TECH TALK: HoloLens 2 Headset

The HoloLens 2 is a digital alternative to providing hard copy information/work instructions/work packs.

The table below is intended to be a technology selection decision support tool and not a substitute for business procurement processes. All information is correct at time of last update.

What's in the box	Technical specifications	Set up investment and required skills

What's in the box

Image source: AITI photo stock

Hardware

Manufacturer:	Microsoft
Model and release date:	HoloLens 2 (7 Nov 2019)
Price:	AU$5,090 (ex GST)
Device:	Headset x 1 Recharge cord x 1
Weight:	566g
Battery life:	2–3 hours of active use
Recharge time:	Less than 65 min
Speakers:	Built-in spatial sound
Usage environment:	Indoor use
Compatible with Hardhat:	Available (Trimble)

For more information go to
https://www.microsoft.com/en-us/hololens/buy

Technical specifications

Computer and Connectivity

Security Operation Centre (SOC):	Qualcomm Snapdragon 850 Compute Platform
HPU:	Second-generation custom-built holographic processing unit
Memory:	4-GB LPDDR4x system DRAM
Storage:	64-GB UFS 2.1
Wi-Fi:	Wi-Fi: Wi-Fi 5 (802.11ac 2x2)

Key Features

Hand tracking:	Two-handed fully articulated model, direct manipulation
Voice:	Command and control on-device; natural language with internet connectivity
Eye tracking:	Real-time tracking (2 IR cameras)
Head tracking:	4 visible light cameras
Spatial Mapping:	Real-time environment mesh
Mixed Reality Capture:	Mixed hologram and physical environment photos and video

Set up investment and required skills

Key Compatible Software

- Microsoft Dynamics 365 Guides
- Microsoft Dynamics 365 Remote Assist
- Microsoft Mesh
- 3D Viewer
- Microsoft Edge

Key Knowledge

- Experience with CAD
- Experience with animation software (e.g. Blender)
- Experience with gaming engine (e.g. Unity)

Practical Task Setup
(as experienced by engineers)

- Heavy workload on CAD and animation work; large CAD file size (>100MB) difficult/slow to run
- Relatively quick to do story boarding and task setup (e.g. simple tasks can take only half a day)
- Spatial anchoring of CAD model does not align perfectly every time causing slight deviation of AR objects

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PEOPLE PERSPECTIVE: HoloLens 2 Headset

Task/Environment Suitability	Usability Features	Task/Environment Constraints	Usability Constraints	Key Opportunities & Applications	Guidance for Implementation
Need to be hands-free (e.g. working at height) **Medium information load or complexity** (e.g. involves some reference material, data or drawings) **Need to communicate or capture data in real time** (e.g. input data, take photo or video) **Open or confined space** **Repetitive tasks** (e.g. simple wiring or maintenance work)	**Performance** Functions of interface are well integrated Spatial anchoring of CAD model does not align perfectly every time **Customisation** Accommodates users wearing glasses and has built-in eye calibration to provide good object clarity Adjustable head band for different size heads Built-in gesture familiarisation/practice **Comfort** Light weight & even weight distribution to minimise neck strain **Safety** Hinged visor that moves up/down (i.e. can be flipped up when not using/transiting between locations)	**Accuracy/performance may be reduced by:** Unreliable or weak internet connectivity (e.g. when surrounded by lots of metal/steel) Some outdoor/production environments may reduce contrast sensitivity of interface/impair quality of holographic image (e.g. extreme lighting conditions, rain, dust, sparks, welding arc) Hardware compatibility issues when required to wear other PPE (e.g. masks, other headsets) Software compatibility/ interoperability issues if using multiple apps or systems High information load or complexity (e.g. complex data, drawings or lots of reference documents may lead to less reliable navigation)	**Performance** Moderately high mental effort required to use; frustrations associated with inconsistent recognition of hand/eye gestures and information provided out of field of view Those with fine motor skill deficits may experience significant frustration Requires familiarisation time **Comfort** Extended periods of use may cause eye strain Some users may experience motion sickness Head band would get sweaty in hot conditions **Safety** Restricted field of vision and reduced spatial and situational awareness could result in injury (e.g. augmented objects can obscure real world view at times)	**Quality control/error minimisation** Inspection tasks (e.g. compartment completion, installation, fault finding) Warehouse (picking) Maintenance System activation, operation and commissioning **Training and knowledge transfer** Workplace inductions Ensure correct safety preparation Communicate with remote subject matter experts **Sales** Opportunity for virtual demonstration and use of product	In-depth training required to become adequately familiar with gesture motions and confident with visually searching for augmented information outside immediate field of vision Incrementally extend use time and monitor for discomfort (e.g. headaches) Use may be distracting to others. Consult with and ensure all employees aware of device and its application. Develop appropriate rules and procedures Supervision and IT safeguards need to be considered and in place to ensure appropriate access of information by individual users Ongoing support or access to expertise may be needed if wishing to adapt interface for diverse tasks/ applications

These suggestions are formulated from a human factors research trial examining use of the technology in a brief visual inspection task working at height in a semi-industrial environment. Selection and implementation of a technology should consider the abilities of the person doing the task, the task requirements, and the environment in which the work is to be done.

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