

AK AUGMENTED KNOWLEDGE

Augmenting Human Intelligence

Company Overview

Augmented Knowledge Corp. / 2016. 11. 16

(22212) 3rd Floor, Inha Dream Center Bldg #1, 100 Inha-ro,
Michuhol-gu, Incheon, South Korea

CEO & Founder Kevin Jo / GeunSik Jo Ph.D in Computer Science,
(Current) Professor at Inha University
The Graduate Center of City University of New
York/Ph.D

Solution IAR-MAP
Intelligent Augmented Reality Maintenance Platform
: AR/AI integrated B2B oriented platform that push information
automatically from server across parts (parts identification, cross-
referenced technical documents, work procedures, legacy
information) through AR device to guide workers

Providing Contextual Knowledge for workers

- AI Knowledge Manager
- AR Contents Creator
- Augmented Knowledge Viewer

Authentication Venture Company(No. 20190300202, March 2019)

Affiliated laboratory Augmented Knowledge Lab.
(No. 2017112764 / KOITA)
Inha Univ. AI Lab. (<http://ailab.inha.ac.kr>)

Augmented Knowledge Corp.

Empirical Research 2008~2012

- Empirical Research: IAR Project
(Korean Air/USC/AIRBUS)
- 30% Reduction in maintenance time



TIPS & Seed Funding 2017

- Mar Venture Certified (20170300088)
- Apr Seed round 2
(by SparkLabs Global Management)
- May Selected for TIPS Program (TIPA)
- Jun SparkLabs Demoday 9 & IR
- Nov The 2nd National Defense
ICT/SW Conference
- Dec SparkLabs Demoday 10



Pilot Test 2019

- Feb. Aviation Festival Asia(Singapore)
- May. Aviation Festival Americas(USA)
Augmented World Expo(USA)
Seoul VR/AR Expo(Korea)
- Jul. AI Expo Korea 2019
- Sep. Selected for Incheon VR/AR
contents development
- Nov. GMV 2019 (KINTEX)
- Nov. AR manual prototype
for fault response (D company)
- Nov. Selected for TIPS Overseas Marketing
Funding Support



2016 Business Corporation

- Nov Established (Spin-off from Inha Univ. AI Lab)
- Dec Seed round 1
(by SparkLabs Global Management)



2018 Partnership & Exhibition

- Mar. Mutual NDA (MotionWerX)
- Apr. Born2Global member company
- May. AWE USA 2018 EXPO Exhibition
(Santa Clara, U.S.)
- Jun. Techsause Global Summit
(Bangkok, Thailand)
- Jul. AI Expo Korea 2018
Busan AR Festival 2018
- Nov. Mutual NDA(Leon Global Trading)
- Dec. Applied to Bearing manufacturing
machines

