



Acquisition Directorate

Research & Development Center

Augmented Reality for CG Mission Support Market Research/Technology Assessment

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UNCLAS | CG-926 RDC | Mr. Robert Taylor
FORCECOM | December 2018



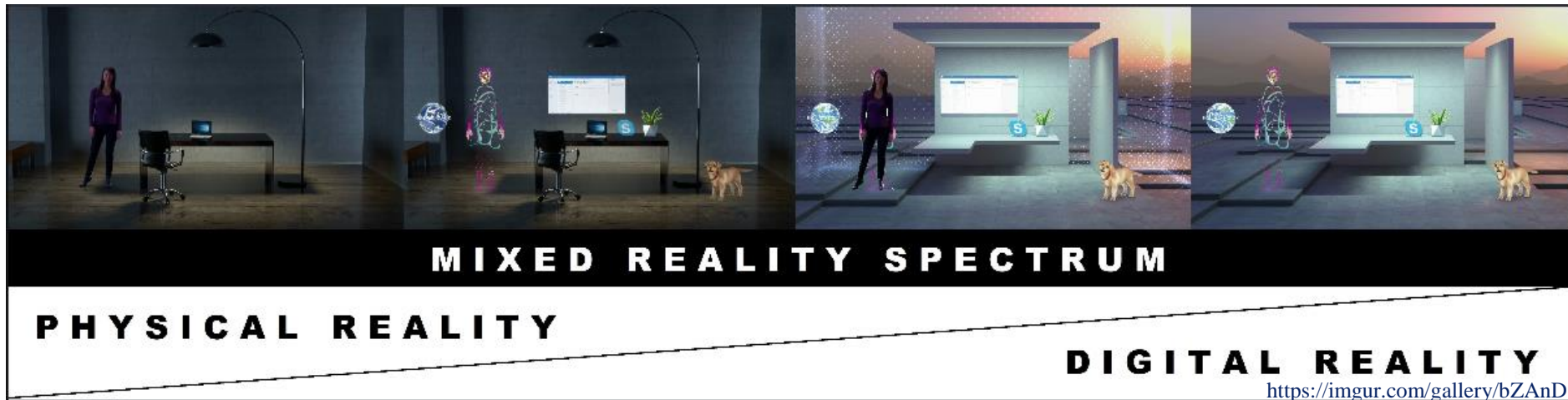


Outline

- What is Augmented Reality (AR)?
- Project Genesis
- Technologies Assessed
- Market State
- USCG Mission Support Use Case
- USCG Academy's Augmented Reality Cadet Capstone Project
- Agile Scrum Development Strategy
- RDC's Augmented Reality Development
- Defense Logistics Agency (DLA) Contracting Vehicle
- Field Testing and User Evaluation
- RDC Augmented Reality Project Path



What is Augmented Reality (AR)?



