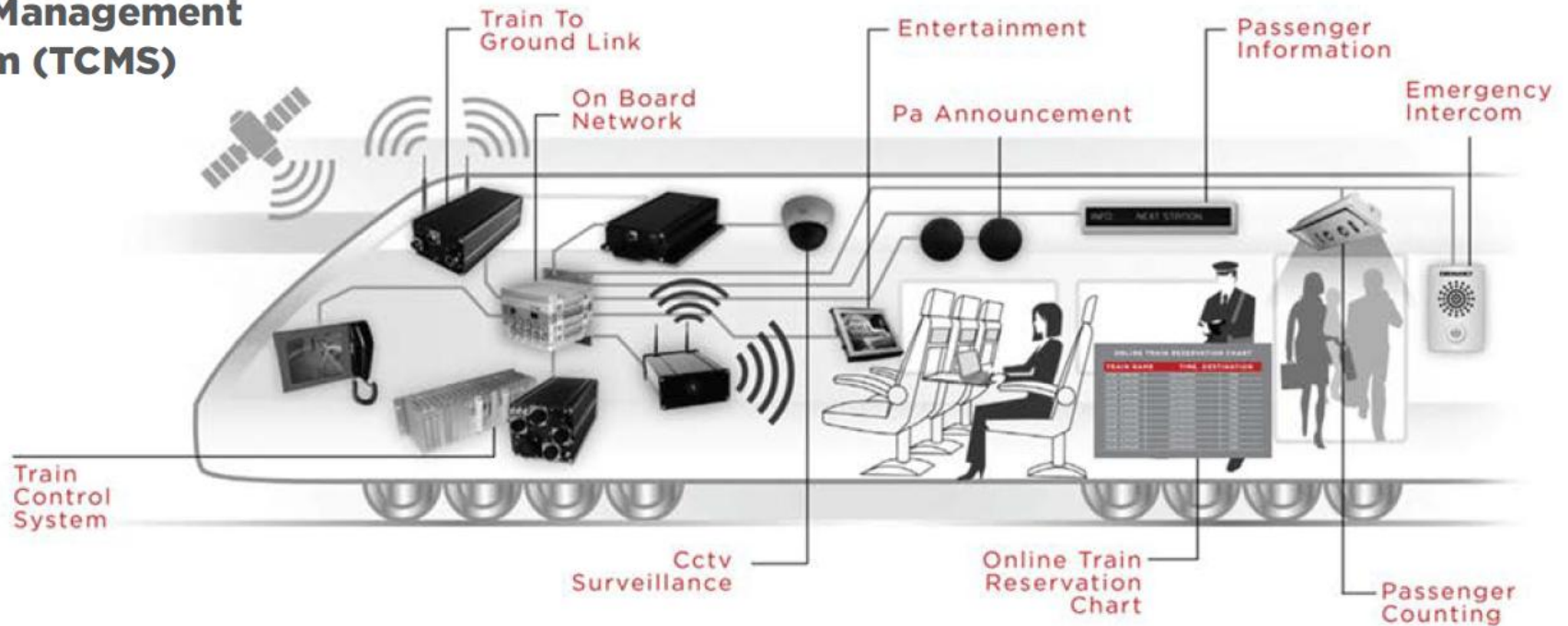


Rolling
In Exam

ATES ENS SCREEN AT NAGPUR

SMART COACH

Train Management System (TCMS)



Passenger Address/
Infotainment (PAPIS)

Train Communication
Network (TCN)

Automatic Plug-Door
& Step Control

CCTVs with
Facial Recognition

Fire/Smoke, Detection,
Suppression & Alert

Emergency Talk
Back (ETB) System

On-Board Condition
Monitoring (OBCMS)