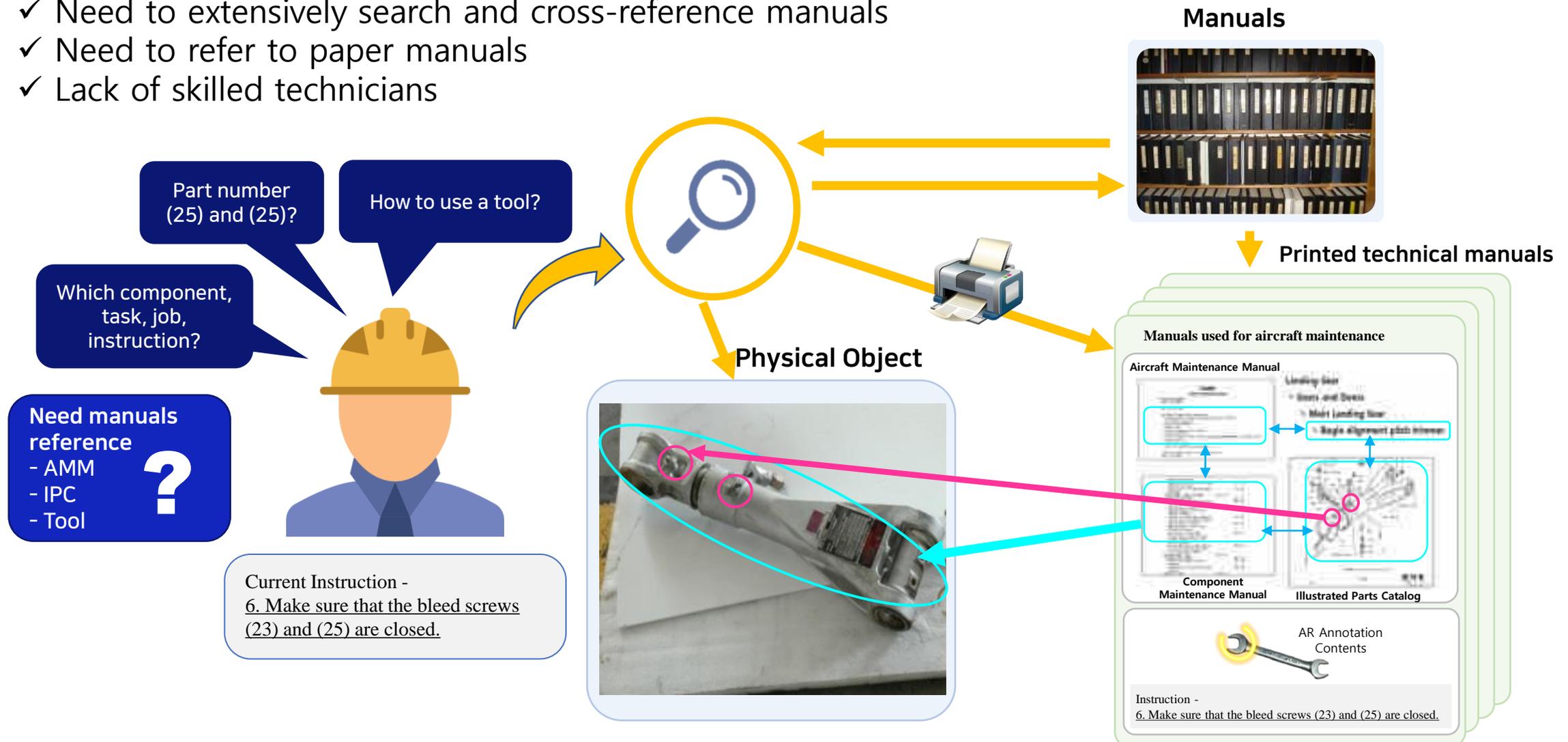


2020 Commercialization

- Apr. Selected for Incheon VR/AR
unified contents project demonstration
- May. Selected for Realistic Contents Development
(RAPA)

Current Workflow(Aviation MRO) - Manuals Separated from Reality

- Environment where documentation need to be referenced while working
 - ✓ Need to extensively search and cross-reference manuals
 - ✓ Need to refer to paper manuals
 - ✓ Lack of skilled technicians



Why applying AR contents for industries is difficult?

Simple Graphical Augmentation is not enough



Complexity of pre-built information/legacy manuals and high-cost of AR contents creation



Manuals should be cross-referenced with a context-awareness, to understand a simple command



Too many apps - Manuals do not fit in a glass

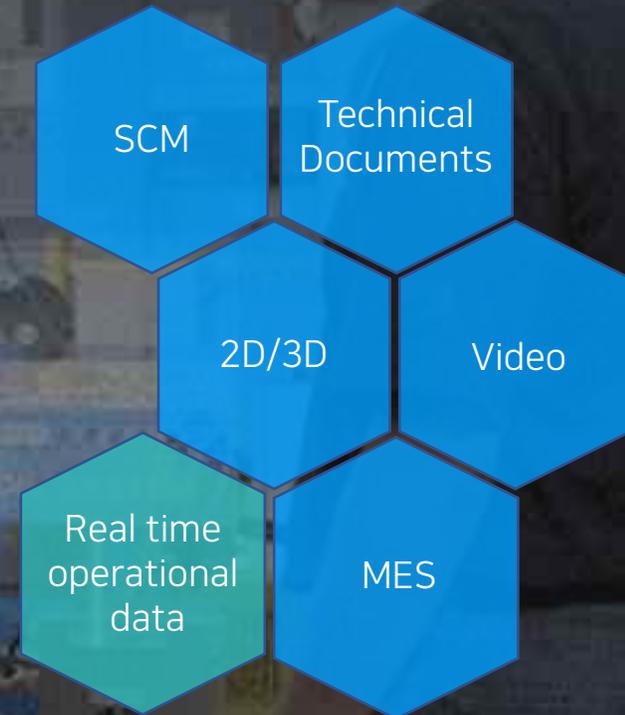


Industrial XR – Smart Factory Digital Twin

Augmented Knowledge has the Solution for Integrating Augmented Reality (new technology) with B2B information (legacy systems)