Real World

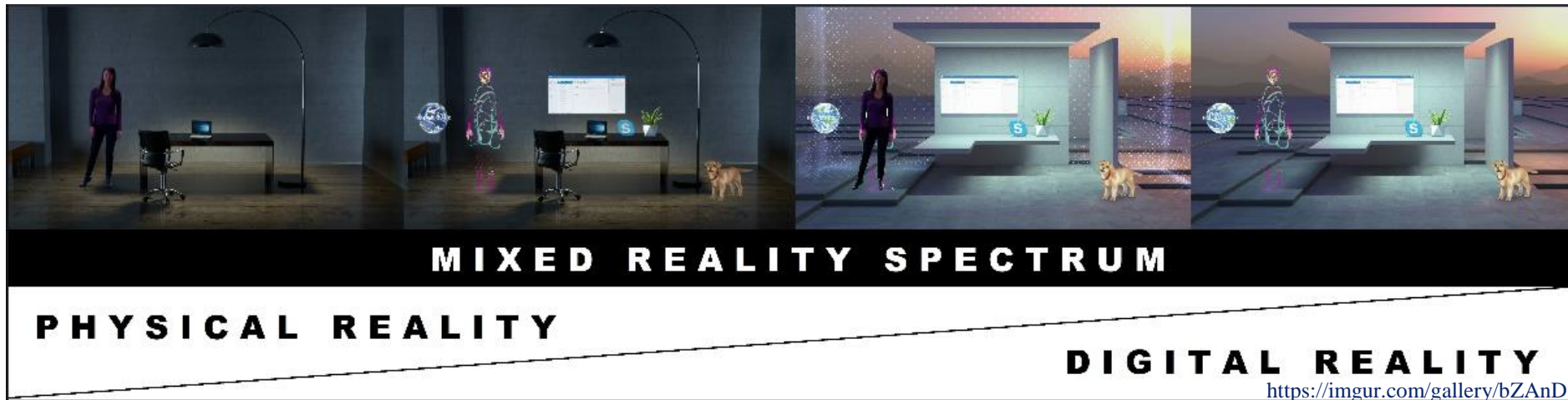
Augmented Reality

Augmented Virtuality

Virtual Reality



What is Augmented Reality (AR)?



