ORGANIZER

ISGF
India Smart Grid Forum

# India SMART UTILITY Week 2025

## CONFERENCE THEMATIC SESSIONS

**Transformative Technologies in the Power Sector**

WORKSHOP ON IMMERSIVE TECHNOLOGIES:
**AR/VR, DIGITAL TWINS, DRONES** & **ASSISTED REALITY** FOR
**ENHANCED OPERATIONS** & **EFFICIENCY**

***Presented By***


**Keyur Bhalavat**
**Co-Founder & CEO, Plutomen**

# SPEAKERS OF THE ENTIRE SESSION

**Keyur Bhalavat**
CEO & Co-Founder
**Plutomen**

**Hiren Kanani**
CTO & Co-Founder
**Plutomen**

**Derrick Sawyer**
Chief Revenue Officer
**RealWear**

**Dr. Aniruddha Roy**
Chief Technology Officer
**Genesys International**

**Bhagyesh Patel**
Technical Director
**Khodiyar CAD Center**

# PURPOSE OF THE WORKSHOP

**Explore Cutting-Edge Technologies**
Delve into the practical applications of AR/VR, Digital Twins, Drones, and Assisted Reality in power generation, transmission, and distribution.

**Hands-On Learning**
Engage directly with innovative technologies, gaining real-world experience to understand their potential impact.

**Foster Industry Collaboration**
Facilitate knowledge exchange and networking between industry leaders and practitioners.

**Vision for Implementation**
Empower participants to define actionable implementation strategies for integrating these technologies into their own organizations.

# Plutomen – Emerging leader in the Industrial Metaverse

Plutomen bridges the skills gap and drives digital transformation in industrial operations, offering XR & AI solutions that simplify training, maintenance, and remote assistance, empowering deskless workers with digital proficiency.

## Years of XR Experience

Transforming Realities with Innovation. Your Trusted XR Solution Partner.

**9+**

## Experienced Creator Community

Harnessing Collective Talent for exceptional results.

**30+**

## Ecosystem Partners

Creating a Holistic XR Ecosystem, with Industry Titans for Unmatched Innovation

**8+**

## Projects Delivered

Unlocking Possibilities through XR Solutions. Driving Results with our Expertise.

**45+**

## Industries Served

Revolutionizing XR Solutions for Diverse Sectors.

**12+**

## Ready to Deploy Products

Ready to Deploy, No-Code Solutions: Empowering Diverse Use Cases with Ease

**3**

# Plutomen Solutions for Industrial Frontlines

## Plutomen Connect

### Minimize workers skill Gap

Remote Assistance & collaboration platform that featuring one-click connect with experts, Messaging Corner, Knowledge Repository, Video Recording.

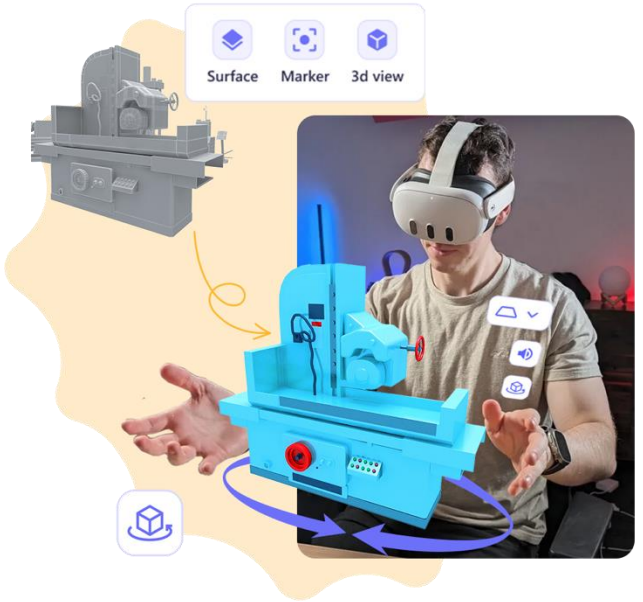
## Plutomen Workflow

### Increase workforce Productivity


Work Assistance platform for creating & accessing digital work instructions for SOPs, Process Checklists, Maintenance & Troubleshooting Sequence, Inspections and Audits.

## Plutomen Assist

### Speed up Frontline Training

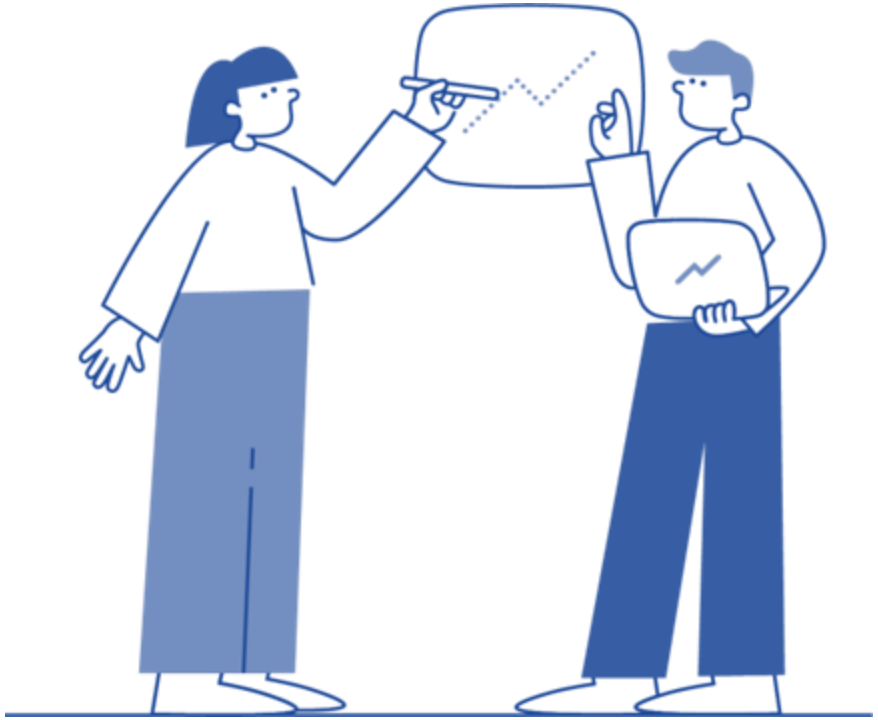



3D Immersive Self Assistance, Training, Publishing & Authoring Platform for next-gen workforce with Interactive Manuals & Knowledge Repositories.