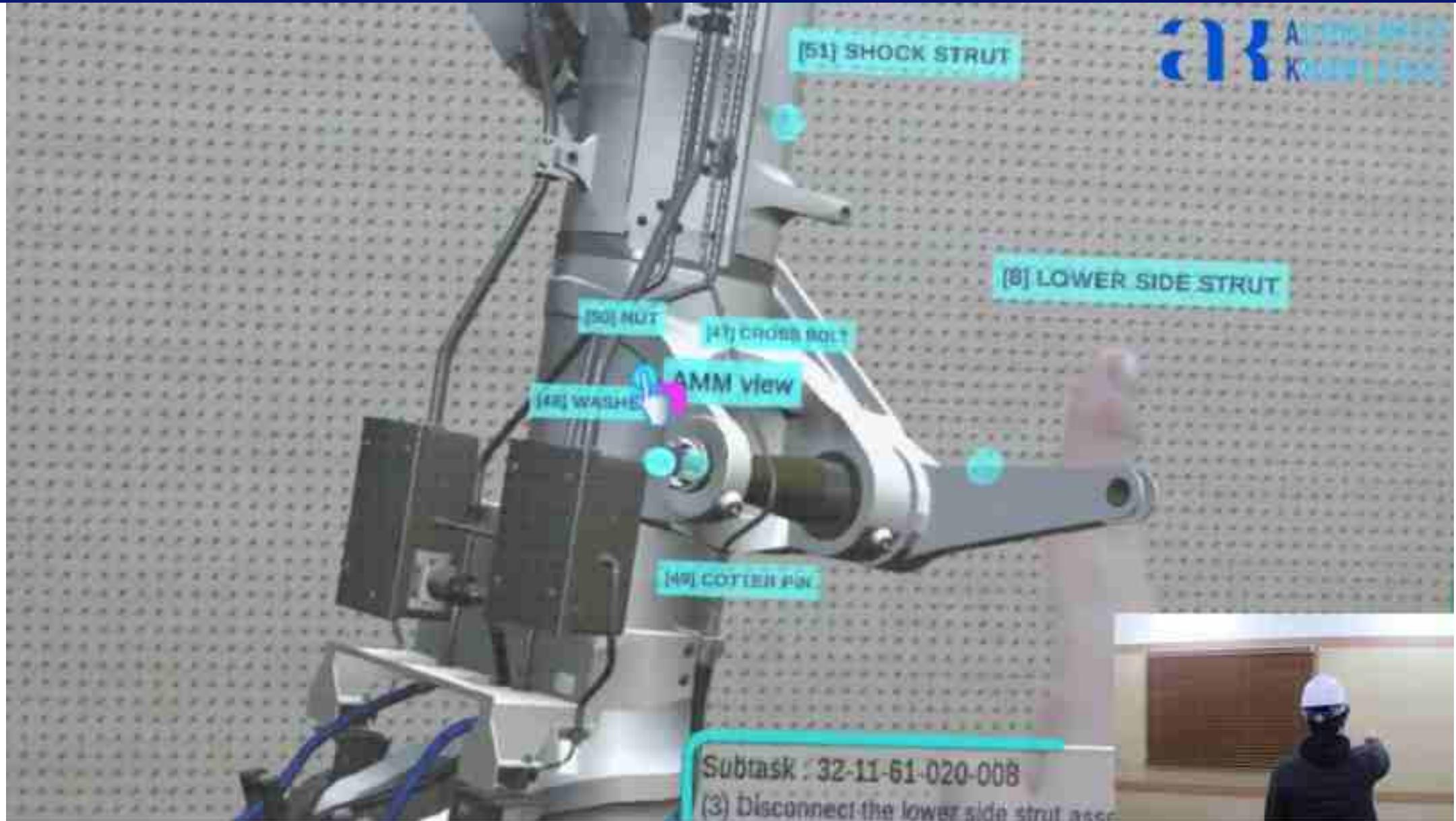


LEGACY INFORMATION



IOT DATA

Platform Demo (3D) – Aircraft Maintenance for Education with HoloLens



Platform Demo(3D) – Aircraft Maintenance with HoloLens

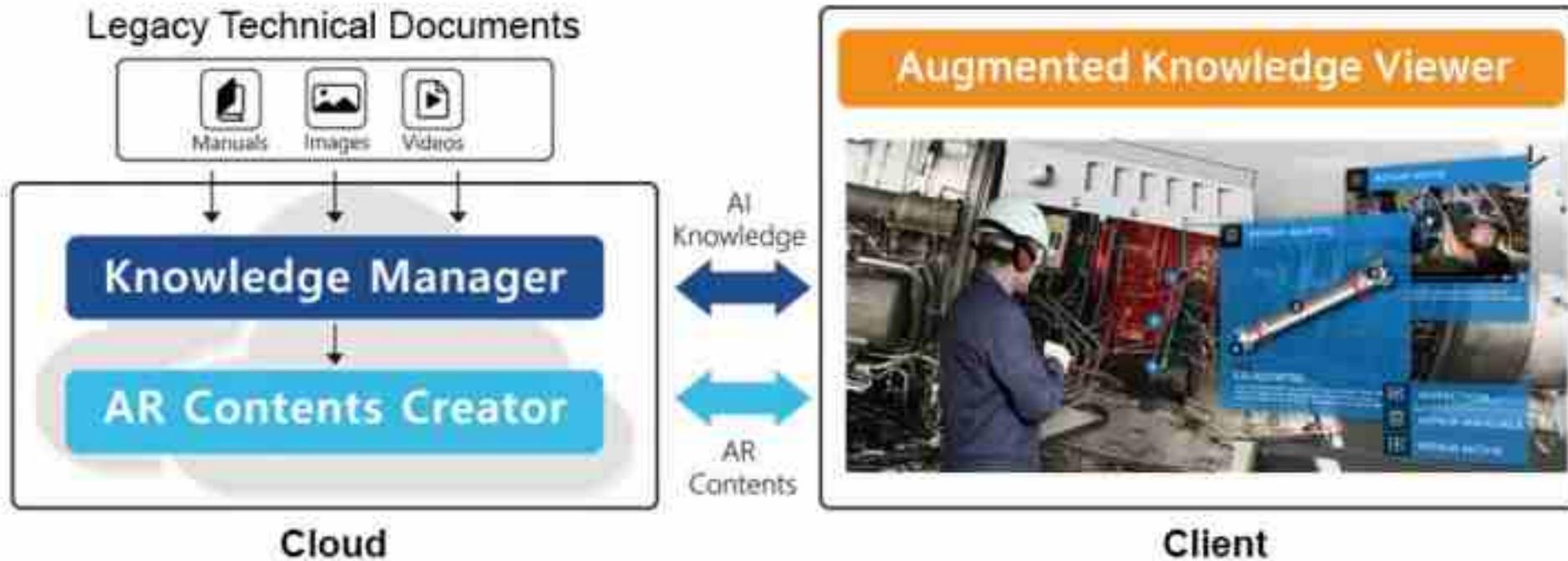


[Demo Video Link: <https://youtu.be/oaM5ZVy3KuI>]

