

AUGMENTED REALITY KNOWLEDGE MANAGEMENT

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International Society for Knowledge Organization

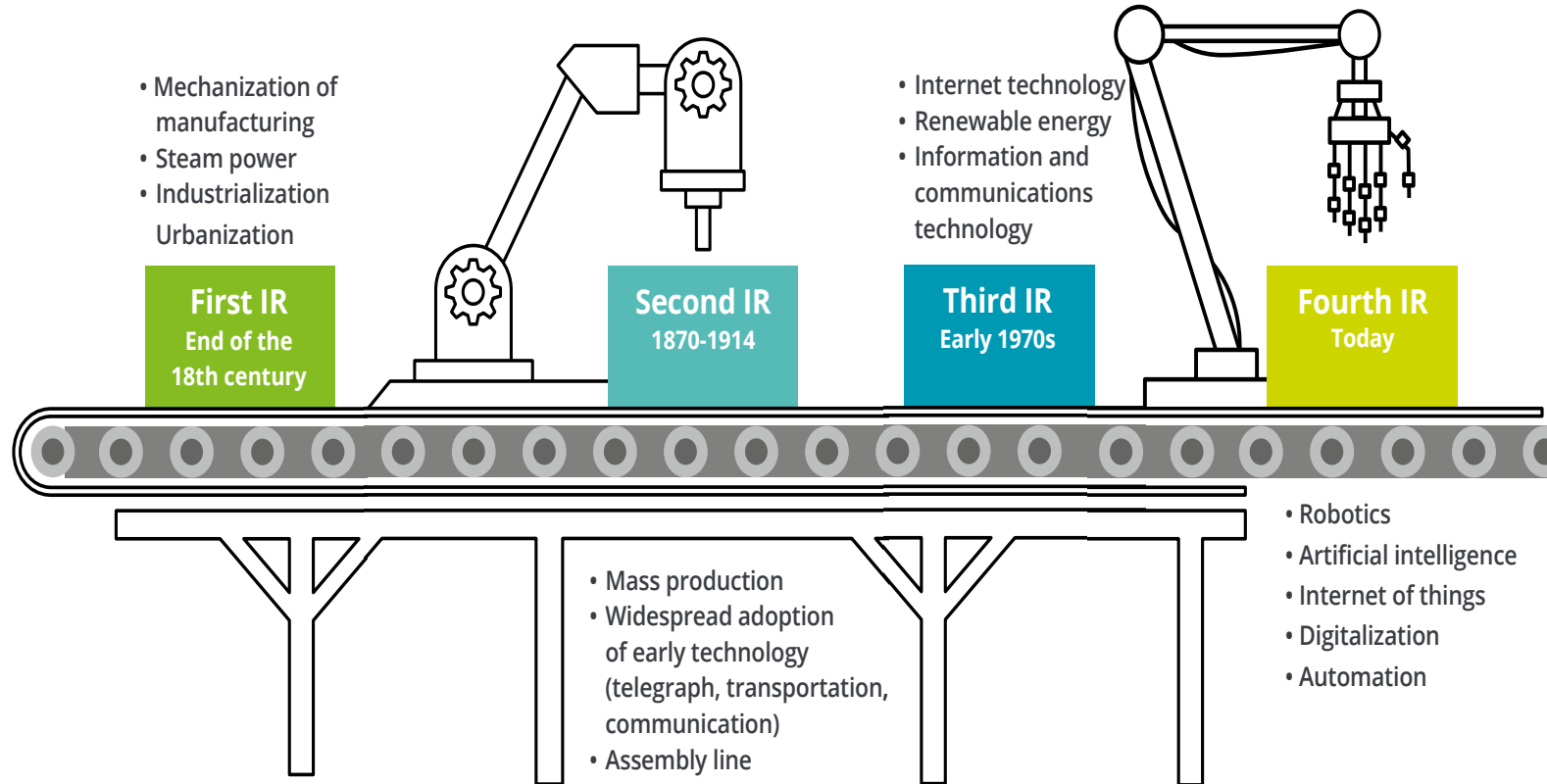
Singapore Chapter



Agenda

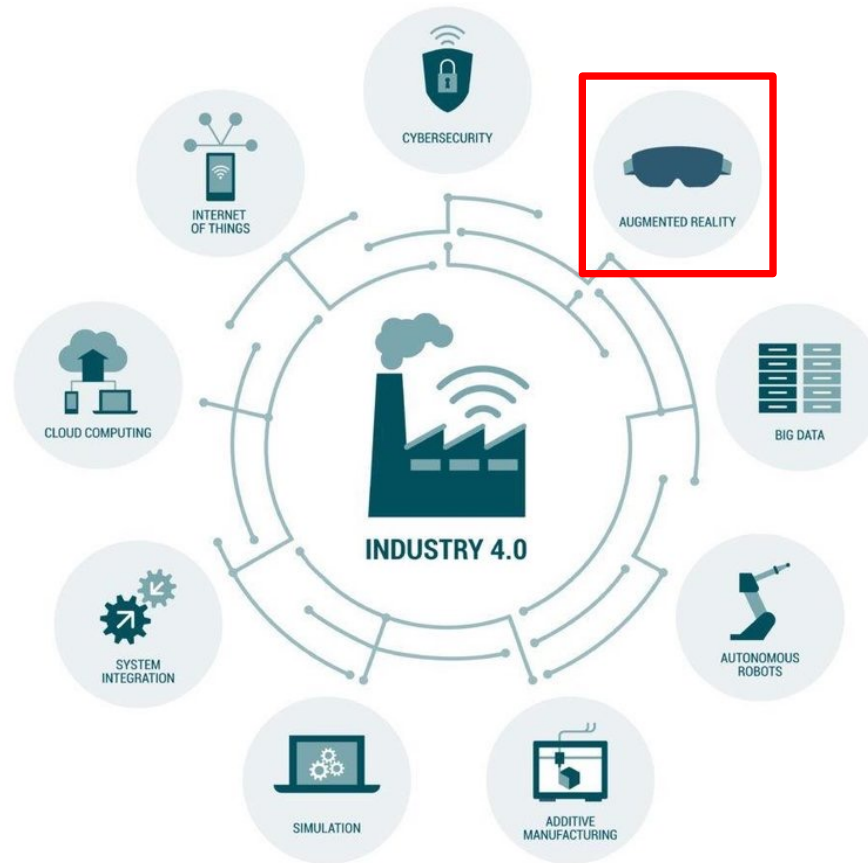
- A brief introduction to Industry 4.0
- Augmented reality (AR) and the use of wearable AR technologies
- Experiences from the oil field (AR use cases from a knowledge transfer perspective)
- Workplace safety and health institute at Singapore's Ministry of Manpower example
- Future KM and AR aspirations.

Industry 4.0



Adapted from: Preparing tomorrow's workforce for the Fourth Industrial Revolution (Deloitte Global)