# CURRENT POWER SECTOR CHALLENGES

- **Aging Infrastructure:** Increased need for maintenance & monitoring of outdated systems to ensure reliability.
- **Complex Grid Systems:** Growing complexity due to the integration of distributed energy resources (DERs), requiring advanced management.
- **Workforce Knowledge Gap:** Challenges posed by a retiring workforce & the growing skills shortage in the sector.
- **Rising Operational Costs:** Increasing pressure to achieve greater efficiency while managing rising costs.
- **Regulatory Compliance:** Stricter safety & environmental regulations necessitating continuous adaptation.
- **Disaster Response & Resilience:** The need for faster disaster response & building resilience into power systems.

# People are the strongest and weakest link



**Workforce inconsistencies cause hundreds of $billions of downtime, quality and safety losses every year. Human error is the cause of:**

- **23% unplanned downtime**
- **68% of defects**
- **70% of safety incidents**
- **80% of tasks are preformed by people using age-old methods, Contributing to 68% of variability**

1 ATKenary Research

# OPPORTUNITIES

- **Predictive & Data-Driven Operations -** Leveraging AI, IoT & Digital Twins for proactive maintenance & decision-making.
- **Remote & Assisted Operations -** AR/VR & digital tools enabling real-time collaboration, reducing travel needs & enhancing safety.
- **Intelligent Analytics & Automation -** Enhanced data collection for smarter, faster & more informed grid management.
- **Immersive Workforce Training -** Using AR/VR simulations to accelerate learning & improve skill development.
- **Extended Asset Lifecycles -** Advanced monitoring & predictive maintenance to maximize equipment lifespan & efficiency.

# INDUSTRY TRENDS DRIVING ADOPTION

- **Energy Transition & Grid Modernization -** Accelerated shift to renewables, requiring advanced grid management & optimization.
- **Efficiency & Cost Reduction -** Heightened focus on streamlining operations & reducing operational expenses.
- **Remote Work & Digital Transformation -** Post-pandemic shift towards remote monitoring, diagnostics & assistance.
- **Workforce Digital Readiness -** Increased adoption of digital tools as employees become more comfortable with technology.
- **Affordable & Scalable Technology** - Declining costs of AI, IoT, AR/VR & Digital Twins, making implementation more viable.
- **Industrial IoT & Smart Infrastructure** - Advancements in connected assets & predictive analytics driving proactive operations.

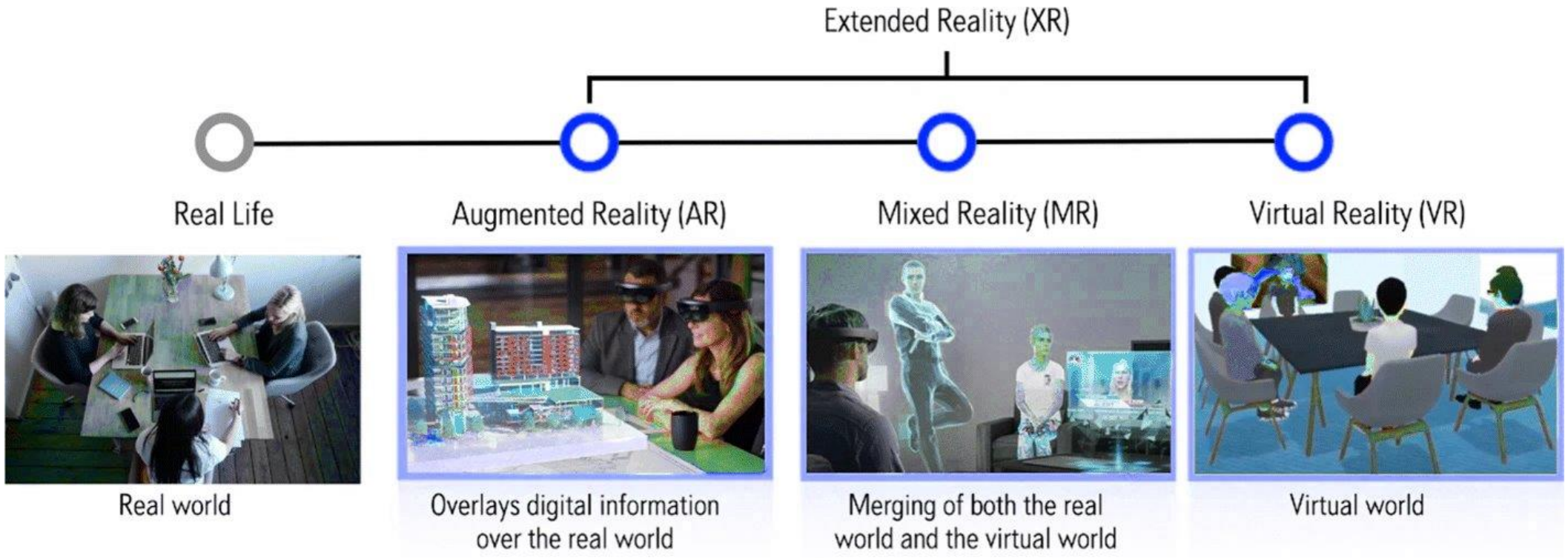
# TECHNOLOGIES TRANFORMING POWER SECTOR

The power sector is leveraging cutting-edge technologies to enhance **efficiency, safety & operational excellence**. By integrating these innovations, organizations can optimize power generation, transmission & maintenance workflows.