Real World

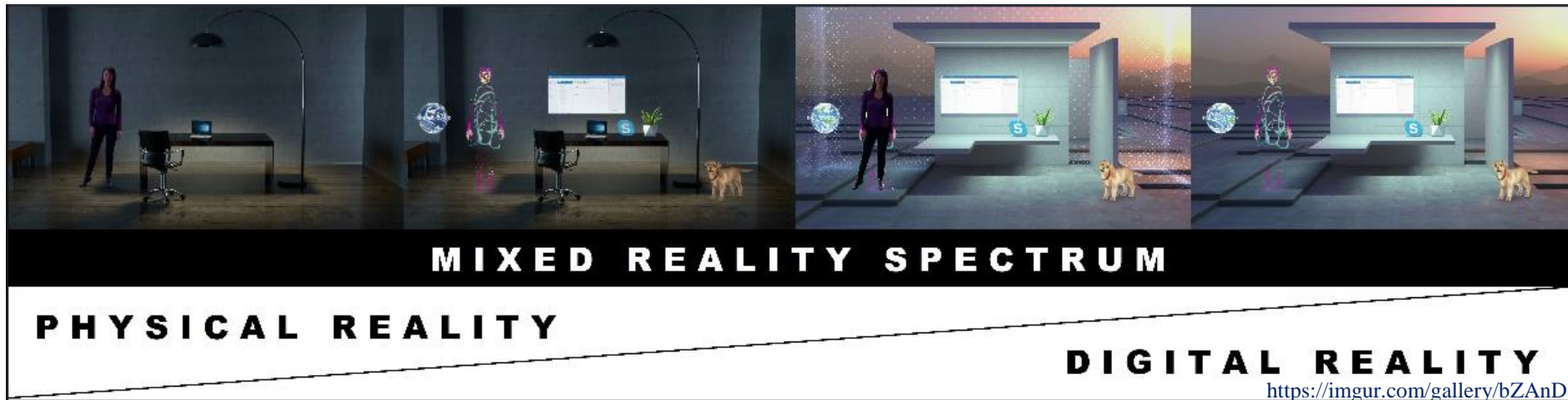
Augmented Reality →

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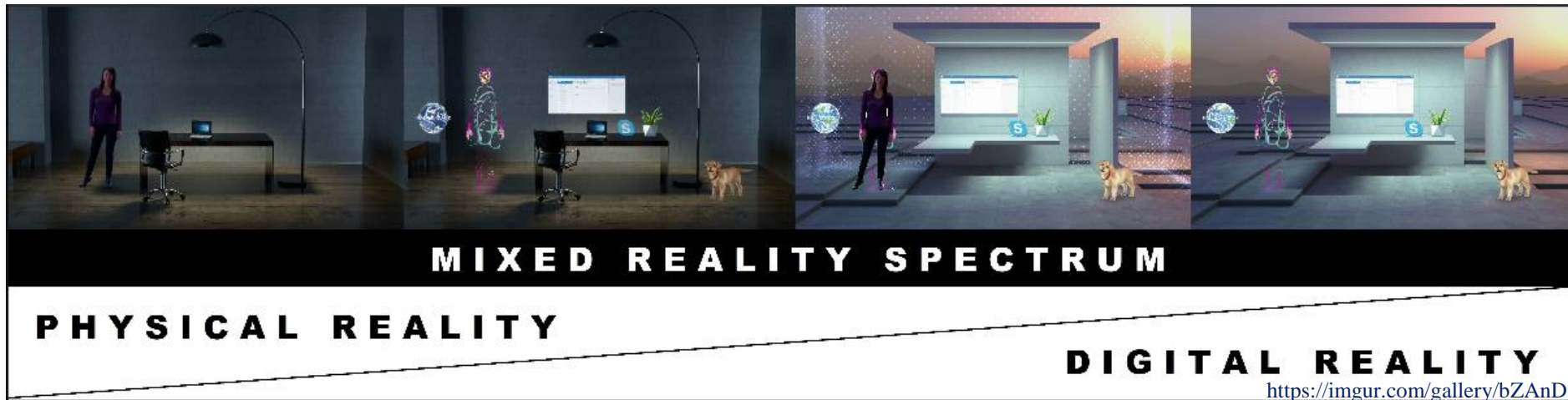
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What is Augmented Reality (AR)?



Real World

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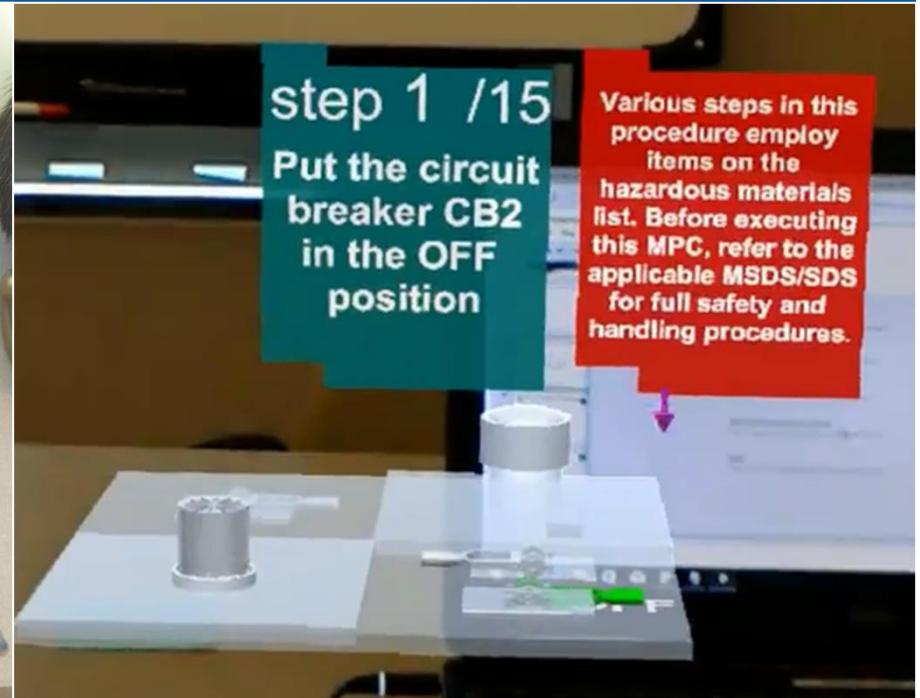
Project Genesis

THE ISSUE

The Coast Guard decided to research Augmented Reality (AR) as maintenance and training aids for air, surface, and shore maintenance programs. Project goals were to reduce labor burden on technicians by providing technical information via AR technology and to increase the availability of assets by improving maintenance efficiency. No AR research or testing had been conducted previously at the Research and Development Center (RDC).