Solution (IAR-MAP) : Knowledge based AR

Unified framework for augmented reality and knowledge

Patent: 1 US("Unifying Augmented Reality and Big Data"), 1 EU, 3 KR



AI Knowledge + AR Contents → Augmented Knowledge

Solution (IAR-MAP) : Knowledge based AR

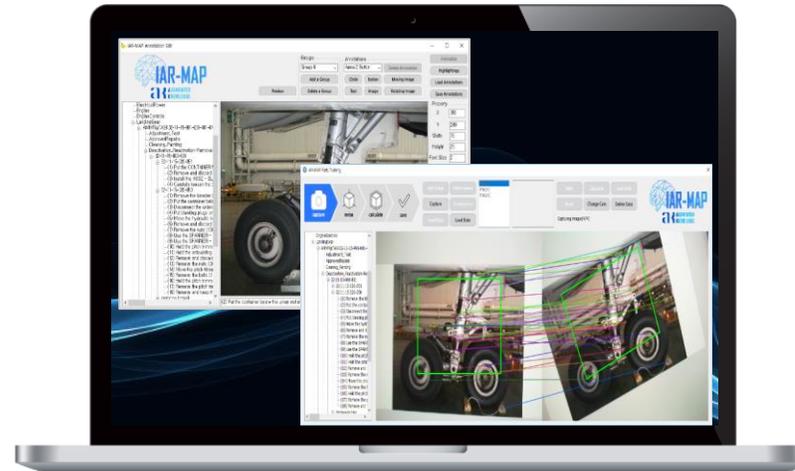
Knowledge Manager

Converts technical manuals (SGML format) into knowledge graph



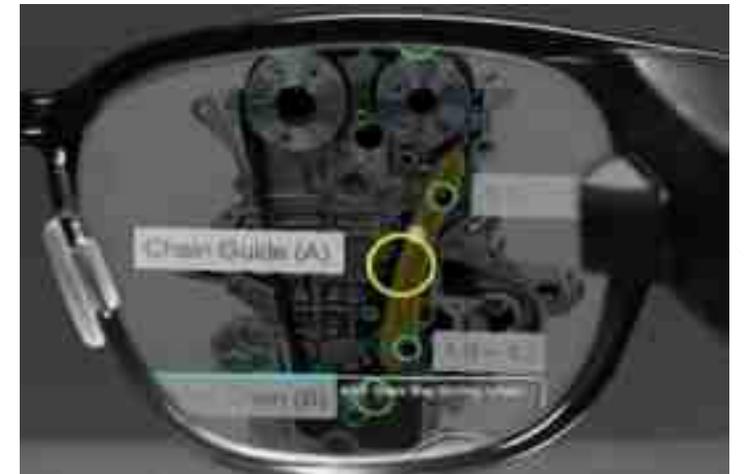
AR Contents Creator

Create AR contents in effective way and connect information with AR contents



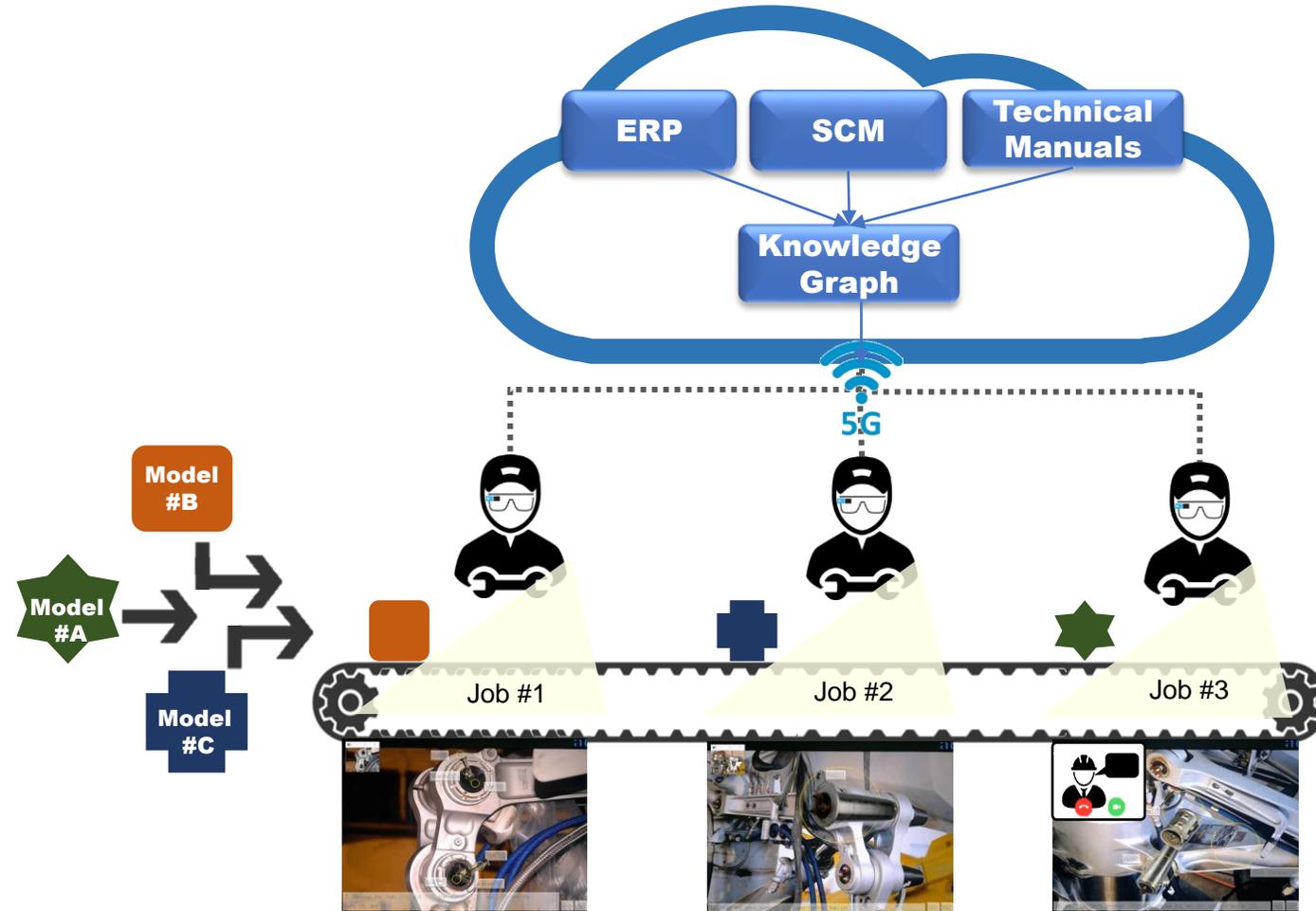
AR Viewer

Pushes information automatically from server and overlays AR contents across parts through AR device.