Real-time Remote
Monitoring & Alerts

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SKYLO
Alerts



Fire/ Smoke
EN 45545



CCTV System with
Facial & Analytics



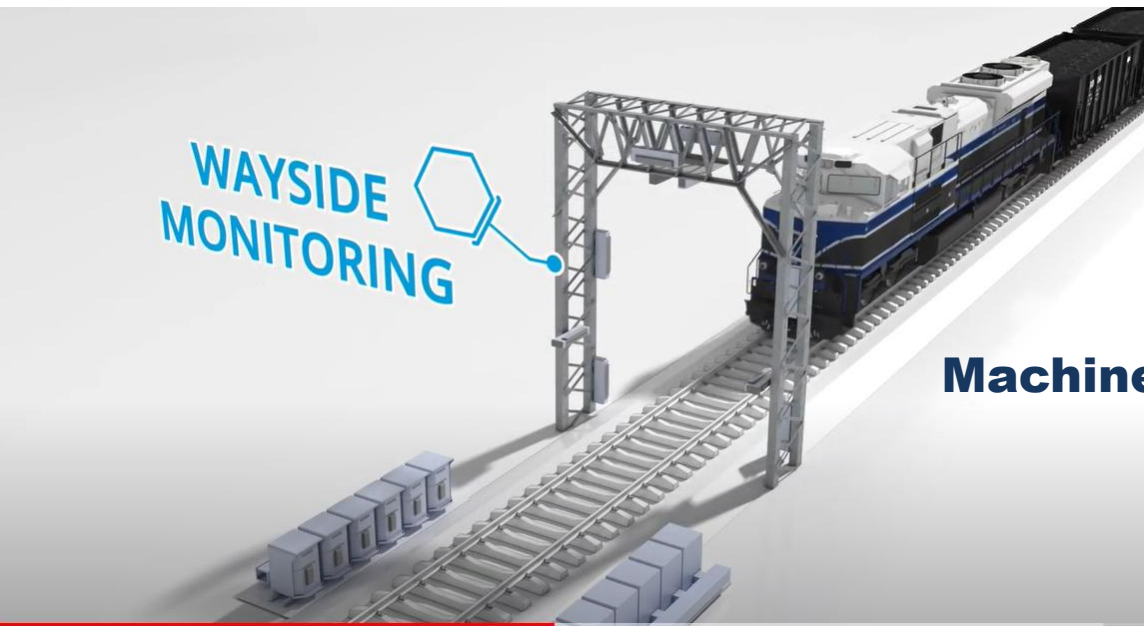
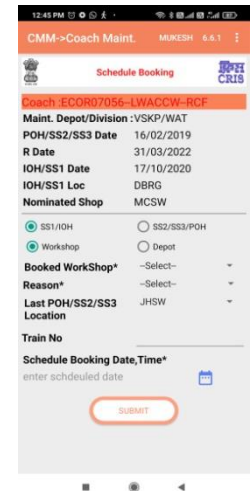
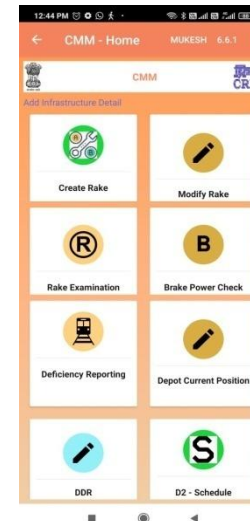
Traceability Data Matrix Tagging - QR/Rfid (GS1, PCGlobal, ISO-9000/14000/18000, EN-50126, ISO/IEC-16022/24720/18004, ATASpec2000, AIAG B4, SAE AS 9132, Industry 4.0)

CMM & FMM

Coach Maintenance Module & Freight Maintenance Module

DBMS for Informed Decision Making:

The CMM and FMM group of projects for coaching and freight maintenance, cover the life of the stock - PU to Depot to Workshop to Scrap.....