Industry 4.0



Adapted from: Christopher Nook, The Nine Pillars of Industry 4.0

AR - and the use of wearable AR technologies



aR

AR - and the use of wearable AR technologies

Reality



aR



AR



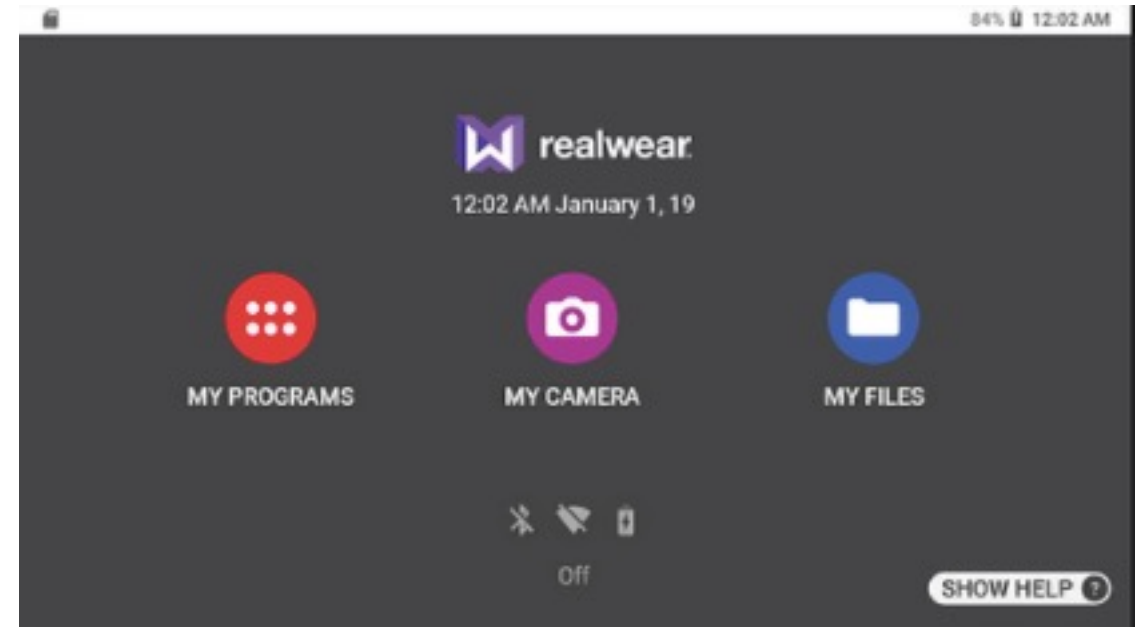
VR

RealWear aR Headset Overview

- Voice operated PPE compatible headset
- Micro display equivalent to a 7" tablet
- IP66 rated and can withstand a 2 meter drop on concrete from any angle



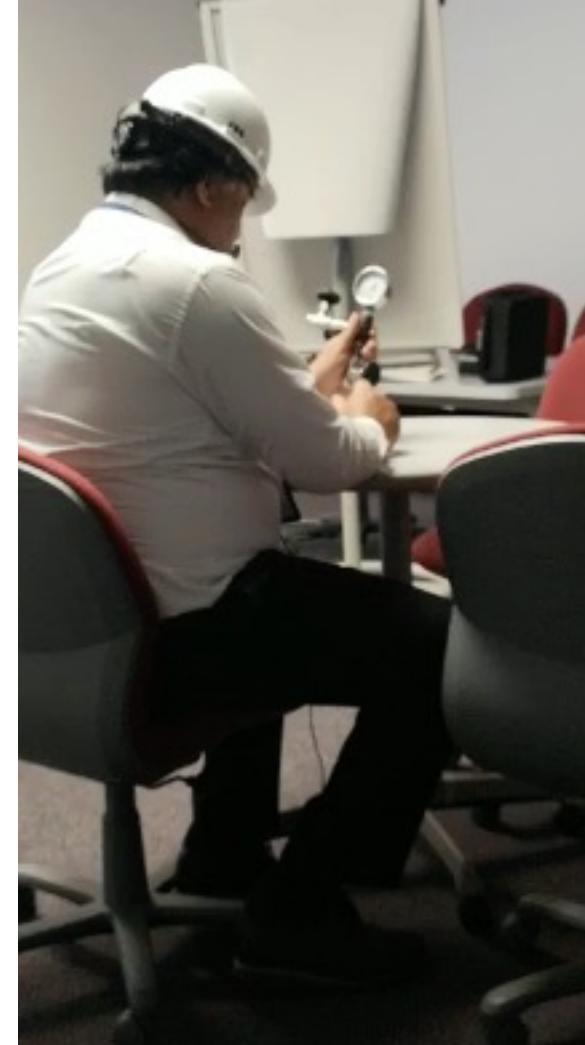
HMT-1



Voice controlled GUI

Experiences from the oil field – proof of concept

- Is AR feasible in the organization?
- Configured headset to work on a 4G network
- Created a script around the basic task of replacing a faulty pressure gauge
- Used this script to develop procedures going forward.



Experiences From the Oil field – Sample Scripts

Broken Gauge Replacement Guide using RealWear Hardware and Vuforia Software

Operating Instructions:

Voice Commands Sequence using RealWear Software:

1. My Programs
2. Capture
3. New Capture
4. Start Capture

Basic script:

In this example we will remove a broken gauge. We will assume it is in service and therefore first make sure the gauge is isolated.