Solution (IAR-MAP) : Knowledge based AR

Supervisor manages and assigns job to each worker through IAR Server –
Technical manuals and instructions are overlaid automatically according to each technician job



Solution-Remote Maintenance

Industrial AR Manual Guide and Remote Maintenance Support

- Working situation video sharing between on-site worker and remote expert
- Automatically overlay and share manual (AR Guide) according to work situation
- Support AR glass, tablet/smartphone (Android) according to customers working environment



Machine/
Equipment



Augmented
Knowledge
Remote

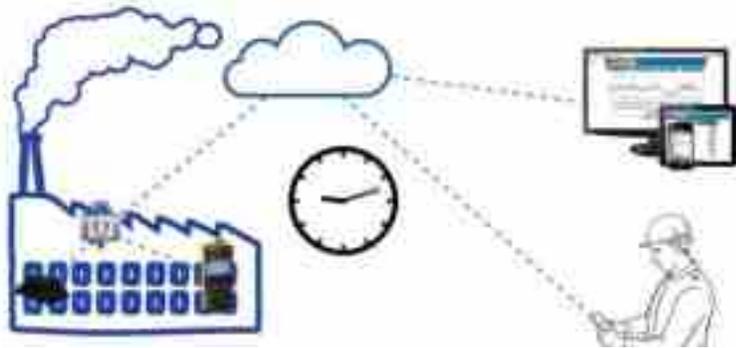


AR Guide

- AR Guide for Preventive Maintenance
- AR Guide for Fault Response
- Working Situation Remote Sharing
- Real Time Remote Support
- Education/Training

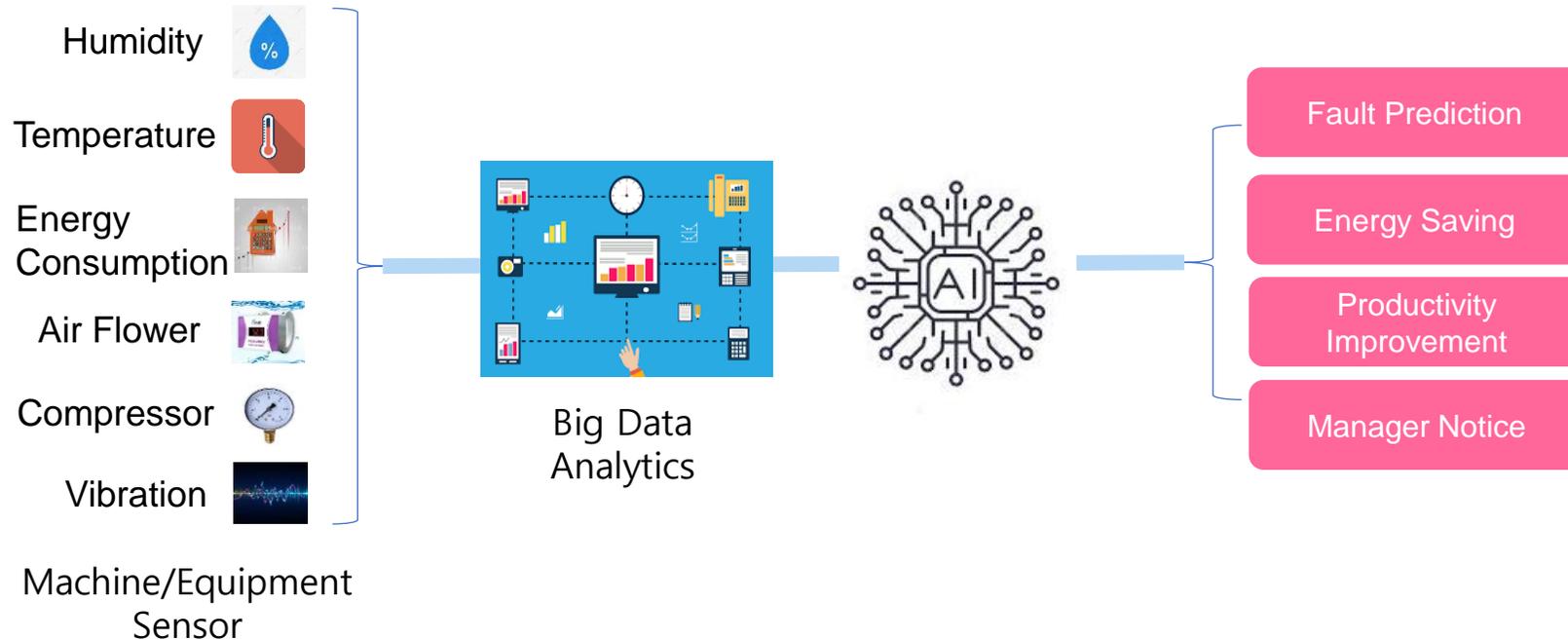
On-site Work Efficiency
Reduced Expert's Business Trip Expense
Reduced Education/Training Cost
Reduce Time/Cost

Solution – Predictive Maintenance



Predictive Maintenance Support

- Failure prediction through big data analysis collected by sensors
- Automatically augments AR guide for fault response
- Linked with remote maintenance
- Support AR glass, tablet/smartphone (Android) according to customers working environment