## Key Technologies:

- **Augmented Reality (AR) & Virtual Reality (VR) -** Enhancing training, remote collaboration & procedural guidance
- **Digital Twins -** Real-time virtual models for predictive maintenance & performance optimization
- **Drones -** Remote inspection of critical infrastructure, reducing human risk
- **Assisted Reality** - Hands-free digital guidance for field technicians & remote support

# Unveiling the Magic – A Look at Immersive Technologies

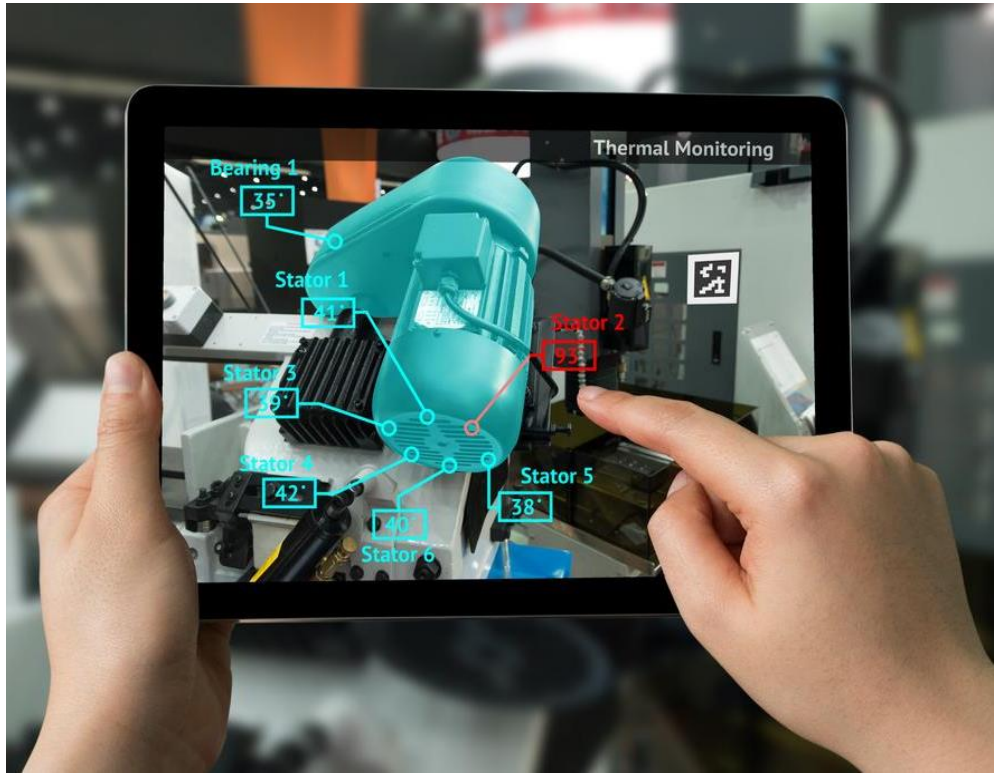



- **AR (Augmented Reality):** Overlays digital information onto the real world
- **VR (Virtual Reality):** Creates a fully immersive, computer-generated environment
- **MR (Mixed Reality):** Blends the real & virtual worlds, allowing interaction with both

# AUGMENTED REALITY & VIRTUAL REALITY

**Augmented Reality (AR)** overlays digital information onto the real world, enhancing a user's perception of their environment.

**Virtual Reality (VR)**, on the other hand, creates a fully immersive, computer-generated environment, allowing users to interact with a simulated world. Both technologies enable more interactive & effective ways to visualize data & perform tasks.




## Distinct Value of AR & VR

- **Visualizes Hidden Data**: Displays complex data for easier understanding.
- **Safe Simulations**: Allows risk-free training in hazardous scenarios.
- **Informed Decisions**: Provides real-time insights for better decision-making.
- **Hands-Free Assistance**: AR enables technicians to work while accessing critical data.
- **Remote Collaboration**: Experts guide on-site workers in real time.
- **Scenario Planning**: VR simulates emergency situations for better preparation.

# AUGMENTED REALITY & VIRTUAL REALITY

## Key Applications

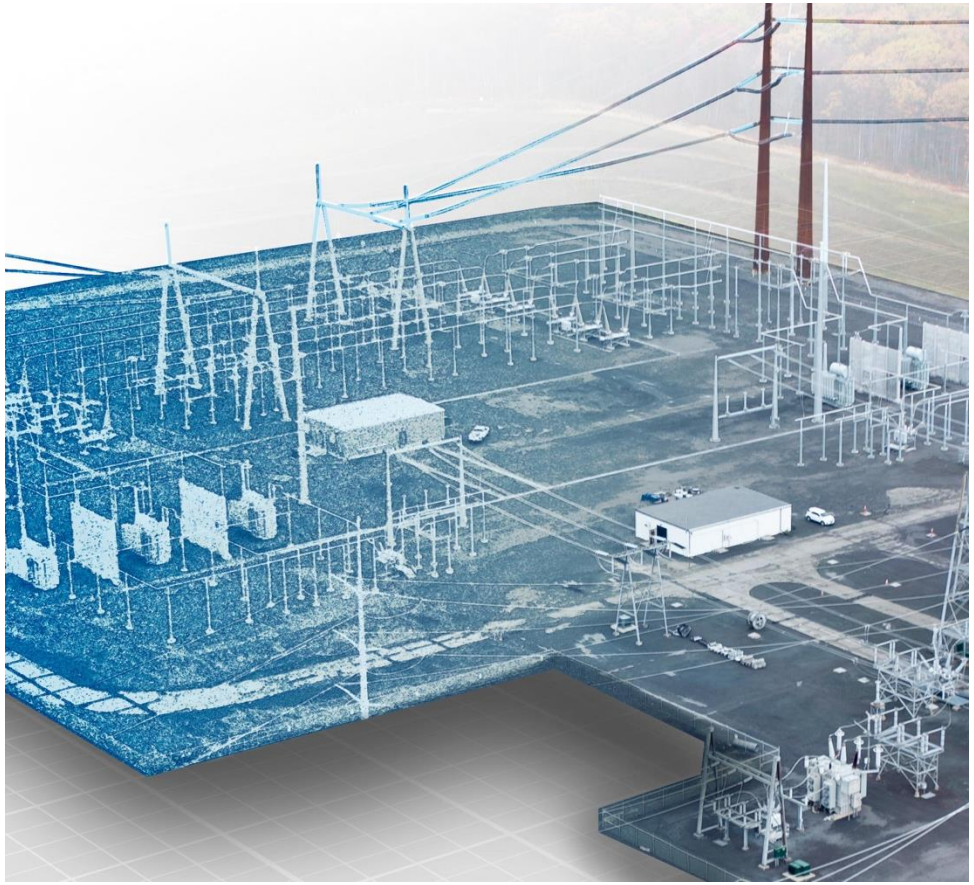
- ✓ **Training & Skill Development** – Immersive training for field engineers.
- ✓ **Remote Collaboration** – AR-powered expert guidance for real-time issue resolution.
- ✓ **Complex Procedure Guidance** – Step-by-step AR overlays for maintenance & repairs.
- ✓ **Scenario Planning** – VR simulations for emergency response drills.

