PLM “one enabled source of the True”

Digital Assets
Virtual Reality
Augmented Reality
Mixed Reality
Analytics
AI

Experience the service
Digital twin
Maximise the potential
Experience the product

Design
VE
MS&S
Purchasing
Strategy
Manufacturing

Customer
Force feedback
Testing the physical complexities of the design & quality: touch, feel, thermal, luxury

Augmented Reality
Desktop AR that enables multiple design and invention scenarios

Scanning
Reverse engineering, capture changes in real time an feed cad updates

Simulation Modelling
Real time human/product interaction long before the physical

Sensor development
Visualisation at a fidelity that trigger the real world sensors

Getting the message across
Experiencing the concept, leads to understanding

Live-feed
Research data delivered in real time

Autonomous Vehicles
Customer experience

Training
AR/VR Immersive Training, understanding technology changes & challenges from the inside

Immersive technology for Research & Development
Sensory immersion
Stimulation of the senses to connect the experience to the customer

Augmented Reality
Connected learning and understanding

Scanning
Quick change capture

Immersion technology for Design

Training
AR/VR Immersive Training
Rapid comprehension of 3D development and processes reducing time wasted

Autonomous Vehicles
Communicating the complexities of self-driving products

Drones
Design aid, to visualise and capture locational design environments

Immersive design
Removing the barriers that restrict innovation and creativity, focused quality

Simulation Modelling
Connecting the design to the feasibility of physics

Live-feed
Research clinic data feed in the experience to close the gap between customer and designer
Immersion Technology for Feasibility

Packaging solution
Simulation of clash, save zones, vision angles

Augmented Reality
AI assist, data feeds, concept trials

Scanning
Reverse engineering

Live-feed
Always connected to the live data

Training
AR/VR Immersive Training, for rapid comprehension and development

Virtual variants
Testing many not few, keeping closer to the design aspirations

Connected to the customers
Engineering the services inline with customer wishes

Cutting edge
Feed research solutions = trial-test-deliver

Simulation Modelling
Global solutionizing

Immersive Technology for Feasibility

Virtual variants
Testing many not few, keeping closer to the design aspirations

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Always connected to the live data

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Simulation Modelling
Global solutionizing

Immersive Technology for Feasibility
Human solution
Human centric design and experience simulation

Augmented Reality
Engineering assistance, data in context

Scanning
Reverse engineering

Live-feed
Connected, informed and current

Training
AR/VR Immersive Training, Rapid on boarding and up skilling

Engineering challenges
Greater understanding of the technological and environment challenges

Economical effects
Weight, sustainability, cost, implication on solutions real-time

Sensor development
Safe testing of autonomous solution

Simulation Modelling
Vehicle characteristic modelling

Immersive Technology for Engineering
Immersive Technology for supply and logistics

**Linefeed**
- Kitting / Sequencing Development
- Racking, process, feeds

**Augmented Reality**
- Picking Visualisation
- Construction Verification

**Picking Solutions**
- Pick to light/voice
- Picking assistors / Robots

**Scanning Aids**
- Wearables
- Electronic Labels

**Training**
- AR/VR Immersive Training, process efficiencies

**Automated Vehicles**
- AGVS
- Finished Vehicle Distribution

**Drones**
- Emergency Delivery
- Warehouse Support
- Inventory Checks

**Beacons / RFID**
- Supply Chain Visibility
- Stock Accountability

**Simulation Modelling**
- Software Implementation

**Immersive Technology for supply and logistics**
Augmented Reality
- Robot location/program
- Live status
- Live training
- Part identification
- Line side data vis.

Vision Systems
- Wearables
- Electronic Labels

Identification
- Wearables
- Electronic Labels

Live-feed
Digital twin driving all activities

Training
- AR/VR Immersive Training

Automated Vehicles
- AGVS
  Autonomous feature use

Beacons / RFID
- Supply Chain Visibility
  Stock Accountability

Simulation Modelling
- Virtual reality, walk the line

Immersive Technology for Line Development
Immersive Technology Manufacturing training

**Training**
AR/VR Immersive Training; on the job training, updates, and quality improvements, up skill in real time

**Augmented Reality**
Connected assistants, instruction, changes, lessons learnt

**Process steps**
Step by step build virtualised

**Identification**
Targets to maximise accuracy

**Live-feed**
Current training challenges

**Assisted robotics**
Cultural development, for trust in technology

**Virtual awareness**
Safe awareness of safety and process, zero incidents

**Targets / RFID**
Tracking cues

**Right first time**
AR inspection and conformation

Current training challenges
**Robotic Solutions**
Assisted robotics, safe working

**Augmented Reality**
Data display, exchange, monitoring and enhancing

**Live-feed**
Sequencing Development / predictive, responsive

**Identification**
Accuracy predictive algorithms

**Process flow**
AR/VR Immersive Training, comprehension

**Automated Vehicles**
Full factory simulation (digital twin)

**Drones**
Process monitoring, data exchange, part delivery

**Beacons / RFID**
Preventative maintenance, change management

**Simulation Modelling**
Maximise productivities through AI learning

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**Immersive Technology for manufacturing efficiencies**
Virtual Reality
Offline training for safety, onboarding, familiarity of environment

Augmented Reality
Operator assistant, wellbeing monitor, emergency information

Training
AR/VR Immersive Training, better, rapid, comprehension of tasks.