MVIS

Machine Vision Inspection Systems

The On-Board Vs Track Side discussion

The On-Board Vs Track Side discussion

**NUMBER OF
ROLLING
STOCK**

**RANGE IN
OPERATING
SPEEDS**

**EXTENT OF
STANDARDIZATION**

**SIZE OF
NETWORK**

**TRAFFIC
DENSITY AND
FLOW**

The rationale for Super Sites

The rationale for Super Sites

SENSOR

**DATA
AQUISITION**

**EDGE
PROCESSING**

**TRENDING
ANALYSIS**

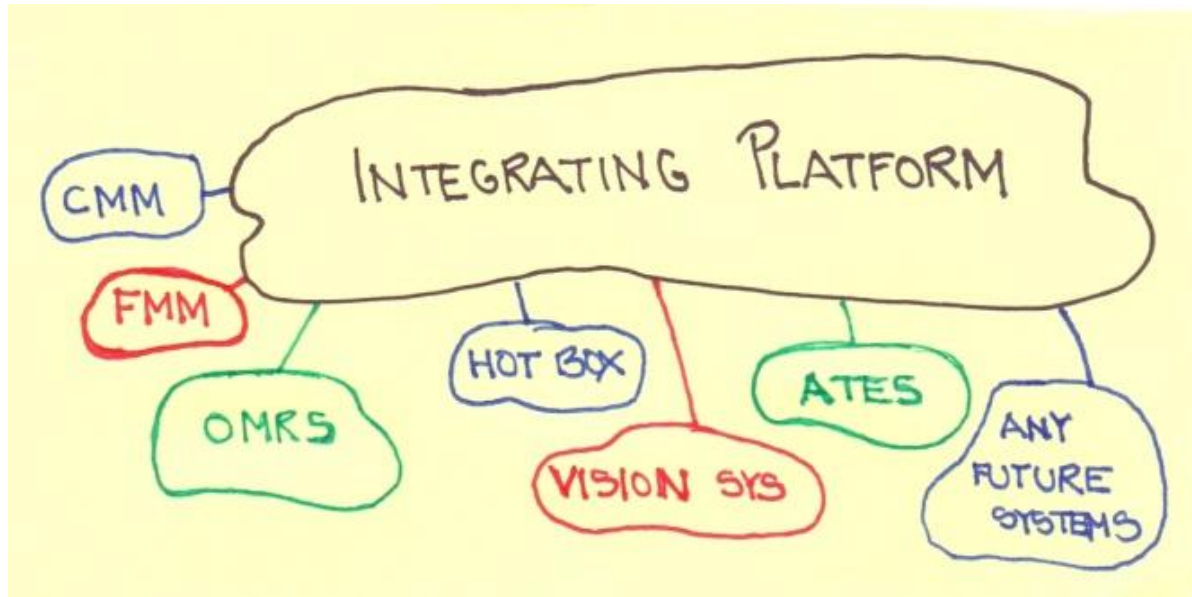
POWER

**DATA
COMMUNICATION
INFRASTRUCTURE**

**CENTRALIZED
CLOUD OR SERVER**

Integrating Information

Integrating Information



Imagine a
SMART
yard...

**EASE OF
ACCESS TO
INFO**

**MINIMIZE
VENDOR
LOCK**

**FUTURE
PROOF**

MODULAR

SCALABLE

What Can YOU Do?

Innovation at Work



The Solapur Division MABs

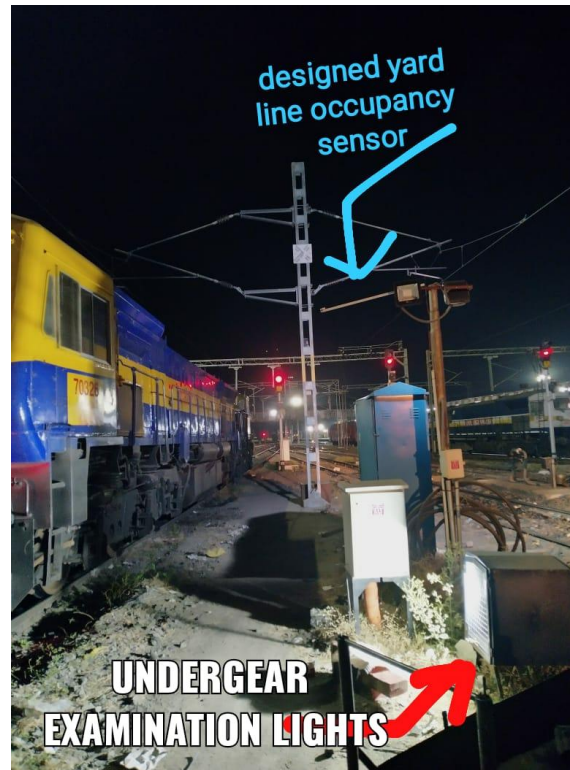
MAB 1.0



MAB 2.0



MAB 3.0



Suryakant Munjewar
DME/Ops
Solapur Div
Central Railway





Confederation of Indian Industry
Business and Beyond
125 Years: 1895-2020

Rolling Stock 2.0

Transforming Trains
Through Technology

Provides the BIG picture, including the **Vision** for and **Mission** of the Rolling Stock initiatives.

An Interesting Read to get an Overview of the wider initiatives in play, including PUs and Workshops.

Gives Direction to our efforts while focusing on the customer.

How *many* of these terms **now** make sense to you?

CMM OMRS RFID ATES

WILD FMM HAHW MVIS



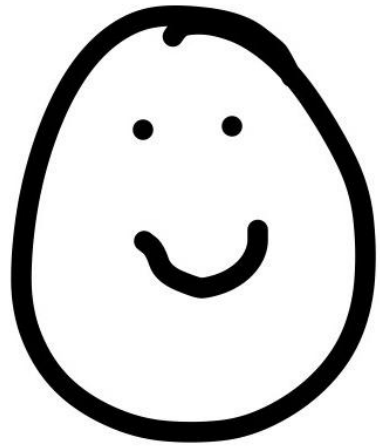
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Do you have
any
Questions?