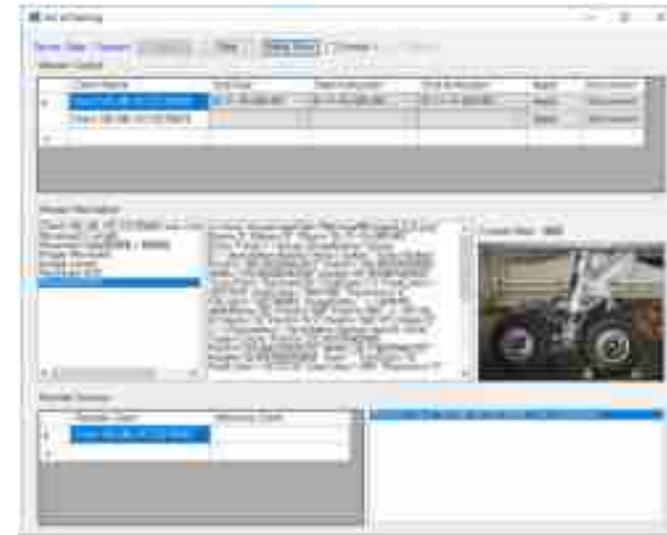


Completed Platform Commercialization through Government R&D Project

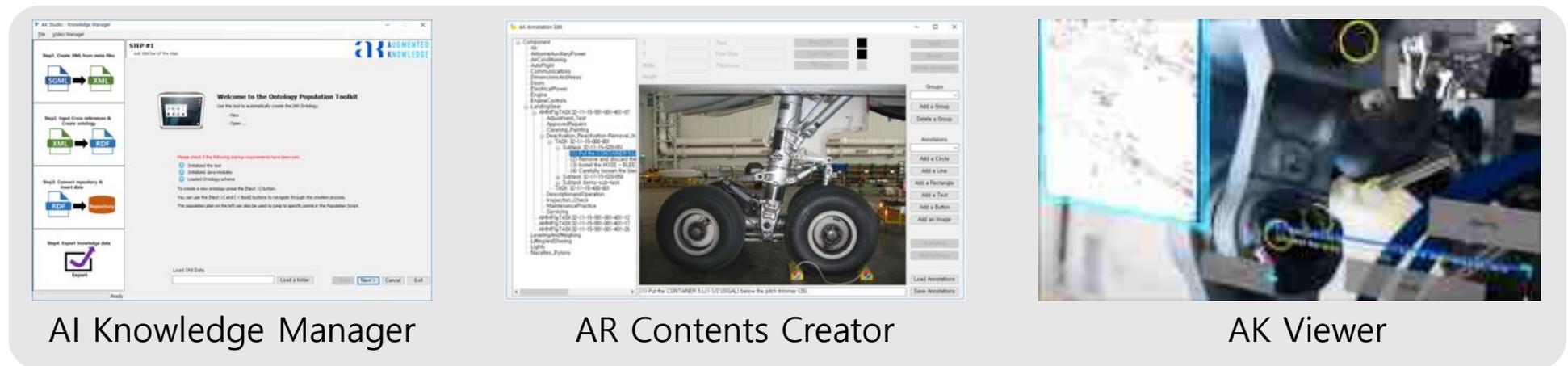
TIPS program (Tech Incubator Program for Startup)

- Project Name: Intelligent Platform Development for Augmented Reality and Legacy Information Unification
- Period: 2017.05~2019.10.
- Funding: 625,2 million KRW
(Government Support: 500 million KRW)

Patent Application: 1 US, 1 CN
4 programs



IAR Server



USE CASE – Machinery Field Area (1)

Disassembly and assembly of bearings manufacturing machine

Recognize the current work context, and automatically display the instruction and video guide on the tablet device

Reason for introduction

- ✓ lack of skilled workers, high wages

License

IAR-MAP Standard

- ✓ IAR Viewer for Tablet
- ✓ Contents Building Service



[Demo Video Link: <https://youtu.be/VdXKws7DWBg>]

USE CASE – Machinery Field Area (2)

■ AR Manual for Heavy Machineries Fault Response

Automatically display error code, AR guide and manual on tablet device for heavy machineries fault response