## Power Sector Use Cases for AR & VR

- **Remote Inspections:** AR enables real-time expert guidance, minimizing downtime.
- **Predictive Maintenance:** VR simulates failures for proactive planning.
- **Training:** VR provides immersive maintenance & safety training.
- **Field Support:** AR delivers real-time data for on-site repairs.
- **Safety Drills:** VR enhances emergency preparedness through simulations.
- **Design & Simulation:** VR optimizes power plant designs & workflows.
- **Performance Monitoring:** AR overlays real-time data on equipment.

# DIGITAL TWINS

Digital Twins are virtual replicas of physical assets or systems that are continuously updated in real-time through sensor data, enabling accurate & dynamic simulation.



## Distinct Value of Digital Twins

- **Real-Time Monitoring**: Continuous updates for data-driven decision-making.
- **Operational Efficiency**: Optimizes performance & resource management.
- **Cost Savings**: Predicts failures & extends asset life, reducing costs.
- **Enhanced Accuracy**: More precise forecasts using live data.
- **Informed Decisions**: Provides actionable insights for better decisions.
- **Risk Management**: Identifies & mitigates potential risks in real-time.
- **Integrated Systems**: Seamless connection of assets for optimized management.
- **Sustainability**: Improves energy efficiency & reduces waste.
- **Customization & Scalability**: Tailored models that scale across assets.

# DIGITAL TWINS

## Key Applications

- ✓ **Predictive Maintenance**: Identifies potential failures & optimizes maintenance schedules.
- ✓ **Performance Optimization**: Continuously monitors & improves asset performance.
- ✓ **Lifecycle Management**: Tracks asset health, ensuring it operates at peak efficiency throughout its lifecycle.
- ✓ **Scenario Simulation**: Tests different operational conditions or emergency scenarios to plan responses.

## Use Cases in Power Sector

- **Smart Grid Management:** Digital twins predict failures & optimize energy distribution.
- **Power Plant Monitoring:** Real-time monitoring & maintenance optimization through digital twins.
- **Asset Health Monitoring:** Track asset performance & predict failures to extend lifespan.
- **Scenario Planning:** Simulate grid responses for better disaster preparedness & resource allocation.

# DIGITAL TWINS

[Leveraging digital twins in utilities]

# DRONES

Drones, or unmanned aerial vehicles (UAVs), are remotely controlled or autonomous flying devices equipped with advanced sensors, cameras & imaging technology. They are used for inspecting, monitoring & collecting data from hard-to-reach or hazardous locations in real-time.

## Distinct Value

- **Access to Hazardous Areas**: Inspects high-risk locations safely, reducing human exposure to danger.
- **Cost-Effective**: Reduces the need for expensive equipment & manual labor.
- **Real-Time Data**: Provides instant visuals & sensor data for quicker decision-making.
- **Enhanced Safety**: Minimizes risk to workers in dangerous environments.
- **Increased Efficiency**: Speeds up inspections & reduces operational downtime.
- **Precision**: Delivers high-resolution imaging & detailed analysis

