WHITE PAPER

Reduce Unplanned Machine Downtime and Maximize your Return on Investment with Augmented Reality

teamviewer.com/pilot
The pace of competition in the manufacturing industry continues to increase – pushing for lower price per part, shorter lead times, and more stringent quality control.

For example, in the aviation industry alone, 37,400 new aircrafts are expected over the next 20 years – 30 percent for aircraft replacement and the rest for growth – including passenger aircrafts and freighters.¹

Manufacturers today are focusing on achieving higher levels of productivity, optimizing processes, and reducing costs in order to meet these rising demands and maximize their return on investment (ROI).
98% expect to increase efficiency with digital technologies like integrated Manufacturing Execution System (MES), predictive maintenance, or augmented reality solutions.  

Unplanned downtime can be caused by several factors such as hardware failure, lack of operator, or even waiting time for right fault diagnostics and support. During this unplanned downtime, the overhead costs add up, on top of the loss of production.

Life Cycle Cost of a Machine

Maintenance Costs and Unplanned Downtime Impact Return on Investment

On average, operation and maintenance costs have major impacts on the return on investment (ROI) — combined, they often exceed even the acquisition cost.

To maximize the ROI, manufacturers often focus on one key aspect: increased machine utilization time.

In the past couple of decades, automation systems have become more complex — ranging from adaptive automation to collaborative ones. They have drastically reduced the overall lead time by reducing cycle times, eliminating repetitive actions, and increasing the possibility to produce more parts per shift.

But, that’s only one part of the equation.

There’s another major factor: unplanned downtime.

“98% expect to increase efficiency with digital technologies like integrated Manufacturing Execution System (MES), predictive maintenance, or augmented reality solutions.”  

In a study conducted by Deloitte, unplanned downtime costs industrial manufacturers in excess of $50 billion every year.  

A survey showed that one minute of downtime costs automotive manufacturers $22,000.  

$50 billion

$22,000 per minute
Reducing Unplanned Machine Downtime

In a standard maintenance strategy model, there is a major dependency on reactive and planned maintenance, which accounts for only up to 75 percent original equipment effectiveness (OEE). In order to ensure improved OEE, the processes in the reactive, planned, and proactive phases need to be optimized. Additionally, preventive maintenance strategies need to be implemented.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reactive</td>
<td>Repair a machine when it breaks down</td>
</tr>
<tr>
<td>Planned</td>
<td>Regular planned maintenance activities</td>
</tr>
<tr>
<td>Proactive</td>
<td>Defect elimination to improve performance</td>
</tr>
<tr>
<td>Predictive</td>
<td>Advanced data analysis to predict maintenance requirements and identify any issue which might affect machine reliability</td>
</tr>
</tbody>
</table>

What impacts these phases?

1. Technical complexity and geolocation restriction

   This prolongs the maintenance process, often incurring added cost for multiple technicians and experts travelling — in some cases, across the globe — to troubleshoot and repair issues.

2. Shortage of skilled experts increases wait time

   Limited availability of skilled experts or subject matter experts (SME), prolong wait times and often increases machine downtime.

Reliability: OEE and uptime

<table>
<thead>
<tr>
<th>OEE Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50% OEE</td>
<td>Reactive</td>
</tr>
<tr>
<td>50%-75% OEE</td>
<td>Planned</td>
</tr>
<tr>
<td>75%-90% OEE</td>
<td>Proactive</td>
</tr>
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<td>&gt;90% OEE</td>
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</table>

Source: Deloitte®

2.69M jobs open from retirements

4.6M manufacturing jobs to fill from 2018 – 2028

1.96M new jobs due to natural growth

2.2M jobs are likely to be filled

2.4M (53 out of 100) open positions in vacant due to a skills shortage in the US manufacturing industry

Source: Deloitte®
The Augmented Reality Support Solution that Transcends the Digital World

Implementing TeamViewer Pilot optimizes workflow processes significantly, reducing machine downtime in all three phases.

Reactive Phase
Experts located anywhere can support in-house and field technicians at the site in real time through video sessions for faster troubleshooting.

This approach is facilitated by features helping the expert to clearly identify the problem and describe the steps to be taken by the person on-site, even if hundreds of kilometers away.

3D object tracking, for instance, allows the expert technician to place arrows and other annotations on real-world objects that stick with them even as the person on the other end moves their smartphone camera.

Augmented reality technology accelerates user collaboration, and facilitates shorter communication chains, driving efficiency and innovation.

Planned Phase
A planned preventive maintenance strategy helps avoid unnecessary downtime caused by broken machinery or parts. But fault detection is often complex, especially in the industrial manufacturing sector where there are a lot of elements integrated into a system. Or the machine is manufactured in a different country and the developer settings are in the original language.

3D object tracking, for instance, allows the expert technician to place arrows and other annotations on real-world objects that stick with them even as the person on the other end moves their smartphone camera.

With TeamViewer Pilot, these challenges are easily solved by digitally enabling experts worldwide to virtually put themselves in the position of the person on site. The experts can also support through complex routine maintenance checks, especially with new technicians or ones that lack in-depth knowledge of the procedure.