Ms. Theresa Wagner, RDC 2017 STEM Intern from NJ Institute of Technology



Technologies Assessed 2017

Epson Moverio BT-300



Vuzix M300



Meta 2



Sony
Smarteyeglass



Google Glass



Icis Shima



ODG M-7



Microsoft HoloLens

Technologies Assessed 2017



2017 DoD Maintenance Symposium, Salt Lake City, UT Microsoft HoloLens



RDC showcases and explores AR solutions | CG-4 demonstrates Boeing AR solution



Market State 2018

Microsoft
Technology
Centers



AR Solutions for Manufacturing

Increase technician proficiency, maximize manufacturing output, and reduce assembly errors.

UP  SKILL

AVATAR
PARTNERS

Harvard Business Review

ARTICLE COLLECTION

A Manager's Guide to Augmented Reality

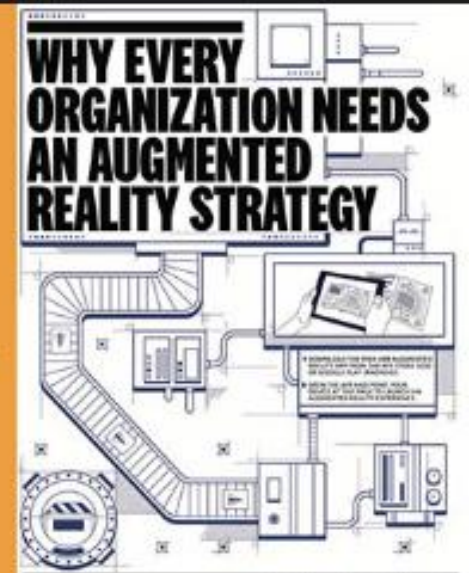
Why Every Organization Needs an Augmented Reality Strategy
by Marshall E. Meyer and James E. Davenport

How Does Augmented Reality Work?
The key is a digital twin.

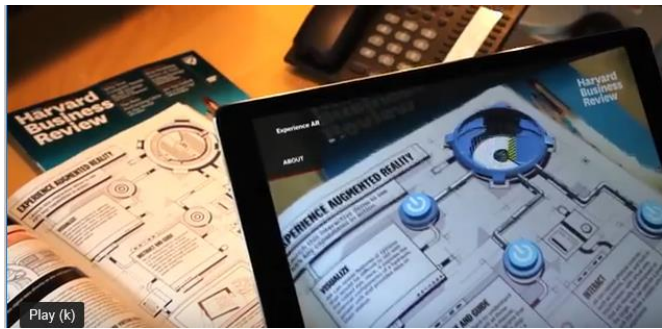
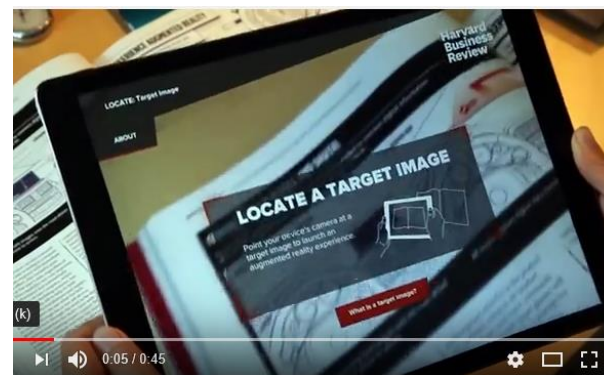
Augmented Reality in the Real World
Companies are learning and starting.

One Company's Experience with AR
A conversation with ABB's chief digital officer, Gunnar Stenel, by Andrew Hesse.

The Battle of the Smart Glasses
Hype is giving way to disappointment.