# DRONES

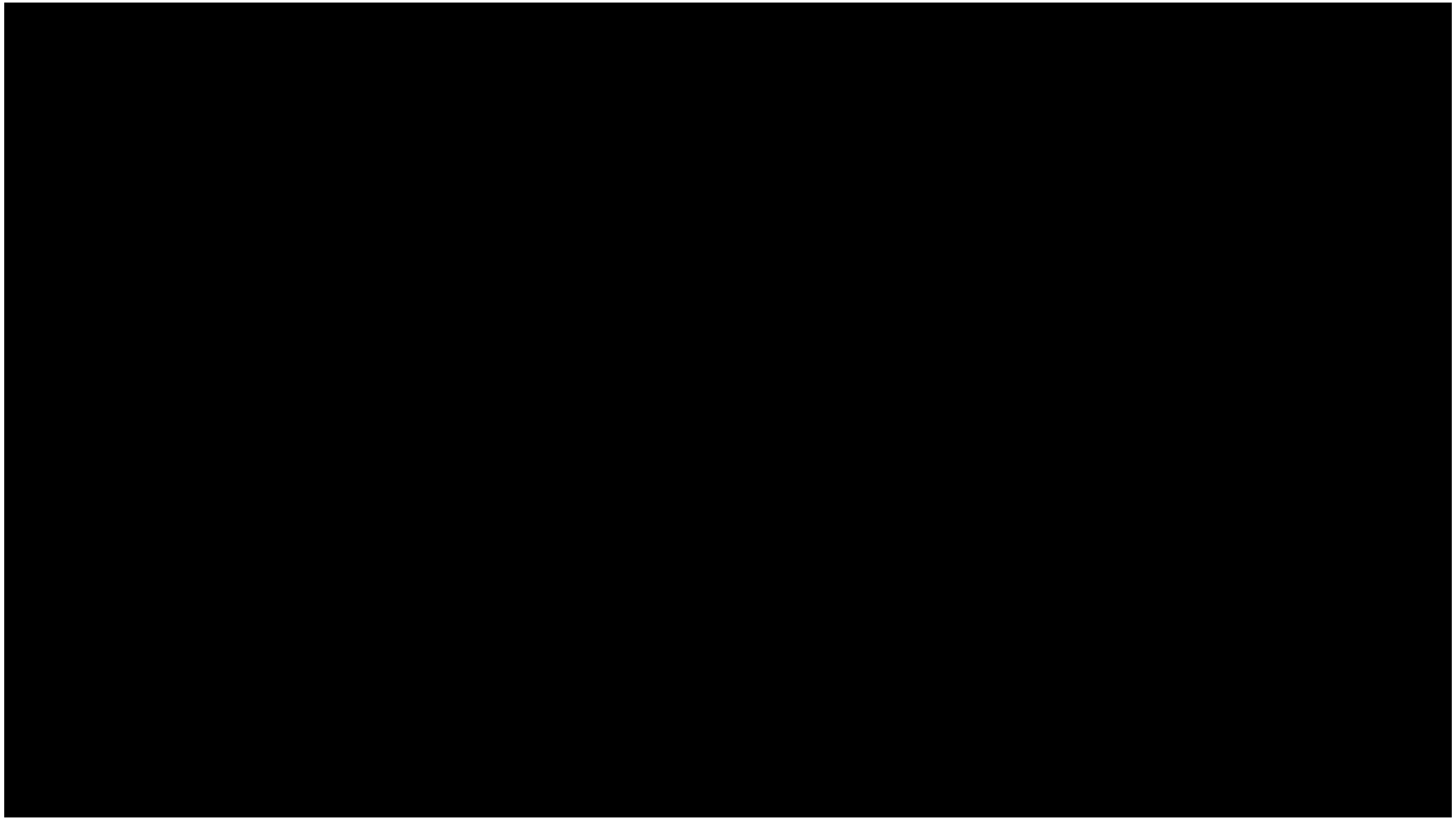
## Key Applications

- ✓ **Infrastructure Inspection:** Monitors power assets for damage.
- ✓ **Thermal Analysis:** Identifies faults with thermal imaging.
- ✓ **Disaster Assessment:** Surveys damage for recovery efforts.
- ✓ **Site Monitoring:** Ensures safety & compliance in projects.
- ✓ **Environmental Monitoring:** Tracks conditions for regulations.
- ✓ **3D Mapping:** Generates models for asset management.

## Use Cases in Power Sector

- **Power Line Inspections:** Drones detect faults without human risk.
- **Wind Turbine Monitoring:** Identifies structural issues & malfunctions.
- **Post-Storm Checks:** Assesses damage for faster recovery.
- **Remote Surveillance:** Inspects hard-to-reach energy sites.

# DRONES



[Drone Power Utility Pole Line Inspections]

# ASSISTED REALITY

Assisted Reality involves hands-free wearable devices such as smart glasses or headsets that display contextual information over the real world without fully immersing the user. These devices provide real-time, digital guidance while allowing the user to stay aware of their surroundings.

## Distinct Value

- **Enhanced Situational Awareness:** Provides critical digital cues while keeping the physical environment in view.
- **Real-Time Decision Support:** Offers immediate access to process data & instructions, improving on-site decisions.
- **Error Reduction:** Delivers consistent, standardized guidance to minimize human error.
- **Seamless Integration:** Connects with existing systems (IoT, digital platforms) to consolidate data & support efficient workflows.
- **Improved Productivity:** Accelerates task completion with instant digital support & remote collaboration.
- **Data Capture & Analysis:** Records task performance for post-operation review & continuous improvement.

# ASSISTED REALITY

## Key Applications

- ✓ **Field Maintenance:** Real-time guidance for repairs & upkeep.
- ✓ **Assembly Operations:** Visual instructions during equipment assembly.
- ✓ **Quality Assurance:** On-site inspections with digital checklists.
- ✓ **Remote Troubleshooting:** Live expert support for immediate issue resolution.
- ✓ **Training & Knowledge Transfer:** Hands-on, digital learning experiences.
- ✓ **Safety & Compliance Checks:** Displays protocols & compliance info to ensure industry standards are met.

## Use Cases in Power Sector

- **On-Site Maintenance:** AR provides step-by-step guidance for repairs.
- **Remote Support:** Experts assist workers in real-time troubleshooting.
- **Inspections:** AR ensures quality control and regulatory compliance.
- **Safety:** Real-time alerts help prevent workplace hazards.
- **Training:** AR accelerates skill development with digital overlays.

# ASSISTED REALITY


[Augmented Reality in Utilities and Environmental Services]

# DRIVING EFFCIENCY WITH UNIFIED DIGITAL ECOSYSTEM

Integrating AR/VR, Digital Twins, Drones & Assisted Reality creates a cohesive digital ecosystem where real-time data is captured, analyzed & acted upon for enhanced operational performance.

## Benefits of Seamless Collaboration

- Improved Efficiency
- Enhanced Safety
- Cost Savings
- Faster Decision-Making
- Reduced Downtime


## Multi-Technology Workflow Example:

In a power plant maintenance scenario, a drone conducts aerial inspections & collects thermal data, which feeds into a digital twin for real-time simulation & fault detection. Simultaneously, on-site technicians use assisted reality devices to receive step-by-step maintenance guidance & connect with remote experts, while AR/VR modules support immersive training & scenario planning. This integrated approach streamlines decision-making & reduces downtime.