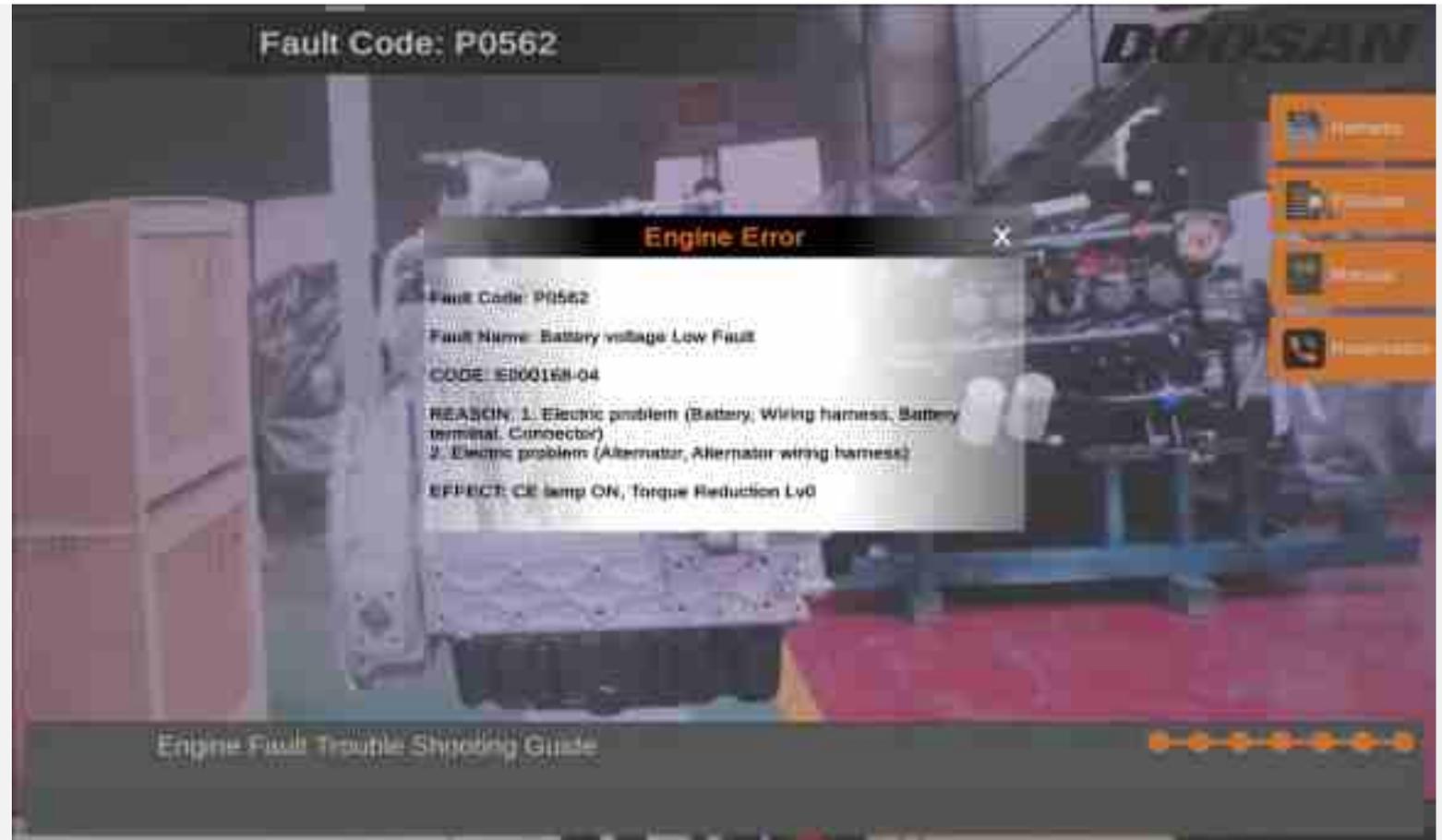
■ Customer

Doosan Infracore (Hancom MDS)

■ License

IAR-MAP Standard License

- ✓ IAR Viewer for Tablet
- ✓ Contents Building Service



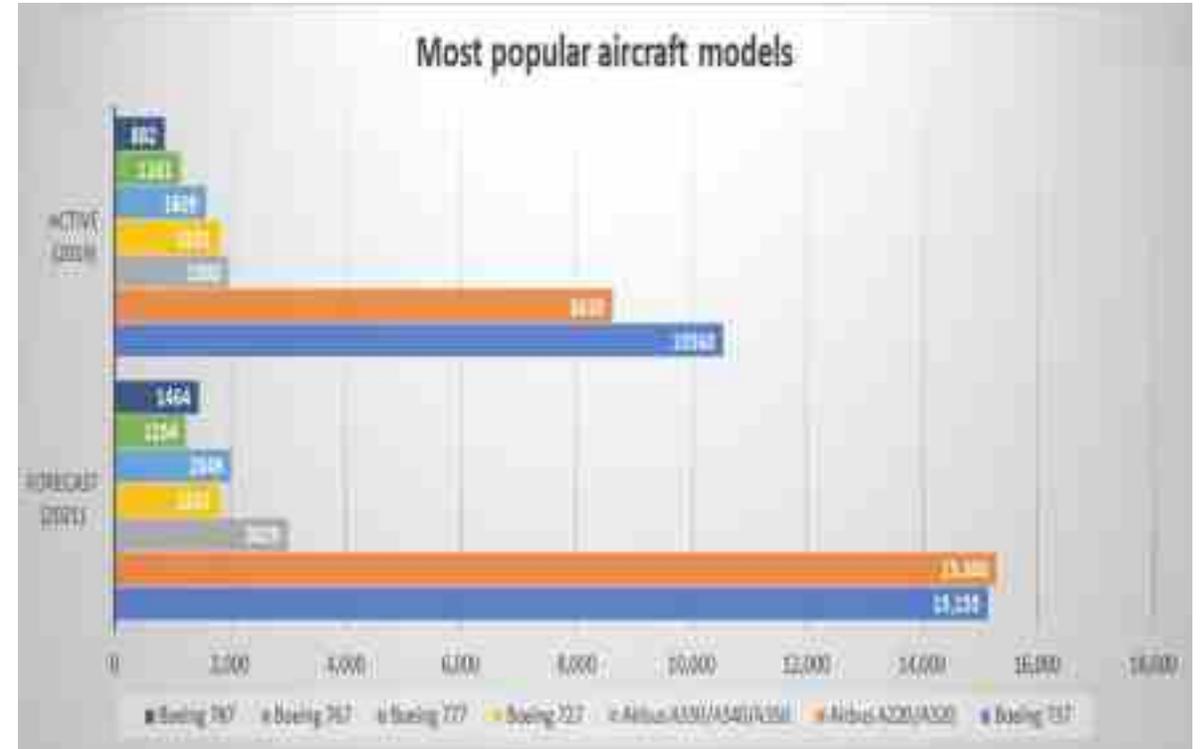
[Demo Video Link : <https://youtu.be/9Nst-9YXwmc>]

Building AR Contents and PoC for Aircraft Maintenance Education (Ongoing)

SharptechnicsK Corp.(Incheon Yeongjong Aviation MRO Complex)
Boeing B737 landing gear assembly/disassembly



Plane model with highest demand in the world : B737
2019: 10,560 planes → 2021: 15,155 planes



[Source] Boeing(Active fleets report, August 2019)
and Airbus(Orders and Deliveries, August 2019)

Building AR Contents for Aircraft Maintenance(Ongoing)

- RAPA Realistic Content Lab Project
 - Funding: 1B for 5 years (starting from 2020)
- Korean Air (Bucheon Maintenance Base)
 - Developing education contents for B737 engine installation/removal process
 - 1st stage of contents development for B737 CFM ENG Fan Blade & LRU part (N2 Speed sensor/Starter) installation/removal
 - Developing Digital Twin based on completed B737 Engine VR/AR contents



Market Entry Strategy – General Industry Area

- Possessed platform generalization (remote AR guide)
- Initial market entry by utilizing government support
- Marketing through possessed network (Namdong Smart Industrial Complex, Incheon Promising Enterprise Association)