This also helps optimize the logistics and warehouse processes where offsite experts assist in identifying the correct spare part, document the part number, and initiate the order process for replacements immediately.

Proactive Maintenance Phase
Proactive maintenance is a much more analytical phase where problems are identified in advance using data from different sources like performance reports and integrated sensors. It is crucial to correctly use the available data and identify any problem which might lead to a breakdown (e.g., table misalignment in machining centers or improper lubrication.)

Using Pilot, the remote expert can guide the service technician through procedures based on advanced analytics and identify small out-of-line errors which might accumulate and lead to a breakdown in the long run.

This not only minimizes unwanted machine downtime, it also prolongs the lifespan of the machinery and decreases the spare-parts inventory.

*According to Airbus, implementation of SART (Smart Augmented Reality Tool) for inspection of bracket installation in fuselage assembly reduced inspection times in some cases from 3 weeks to 3 days.*

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Maintenance Repair and Overhaul Services Market

Increased demand in cost savings compounded with shortage of skilled workers in several industrial sectors like automotive, aviation, or industrial manufacturing has driven immense growth in the maintenance repair and overhaul (MRO) sector.

In 2018, the European Maintenance, Repair and Overhaul (MRO) service market was valued at USD $184.69 billion and is anticipated to expand at a CAGR of 2.5% until 2025.8

What can you do with TeamViewer Pilot?

- **Remote Support Using Augmented Reality**
  - Share your smartphone camera-view of on-site field issues with a remote expert for real-time virtual collaboration, troubleshooting, and faster fault detection.

- **Real-time Collaboration with Experts**
  - Offsite expert can guide the on-site technician step-by-step using freehand drawings and 3D annotations to mark up the screen.

- **Highlight Real Objects with 3D Markers**
  - Offsite expert can help in identification of the correct spare part, document the part number, and initiate the order process for replacements.

- **Solve Problems Together**
  - Offsite experts can provide support for scheduled preventive inspections and detect anomalies faster to decrease unplanned downtime.

- **Fault Detection**
  - Effective and Efficient Repairs
  - Mitigate Language Barriers
  - Training: In-Depth Instructions for New or Unfamiliar Procedures
  - Scheduled Preventive Inspections

- **Identify and Solve Field Issues**
  - Remote access and guidance for faster issues resolution and process optimization.

- **Offsite Expert Support**
  - Real-time collaboration and problem-solving support.

- **Remote Support**
  - Connectivity for remote support and on-site assistance.

- **Training**
  - In-depth instructions and guidance for new or unfamiliar procedures.

- **Mitigate Language Barriers**
  - Real-time translation and understanding for better cooperation.

- **Effective and Efficient Repairs**
  - On-site personnel guided step-by-step for quicker and efficient repairs.

- **Scheduled Preventive Inspections**
  - Regular monitoring and maintenance for system optimization.
Why TeamViewer?
Industry-Leading Remote Connectivity Platform

TeamViewer is the world’s most-loved remote desktop tool with over 30,000 new downloads every hour. Currently, there are over 2.0 billion live TeamViewer IDs that access the world’s largest and fastest remote connection network. This is the only tool you will ever need to keep all your computers, servers, and devices at your fingertips.

TeamViewer Pilot is an interactive remote field support solution, powered by augmented reality, enabling you to collaborate with offsite experts and tag real-world objects in live video streams with 3D sequential arrows to provide guidance and clarify troubleshooting steps.

- Precise object tracking, fueled by the latest Apple and Google technology
- Fast connections, leveraging our global access network infrastructure
- Highest security and privacy standards
- Easy-to-use mobile and desktop applications
- Customer support in over 32 languages

Key Features

Remote camera sharing
Enable your on-site employees or clients to share their smartphone’s camera view, so you can see the problem and help address it.

Highlighting on 3D objects and adding text to markers
Help on-site employees or customers fix issues by drawing and highlighting on the screen, marking real-world objects as well as adding text descriptions.

Freeze Image
Pause the video stream to get a clear still image to work hands-free or highlight and discuss technical details.

Product Benefits

Solve problems faster
Enable your service technicians and customers to get direct support from experts via audio and interactive video.

Reduce costs
Reduce travel costs by replacing on-site visits with remote expert help for service technicians and customers.

Improve processes
Help close the skills gap and transfer knowledge for technical repairs and maintenance, or provide approval for inspections from a central location instead of an on-site visit.

Maintain security
Remote connections are powered by the TeamViewer global access network, secured by industry-grade end-to-end encryption.
Sources


About TeamViewer

As a leading global remote connectivity platform, TeamViewer empowers users to connect anyone, anything, anywhere, anytime. The company offers secure remote access, support, control, and collaboration capabilities for online endpoints of any kind and supports businesses of all sizes to tap into their full digital potential. TeamViewer has been activated on approximately 2 billion devices; up to 45 million devices are online at the same time. Founded in 2005 in Goeppingen, Germany, the company employs about 800 people in offices across Europe, the US, and Asia Pacific.

Questions? Email us at pilot@teamviewer.com

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