# CONCLUSION & NEXT STEPS

**Key Takeaways:**

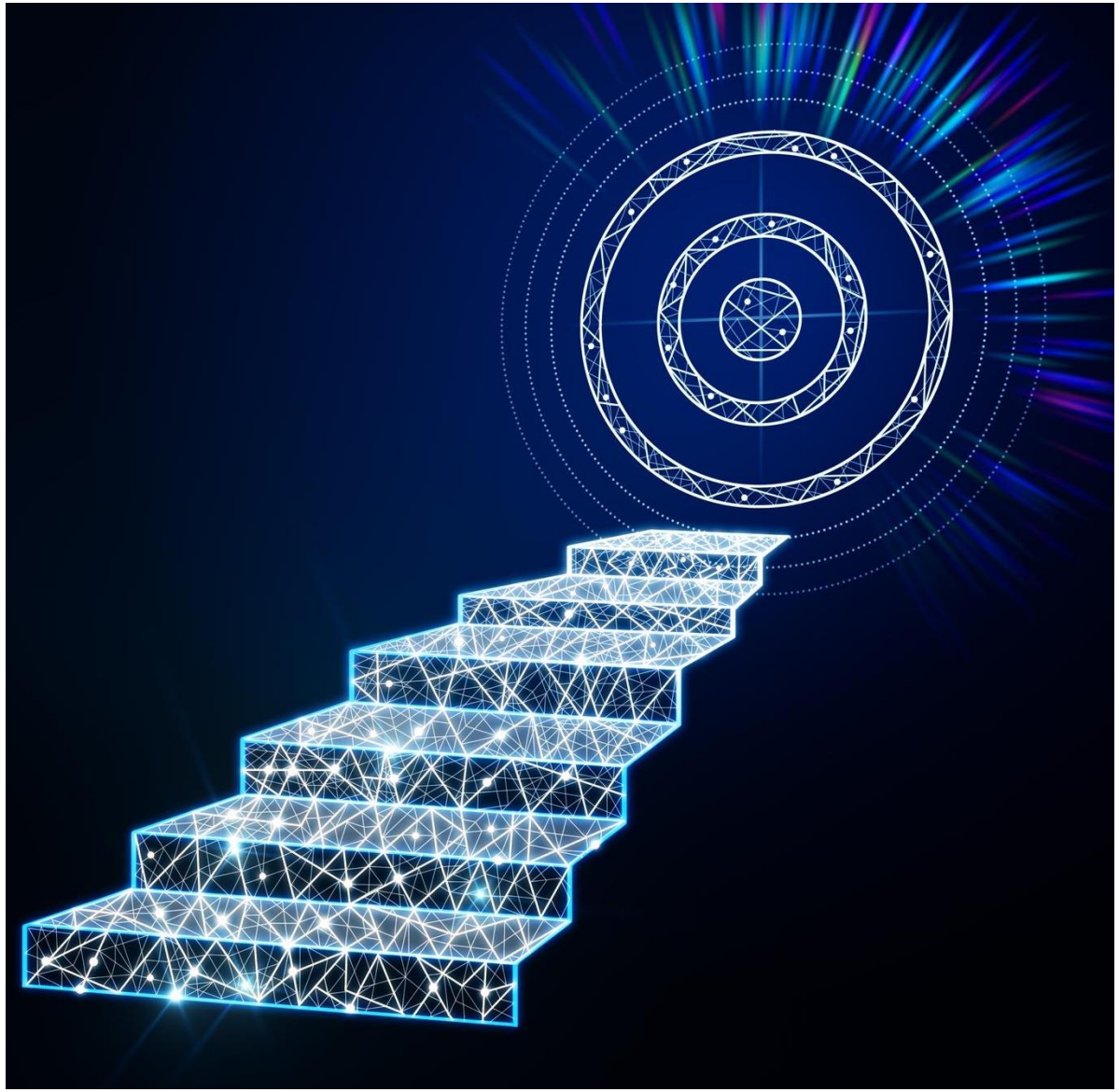
Explore how AR/VR, Digital Twins, Drones, and Assisted Reality are reshaping industries, driving efficiency, safety, and smarter decision-making.

**What's Ahead:**

Get an exclusive look at live demonstrations, where we'll show you how these cutting-edge technologies can be applied in practical, real-world scenarios.

**Engage & Explore:**

We invite you to actively participate, ask questions, and gain valuable insights to help you leverage these innovations for your organization's success.



Host Utilities

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BSES

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GOVERNMENT OF INDIA
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# *THANK YOU*

For discussions/suggestions/queries email: isuw@isuw.in

www.isuw.in

Links/References (If any)

# Plutomen Solutions for Industrial Frontlines

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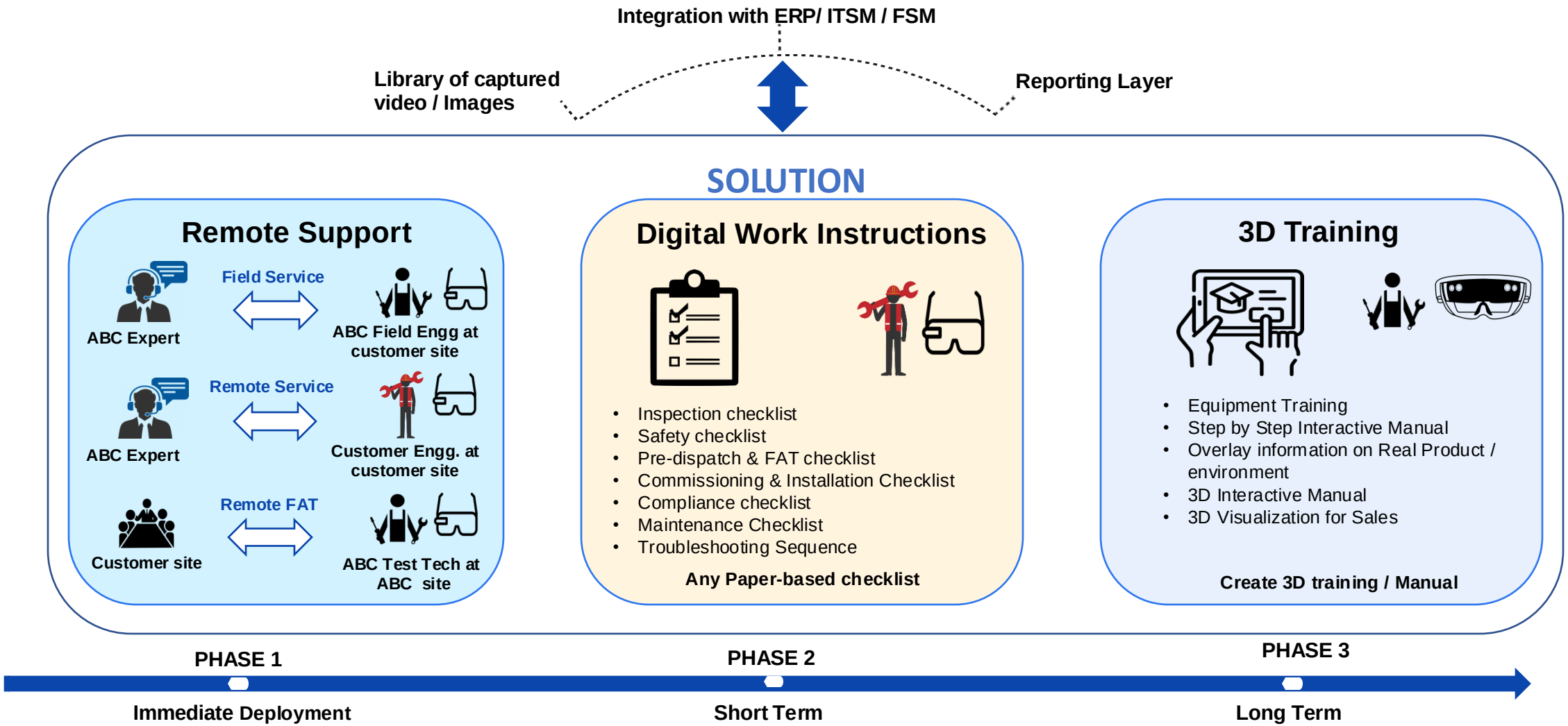
# OVERALL SOLUTION PLACEMENT