TOP ENGINEERING

POSCO



Business Model Realization & Business Acceleration

Test Bed Application

Best Practice Completed

Utilize Government Support Project

Technology development for on-demand smart factory

Incheon Namdong National Industrial Complex Smart Industrial Complex Business Group

Inha University Industry-Academic Cooperation, Incheon Techno Park, KITECH, Incheon Smart City, Namdong District

Incheon Promising Enterprise Association
(Park Yung Dae/Chairman) Member

Daesung SI
INHA IT Hub Network

Market Entry Strategy – Aviation MRO Area



R&D Development Completed

TIPS (Tech Incubator Program for Startup) Program
-Operator: Sparklab
-Project Budget: 625 million won
-Project Period: 2017.05~2019.10
-IAR-MAP Solution Development: AI Knowledge Manager, AR Contents Creator, AK Viewer

Advancement and Demonstration of AR Contents for Aviation Maintenance Education & On-site Aviation Maintenance

(Project supported by government) – Selected for project

Incheon VRAR Unified Contents Demonstration and Development Project
-Project Budget: 200 million won (duration: 7 months, 2020.05~2020.11)
-Consortium: Augmented Knowledge Corp., Sharptechnics K (company specialize in Aviation MRO)

Development of AI based MR Contents for Aviation Maintenance Training

(Project supported by government) – Selected for project

RAPA Realistic Contents Lab Project (5 years)
-Project Budget: 1st step, 200 million won (duration: 8months, 2020.05~2020.11)
-Consortium: Inha University AI Lab, Augmented Knowledge Corp.

Completed AR Contents Prototype for Aviation Maintenance

Incheon VR*AR base center, VR*AR Contents Development Project
- Project Budget: 160 million won
-Project Period: 2019.11~2019.12
-Cooperation with Aviation MRO Company (Sharptechnics K)
-Advised by aviation maintenance expert, Shin Jun Dong (Korea Polytechnics) and 2 others people that have more than 25 years of experience

Enter Aviation Maintenance Education Market

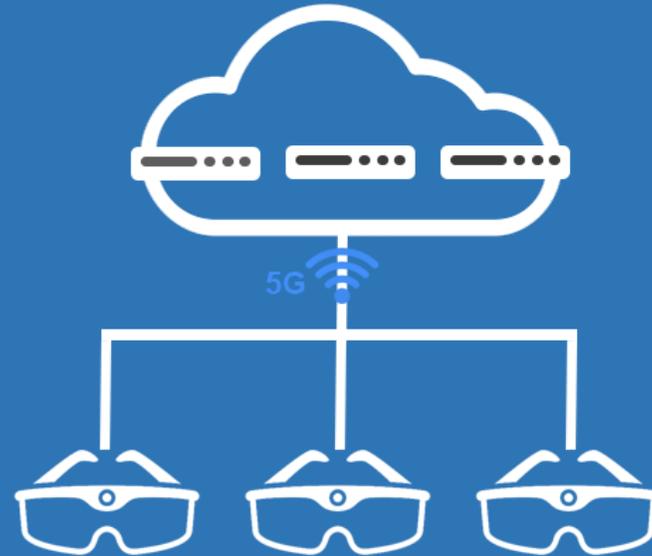
Korea Polytechnics Tender Preparation (2020.07)
Jungseok Aviation High School, Broward College

Business Model



AR Contents Building Service

AR Contents Building Cost



AR Platform Licensing

S/W license according
to number of
connected clients



Platform Licensing for AR Device Manufacturers

AR SW Platform
for Manufacturers

Vision – Industry Innovation: AR supported by AI Knowledge

Context-Aware AR computing with the Contextual Knowledge
(IoT & AR and AI together)

Aircraft Maintenance Training → On-site Maintenance Platform Service



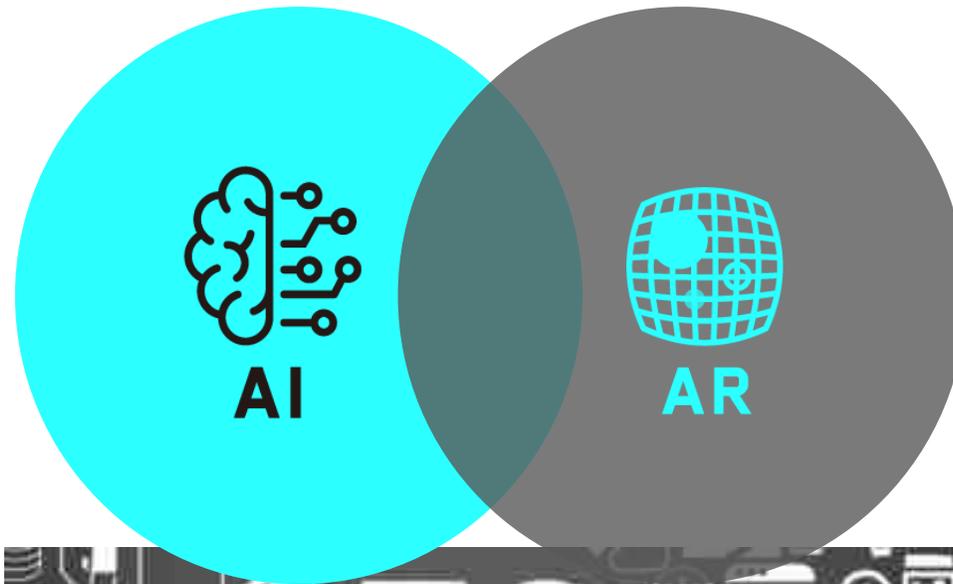
Military



Training / Education



Medical industry



Remote maintenance



Manufacturing / Facility



Logistics (Warehouse)



THANK YOU