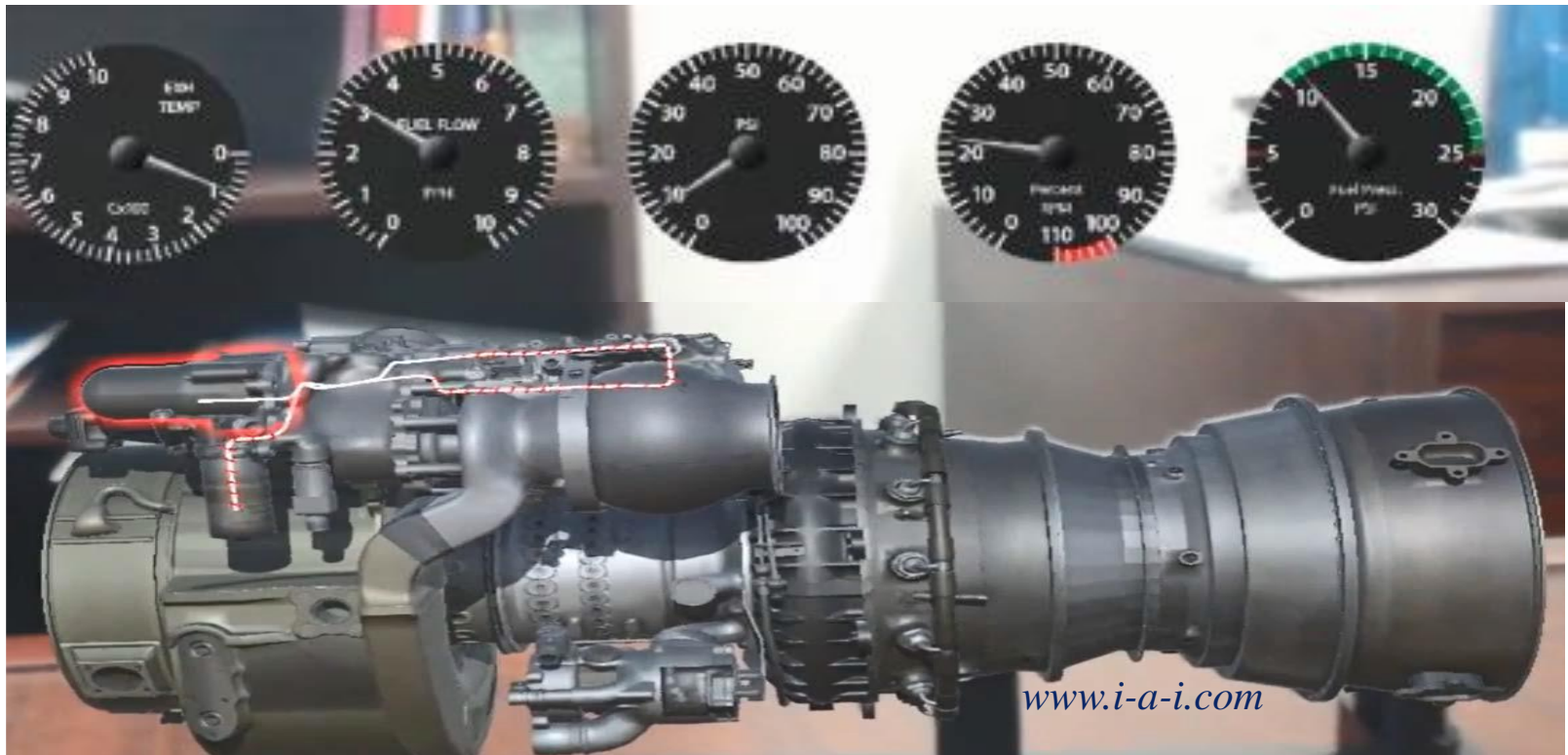


Market State 2018



Market State 2018

Intelligent Automation Incorporated presents their H-60 T-700 Augmented Reality engine-troubleshooting prototype at Naval Aviation Technical Training (CNATT)



Cockpit engine instruments, airflow, fuel flow, and recorded engine sounds are superimposed with a ruggedized tablet computer over hand sized, 3D-printed H60 T-700 engine model to train mechanics in engine startup procedures and fault identification

Market State 2018

Microsoft's HoloLens Deal With the Army Is a Big AR Win

Augmented reality has been slow to catch on with consumers, but the U.S. Army is ready to explore its potential as a combat technology.