# PLUTOMEN CONNECT – CONNECTING EXPERTISE & FRONTLINE

Connect experts with frontline teams in real-time, gaining visibility into the field using AR powered smart glasses.Our solution seamlessly eliminates the distance barrier between your expert and technicians so that they can focus on work-in hand.

## Challenges tackled

- Availability of expert
- Ineffective communication Technologies
- Scarcity of skilled Workers
- Travel cost
- Complexity of machine
- Knowledge Transfer

## XR bridging the gap for immediate support

1. Remote expertise to frontline workers at the point of need/ on Demand
2. Safely and effectively learn on the job, in a live production environment, with supervision and no downtime
3. Reducing repeated work from expert on the same issue/knowledge download
4. Assistance directly in the user's line of sight on IE mobile devices / hands-free headsets

## Key Features

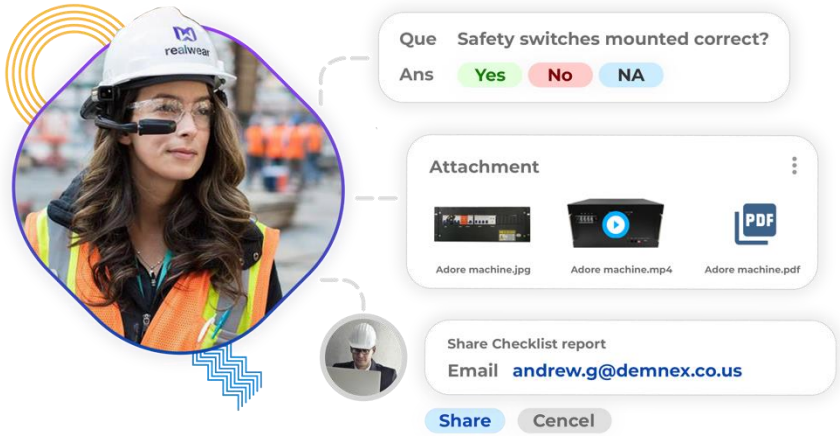
- Company directory
- Guest login
- Create/join session
- Screen sharing
- Freeze screen & zoom
- Screen capture/recording
- Secure chat
- Add annotations
- Add text
- Categorize and create library
- Offline mode - self assist

# PLUTOMEN WORKFLOW – SIMPLIFY WORK & INCREASE PRODUCTIVITY

Eliminate paper and digitize the assembly related audits & inspection checklists. Create, update, and distribute step-by-step work instructions to the entire department silos.

## Challenges tackled

- Evidence of Work
- Complex Process simplified
- On Demand Guide
- Higher Transparency & Accountability
- Better Adherence to process
- Digitalization of work
- Knowledge Transfer




## XR applications to simplify work for frontline workers

1. Augmented work instructions, checklist , video tutorials, schematics & other digital content to direct frontline workers to do the job efficiently & accurately
2. Text-based instructions & images displayed on AR glasses for hands free work
3. Eliminates information cascade time by instantly updating the process changes and brings agility with alignment.
4. On-demand access to contextual information and turns complex processes into fool-proof visual workflows for easy understanding

## Key Features

- Create workflow and modules
- Assign task to users
- View status and progress
- Dashboard management & reporting
- Auto save and share checklist
- Notes & attachments
- Accessible training module, SOPs & tool library
- Conduct inspection / installation / troubleshot in a step-by-step manner
- Update change immediately and remove Information decimation gap

# USE CASES

**From daily rounds, checklists and inspections to complex operational procedures, Plutomen Connected Worker helps your people perform critical, manual work across your plant more effectively and safely**

## Operations

- Regular plant & shift walk through
- Shutdowns, startup & changeover
- Managing abnormal events & troubleshooting

## Quality

- In process quality control & assurance
- Visual inspections & manual data collection
- Validation & verifications
- Audit Management

## Maintenance

- Routine inspections/rounds
- Repairs and tests
- Equipment preparation, recommissioning
- Calibrations

## Environmental & Safety

- Environmental compliance rounds
- Safety observations round
- Incident Management
- Job Hazard Analysis

# MOST PREVAILING USECASES

## INSPECTION AND QUALITY

**Use Case**

Utilising Connected worker devices, for on-the-job assistance & to automatically create reports during inspections

**BUSINESS BENEFITS**

- Reduce overall inspection up to 33%
- Eliminate secondary or tertiary efforts resulting from incomplete protocols (missing images)

**TECHNOLOGY ENABLE**

Assisted Reality, Augmented Reality, Artificial Intelligence, Cloud

## FIELD SERVICE MANAGEMENT

**Use Case**

Utilising Connected worker devices to support on site employees through real time video-audio calling

**BUSINESS BENEFITS**

- Drastically reduce global support process conclusion time through remote support
- Minimise travel cost
- Better Utilisation of expert resources

**TECHNOLOGY REQUIRED**

Assisted Reality, Augmented Reality, Computer Vision, Cloud

## TRAINING & SKILL DEVELOPMENT

**Use Case**

Utilising Connected worker devices for highly immersive training of emergencies and complex procedures

**BUSINESS BENEFITS**

- Ensure higher knowledge retention rates of training content through accurate simulation of emergencies