- Step 1: We will begin by isolating the inlet by turning it clockwise until it is closed
- 5. Take photo (optional)
- 6. Next Step
- Step 2: We will then close the outlet, also by turning it clockwise until it is closed
- 7. Take photo (optional)
- 8. Next Step
- Step 3: With the gauge now isolated, we will slowly loosen it to make sure there is no pressure and then turn it anticlockwise at a regular pace until it detaches.
- 9. Repeat sequences 7 and 8 until all the required steps are complete
- 10. Finish Capture
- ENDS CAPTURE
- 11. Speak Filename
- 12. Append or Accept
- 13. Save
- 14. Transfer Capture session to local computer

Augmented Reality Knowledge Capture Process and End-User Script

1. **State the scenario** – We have a work permit, and we are in contact with OSPAS during the procedure (control valves switchover procedure).
2. **Identify the problem** – normally, the control valve output pressure is high. If not controlled in proper way, the output pressure could cause an explosion in the plant or pipelines. This will lead to loss of life and damage to assets, leading to a shut down.
3. **What is needed to fix the problem?**
 - a. Step 1 - Monitor the 2 individual controllers for control valves
 - b. Step 2 – Increase the set point of the standby controller gradually until it approaches the setpoint of the primary controller
 - c. Step 3 – Monitor output pressure from controllers
 - d. Step 4 – Reduce set point for primary controller
 - e. Step 4 – Increase set point for standby controller
 - f. Step 5 – Maintain 3-15 psi for both control valves
 - g. Step 6 – When the standby controller starts to take action and the standby Control Valve starts to open, reduce the primary controller gradually
4. **Reach solution** - Keep increasing the set point for standby controller until you set the jet pressure, while keeping reduce the primary controller until the Control Valve become fully close

Experiences From the Oil field – Abqaiq Pilot

- Goldilocks experience
- Use case for knowledge capture
- Procedures created are accessed by a QR code generated after a completed capture.



ROI

- **Deliverable:** Support the organizations need to capture expert knowledge & transform this into a reusable learning resource.
- Support business continuity
- Time and resources needed for employee training
- Time saved
 - *Currently, a typical process for a 10-minute video capture can take between 2-3 months*



Email SME



Storyboard video –
develop script



Contact RT Media
share storyboard &
script



RT Media arrange date
for shoot & access
requests



Capture and editing –
including voiceover



Content review
with SME



Publish content to
Shahed

Using wearables, we can get this time down to under 3 days.

Workplace safety and health institute at Singapore's Ministry of Manpower example