 Chris Neiger (TMFNewsie)
Dec 4, 2018 at 6:06AM

Microsoft ([NASDAQ:MSFT](#)) has been plugging away at its HoloLens headset, and while the augmented-reality tech has won over a few clients -- mostly companies using it in industrial settings -- [it has been pretty slow going](#).

However, in a significant milestone for the AR tech, Microsoft just won a \$480 million contract with the U.S. Army, according to a [recent report](#) from Bloomberg. The Army had already been using HoloLenses in some training scenarios, but this deal will see the devices enhanced for combat use as well.

According to a document released by the Army, the government was looking for AR headsets that are capable of providing night vision and thermal sensing, as well as monitoring the wearer's vital signs, protecting their hearing, and even recognizing when they might have received a concussion.

<https://www.fool.com/investing/2018/12/04/microsofts-hololens-deal-army-is-big-ar-win.aspx>

AUTHOR



Chris Neiger
(TMFNewsie)

Chris has covered Tech and Telecom companies for The Motley Fool since 2012. Follow him on Twitter for the latest tech stock coverage.

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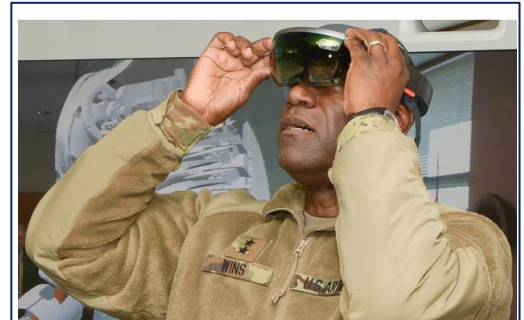
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Dec 4, 2018 at 6:06AM

Technology and Telecom

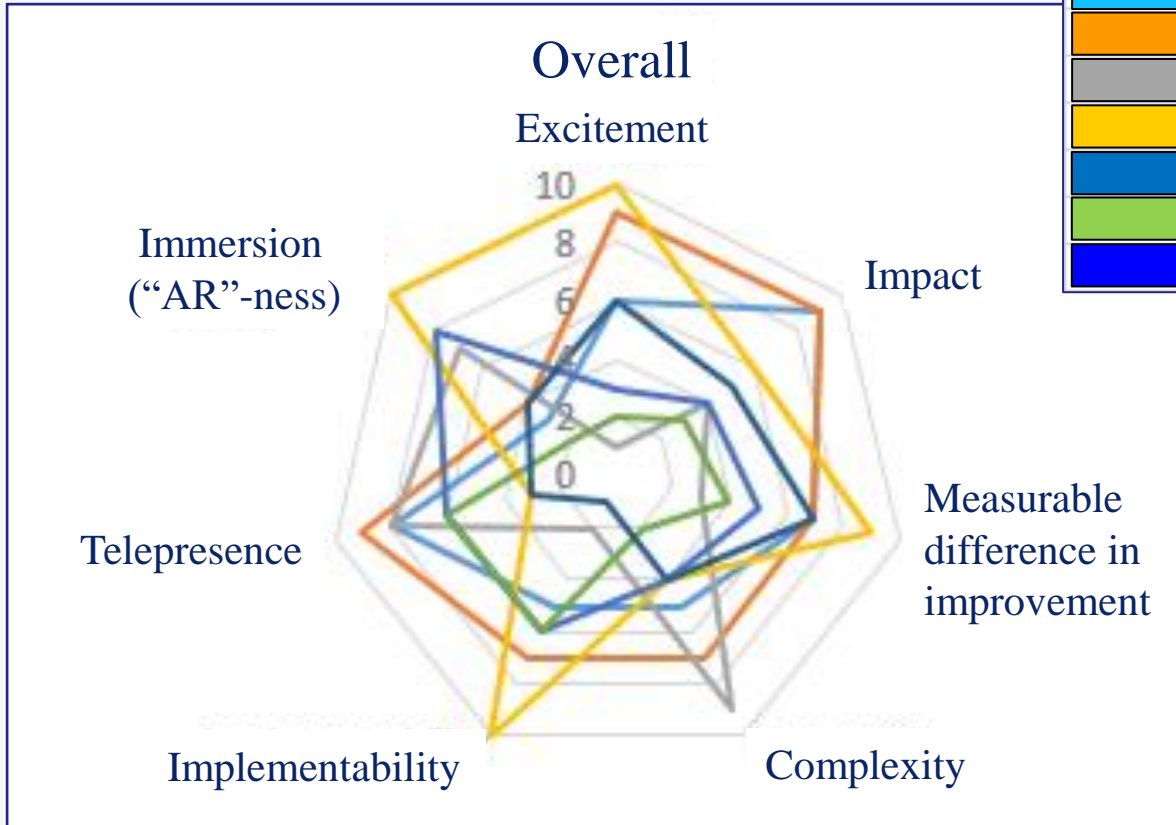
“The \$480 million contract could triple the number of headsets in the market.”

