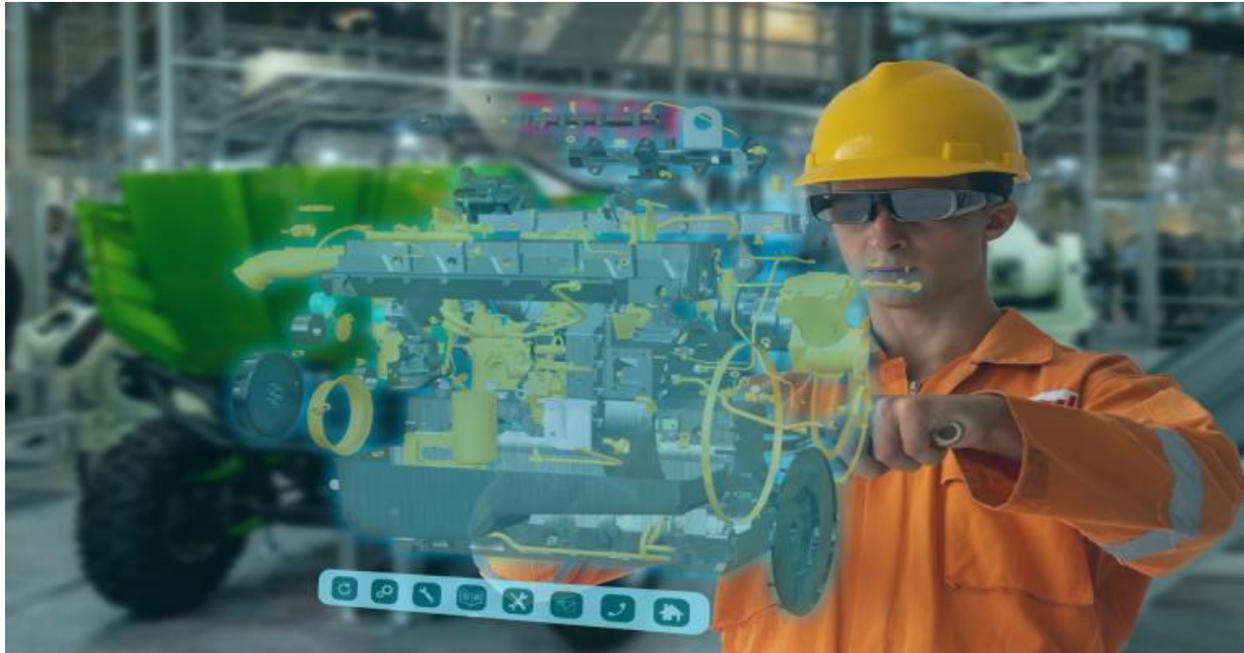


# Future of Maintenance with Video collaborated wearable glasses

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In the era of numerous product variants, configurations and complex equipment/machines, maintenance operations are getting increasingly complex and expensive especially in critical industries like Aerospace, Mining. Even small downtime impacts revenue in these industries and quality of maintenance is highly important. The Smart glasses provide hands-free operation, access to the maintenance information/manual and real-time guidance from experts offers tremendous value to the maintenance industry.

Gadgeon's developed a full-scale Maintenance solution for one of its client that manages work assignment, gives access to maintenance instructions needed to do complete the job in a hands free manner and upload various types of maintenance logs collected via an industrial grade smart. One of the highlight features in this solution was to enable remote video collaboration which connects the technician to their supervisor or experts. The solution offers voice and gesture-based controls which enable more productivity to the technicians in the field and with real-time remote collaboration. This solution eliminates both the real time communication limitations and safety concerns. The remote supervisor can share screen to the field personal do annotation on the remote images etc and guide/monitor him easily to complete a complex task.

## Benefits

The maintenance solution with remote video collaboration delivers many benefits

- Using hand-held mobile devices/ pen and paper mode to collect data for executing a task is problematic from usability perspective. Wearable headsets provide users with a significantly improved and hands-free experience.
- Using enriched documentation about the maintenance task increases productivity and reduces the probability of making mistakes.
- Real-time collaboration over the video call with experts helps to resolve issues more efficiently.
- Decrease the service costs or delays and improve the quality of job done.
- Logging of data with image proofs makes the history of the tasks and data more usable
- Visual confirmation job done rather than spoken words and data makes it more credible.
- Object recognition of equipment in scene and automatic augmentation of relevant content provides real time valuable information for the field personal.

## Wearable glass as smart maintenance solution

The major difference between a regular Android device and a wearable headset is that it has no touch screen, and all user interaction is through voice commands or hand/head-gestures. WearHF (HF stands for Hands-Free) is a custom interface layer including voice and visuals that sits on top of Android. This custom layer intercepts user controls designed for touch and automatically enables them for speech. Because of this a wearable standard Android application can be used to deploy in glass and across several platforms also.

## Better remote assistance fueled with Web RTC

The fast development of mobile technology and connectivity has triggered a completely new meaning of remote assistance. What if the technician needs help during his work? Remote assistance during the work will be a great relief. This solution provides support for video calling facilities between users while at work which is fueled with the power of webRTC. GadgEon developed a scalable Telepresence/Conferencing application that has been highly customized to suit maintenance applications.

- This has been customized to work with voice-based navigation and controls in smart glasses

- Provide easy navigation for the field staff to see remote content or switch to maintenance instructions during the call and help in easy collaboration using annotations or file sharing.
- Help a supervisor monitor activity of multiple people at the same time
- Easy access to call peers or people working in the same location

User experience for the field staff while using most of the regular features of conference call has been enhanced a lot so that their attention from their job is never compromised while accessing the smart glass features.

This auto scalable webRTC solution uses Kurento Media Server cluster deployed on a Kubernetes environment. The solution can support numerous parallel calls which are secured using SSL encryption.

The solution has been deployed on Azure cloud to handle high scaling needs, But it can also be deployed in areas without internet access due to security reasons or being in remote areas with only local intranets.

## Enriched information and supporting document repository

Virtual and augmented reality information will help technicians complete their tasks. Wearable glass enables workers to access the relevant information and documentation in a timely and context-aware fashion. This information are user-friendly and can be accessed using voice or gesture based commands. Major features included in document repository are,

- Secure knowledge database
- Hands-free reference of information
- Easy access

## Conclusion

The augmented reality solution with remote video collaboration provides good reduction of expert travel to the maintenance sites and a reduction of repair times. This solution is useful in multiple use cases such as Telemedicine, online training, remote inspection etc.