**TECHNOLOGY REQUIRED**

Virtual Reality, Artificial Intelligence, Cloud

# A PLANT INSPECTOR (TODAY)

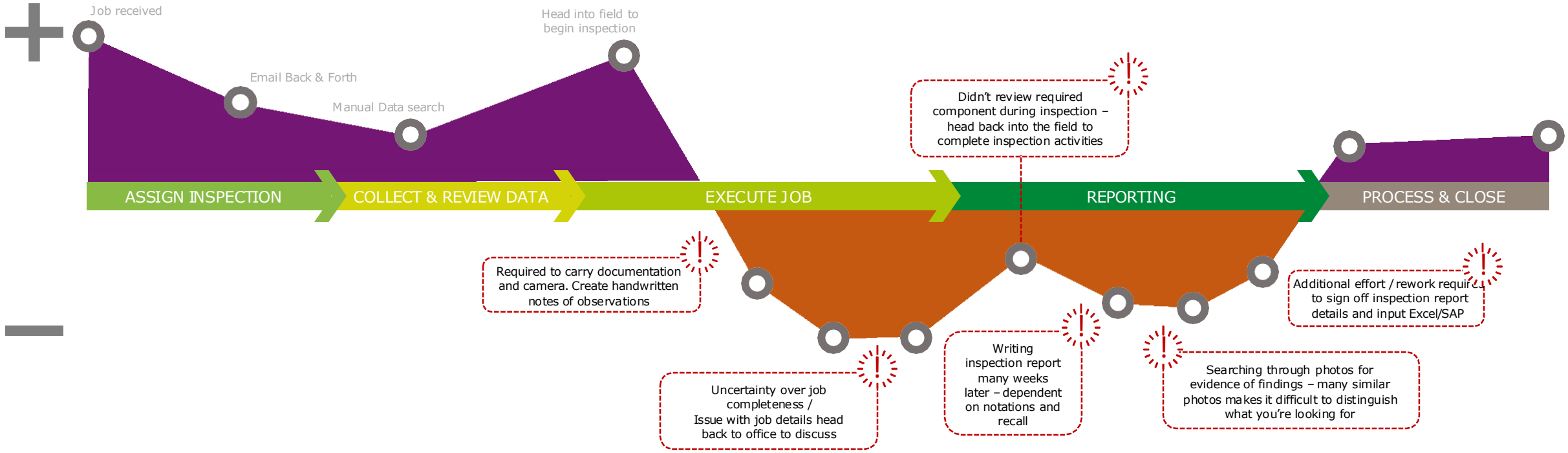
## A QUICK REMINDER OF THE DAY-IN-THE-LIFE OF INSPECTOR / FIELD WORKER

**GOALS**

- Address inspection scope
- Preparation and safe execution inspections
- Getting it right first time in the field

**PAIN POINTS**

- Reliance on recall post inspection
- Analogue Data collection in the field
- Having to return from the field to the office for additional information and reporting writing

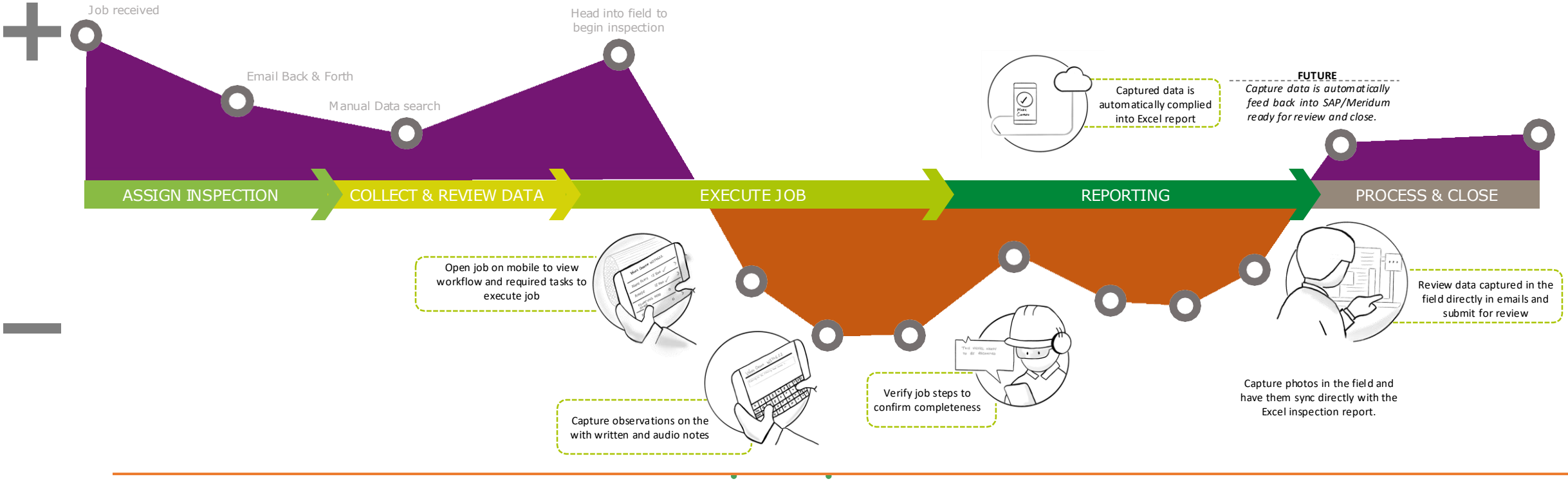


# PLANT INSPECTOR (TOMORROW)

## A QUICK REMINDER OF THE DAY-IN-THE-LIFE OF DIGITALL ENABLED INSPECTOR / FIELD WORKER

**GOALS**

- Address inspection scope
- Preparation and safe execution inspections
- Getting it right first time in the field



# SOLUTION EXECUTION FLOW

Work Order assignment | Travel in Plant / Site | Inspection / Maintenance | Remote Assistance | Completion

Technician gets the assigned a scheduled maintenance Work Order.

He accepts the WO and travels to the customer premises.

The WO includes all the details on the customer and job.

Technician reviews the inspection steps and decides that he needs to perform the job with AR-guidance.

He finds the corresponding QR code in the servicing equipment detailed view…

,and initiates the AR workflow with the Smart glasses / Mobile App.

However, he discovers an anomaly, and he does not know how to fix it


He requests assistance from the mobile app / Smart Glass which is routed to the right expert for that equipment.

The issue is resolved, and the WO is completed.

The Work Order is updated, and the reports are stored in customer's DMS.