<https://www.engadget.com/2018/11/29/us-army-480-million-microsoft-hololens-contract/>



<https://spectrum.ieee.org/tech-talk/consumer-electronics/portable-devices/how-will-the-military-use-the-hololens-on-the-front-line>

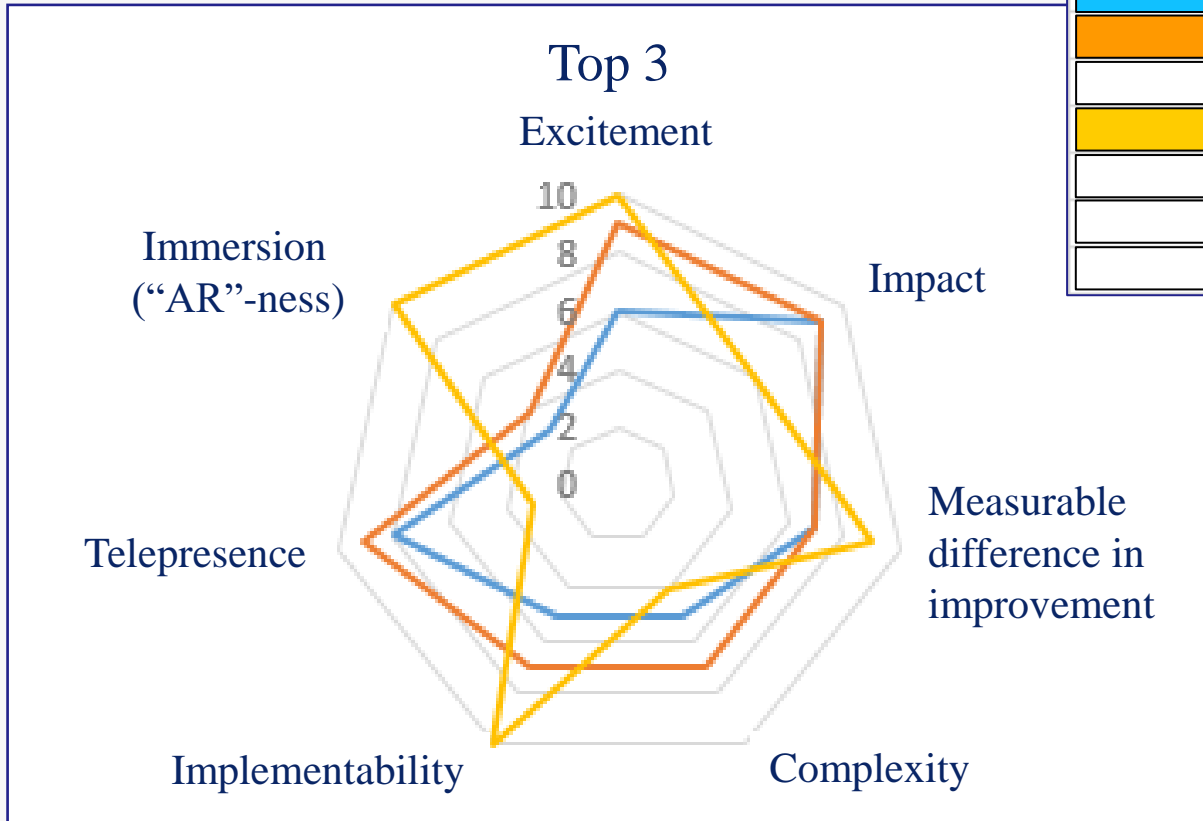
USCG Mission Support Use Case



Use Case	Description
	87' Electrical Troubleshooting
	Steamship Inspections
	Depot Level Maintenance
	School House Training (engine tear down)
	Armory Inspection / Maintenance
	Strike Team Boat Inspections
	Container Inspections



USCG Mission Support Use Case



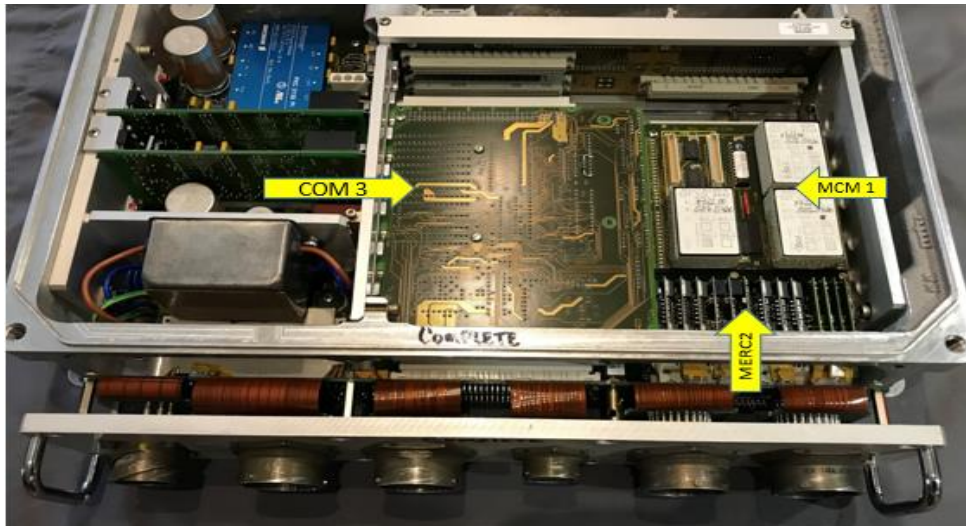
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USCG Mission Support Use Case



Surface Forces Logistics Center ASSIST Trip Report



**Maintenance
Action:**

Replace
Communication
Circuit Board