Near-miss-slipID: 410

Await Response

from_id: 12510



NA

14 Jan 2021 04:49 PM

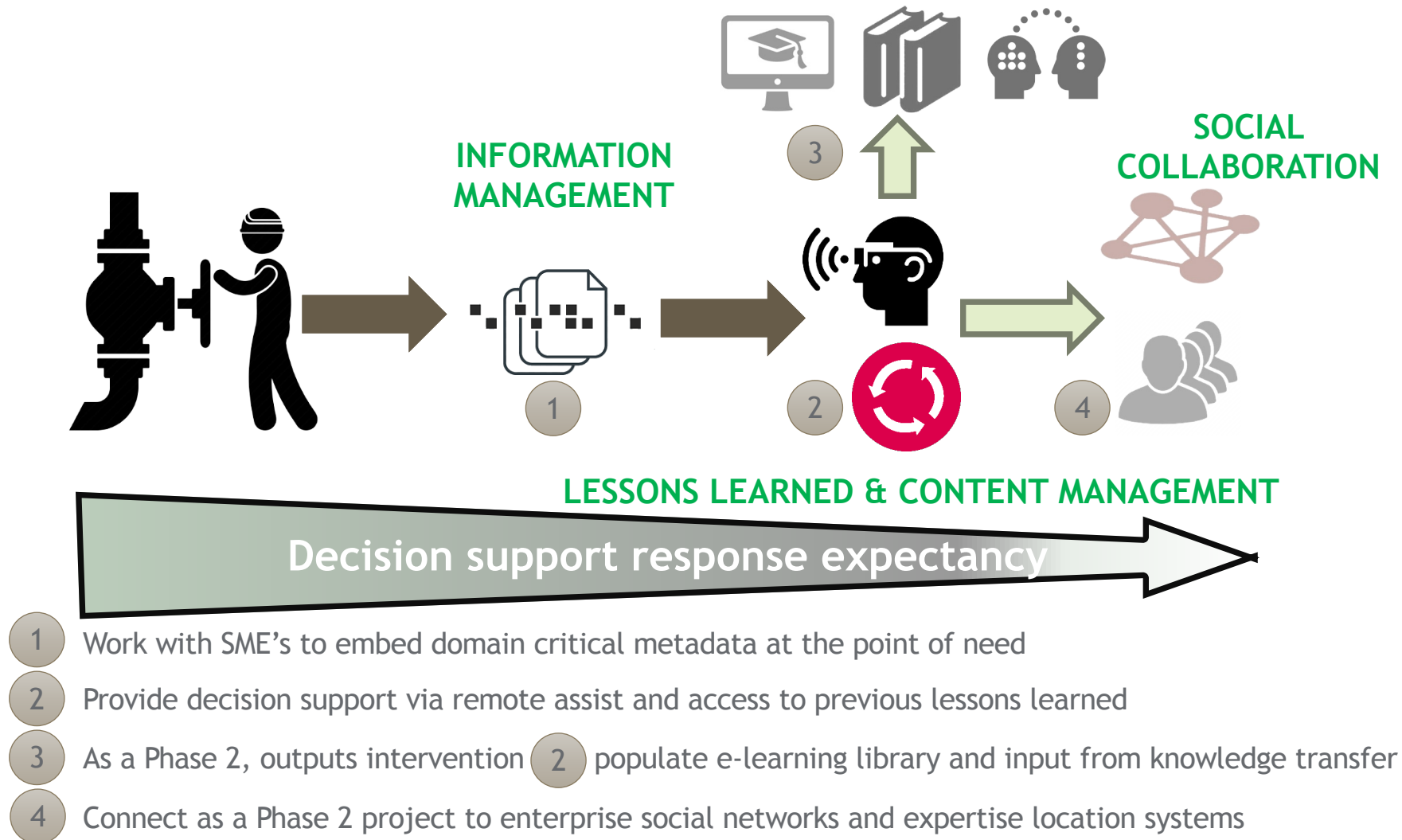
WILL ACT ON IT NOW

WILL NEED MORE TIME

FALSE ALARM

INCIDENT REPORT

Future KM-AR aspirations



KM-AR aspirations summarized

- Use AR as a vehicle to implement and embed KM principles:
 - *IM principles, through the efficient tagging of information at the point of need*
 - *Capture multimedia lessons learned for reuse*
 - *Connect to Enterprise 2.0 tools i.e. social software, expertise location and enterprise social networks to reach a greater breadth of knowledge providers.*
 - *The heart of most successful KM initiatives - people change*

Adoption challenges and lessons learned

■ Barriers

- *Hazardous environments*
- *Noisy Environments*
- *Cloud averseness*
- *Working with non-techies*
- *Internal I.T ☹*

■ Lessons Learned

- *Start with the business challenge (duh)*
- *Create a minimum viable product asap*
- *Be confident about the value KM can bring*

■ Continue the conversation...

- *“Knowledge Enhanced Augmented Reality”*
- *Contact me: arshad@intotok.com, intotok@gmail.com*



KE.AR
Knowledge at your fingertips

Thank you and questions?



KE.AR

Knowledge at your fingertips

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Why?

- Increases operator productivity, by supporting effective decision making - embedding mission critical knowledge at the point of need
- Acts as a gateway to key knowledge sources (SME profiles, knowledge bases & lessons learned)
- Reduces risk in environments, such as HSE by reducing LTI's and insurance premiums.

How?

- Focus initially on Industrial use cases (i.e. facilities, maintenance & production operation)
- Select AR software and hardware solutions. Conduct POC in a low-profile area of the organisation
- Work with subject matter experts to demonstrate success on a discrete Aramco business challenge
- Move to larger scale implementation, taking into account the strategic goals, scope, change management and measures of success in the longer term.

Deliverables

- Vetted use case documents with the business area and approved in conjunction with them
- Successfully completed pilot in a business area
- Large scale business proposal or plan.