Automated Vehicles
Awareness of automation around operator

Virtual Reality
Offline training for safety, onboarding, familiarity of environment

Augmented Reality
Operator assistant, wellbeing monitor, emergency information

Posture analysis
Safe working environment, reduced stress and strain, increased wellbeing, customer focused

Identification
Wellbeing monitoring

Assisted robotics
Cultural acceptance

Simulation Modelling
Digital Twin

Immersive Technology for Human experience
Augmented Reality
Issues management, lessons learnt and captured, live updates and change feed

Virtual Reality
Process development

AI Circular evolution
AI learning

Training
AR/VR Immersive Training, rapid learning, lessons learnt, quality focus

AR VR assisted inspection
Right first time, finish digitally checked

Tracking
Accurate alignment, part check, quality monitoring, problem traceability

Simulation Modelling
Digital Twin
Change capture

Immersive Technology for Quality and Finish
Augmented Reality
Remote assistance, updated process, information and maintenance

Clearance zones
Smarter engineering

Digital service manual
Fully immersive manual, AR VR MR

Training
AR/VR Immersive Training, up skill support non skilled, process evolution

Tools development
Service tool improvement/replacement

Service digital twin
Process, productivity, enhancement, mirror of the real world

Part logistics
Supply Chain Visibility Stock Accountability

Simulation Modelling
Digital Twin Paint Line Simulation

Immersive Technology for serviceability
Augmented Reality
Connected Assisted Learning

Virtual Reality
Environment, location, awareness, learn in context

Gamification
Fun, engaging, competitive learning

Technology
Evolution of technology acceptance

Simulation Modelling
Digital Twin
Cross departmental understanding reducing placement time and effort

Training
AR/VR Immersive Training, experts data capture and replayed, resource efficiency, greater comprehension

Enhanced engagement
Immersed learning, creative and fun
Augmented Reality
PR for products and services, feed to customers through AR apps

Virtual Reality
Online experience of product and services

Design feedback loop
Circular awareness of customer trends and aspirations

Training
AR/VR Immersive Training of sales and marketing staff, complete awareness of product, and message

Customer immersion in product
Customers get to step inside their virtual configuration, smell the leather, touch the paneling, drive their passion

Projection mapping
PR & marketing visual enhancement

AR Customer support package
Customer operation manual digitised, customer support Augmented into their experience

Awareness of things to come
Service / product virtual unveiling & PR
Immersion Technology for purchasing & finance

Training
AR/VR Immersive Training, on process on boarding, safety, development

Augmented Reality
Statistics, trends, updates, diagnostics delivery

Virtual reality
Immersion in consumer data

Communication
Globally connected

Wellbeing
Health and safety monitoring, environment enhancements

Live data streams
Informed contingencies

Simulation Modelling
Digital twin of finance model, transaction, trends, threats

Immersive Technology for purchasing & finance
Augmented Reality
Fed updates, PR, support, direct to AR media and hardware

Virtual Reality
Off & on line training

Communication
Global community, resource allocation

Training
AR/VR Immersive Training on boarding, way finding, well being, development

Way finding
Augmented information, and safety enhancements, reduction in incidents, and increased productivity

Development/learning
Rapid up skilling, higher retention of information

Performance monitoring and support
Support on demand

Immersive Technology for Human resources
**Augmented Reality**
Support services and connected assistant, global data share

**Virtual Reality**
System architecture

**One source data set**
AR, VR, CAD Digital assets fit for purpose, within one PLM

**Training**
AR/VR Immersive Training, onboarding, system awareness, rapid comprehension

**Autonomous service**
Data management, visualisation of connected networks, data delivery, data mining.

**Virtual sandbox off grid**
Accelerated adoption, rapid change

**Common platform**
IT/PLM Digital twin

**Simulation Modelling**
Connectivity, infrastructure maintenance, development

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**Immersive Technology for IT & PLM**
What are the components

- Bandwidth
- Connectivity
- AI
- ML
- CLOUD
- Data Structure
- HPC
- IOT
- IDH
# Powertrain AMC Properties – Common Software’s, File format, storage protocol, intuitive, standardised, One master, intelligent, smart, DIGITAL TWIN

### Connected to real-world DIGITAL TWIN

**DIGITAL TWIN**

**Future State**
Digital Twin
Intelligent Tool

- Rapid change
- Flexible, agile
- Reduction in supplier dependencies
- Resource optimisation
- Wider automation
- Predictive & future proof
- Removal of physical tests
- Right First Time
- Risk free innovation
- Connected workforce across all areas
- Closer to the customer
- Reduced software commitments
- Zero incidents
- Global instinct
- Agile transformation when needed
- Reduced waste
- Increased well being
- Maximised production
- Self sufficient
- Creating our own future
- Effective value streams
- New product, new service, new business model
- Reduced cost
- Increased quality
- Happier customers
<table>
<thead>
<tr>
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<th>LEADERSHIP</th>
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</tr>
</thead>
<tbody>
<tr>
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Digital Readiness Level consideration
Three pillars: technology, leadership, value

Applied to your area, where do you think you sit

Ground Zero
Digital Readiness Level consideration
Three pillars; technology, leadership, value

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Applied to your area, where do you think you sit

Ground Zero
Not even on the same page

| Technology | Leadership | Value |
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  - Progressive
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Digital Readiness Level consideration

Digital ready 9
All area’s coordinated and enabling change
Rockwell, Autodesk, Dassault, Siemens, Unity, Unreal, Adobe, etc.

Input

Real-time Data capture

Storage

Output

Capability Layer

Intelligent mining, conversion & simplification

Intelligent Organisation

Task Profile

Automated & add-hoc request cycle

Intelligent Data packaging

Delivery to Temp storage holder

User experience

User interface

Intelligent selective level render

Process flow
Summary

Virtual reality is fundamental to the “Digital Twin”

The Digital Twin is the main driver for industrial 4.0

Industrial 4.0 is about the how, not the what

Provided by

• Intelligent data
• Intelligent Storage
• Intelligent mining
• Intelligent render

The Virtual world will drive the Products & Services of the future