(COM3) in the
Engine Control
System (ECS)
Universal for
Motor Turbine
Union (MTU)

USCGC AMBERJACK; Jonesport, ME
April 23 – April 25, 2018

SFLC ASSIST POC: EMC Thomlinson



USCGA's AR Cadet Capstone Project



Capstone Design Projects
Fall 2018



Augmented Reality for Coast Guard Mission Support

1/c Kaitlyn DeValk
1/c Claire Gilliland
1/c David Rodriguez

Project Advisors: CDR Hartshorn & Mr. Howie
Sponsor: Coast Guard Research & Development Center

Mission Need

- Maximize readiness
- Sharpen skills of workforce
- Increase efficiency and decrease cost



Alternative Analysis

- Improve Maintenance Procedure Cards (MPCs)
- Create standardized videos
- Use virtual reality (VR)
- Use augmented reality (AR)

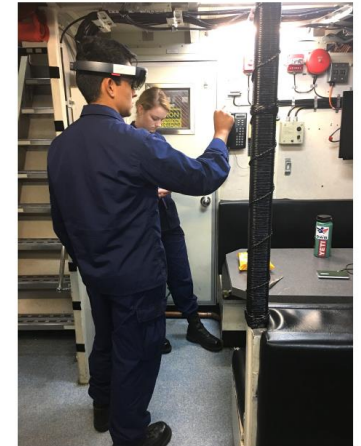


Initial Results

Following MPC: 1 min 44 sec

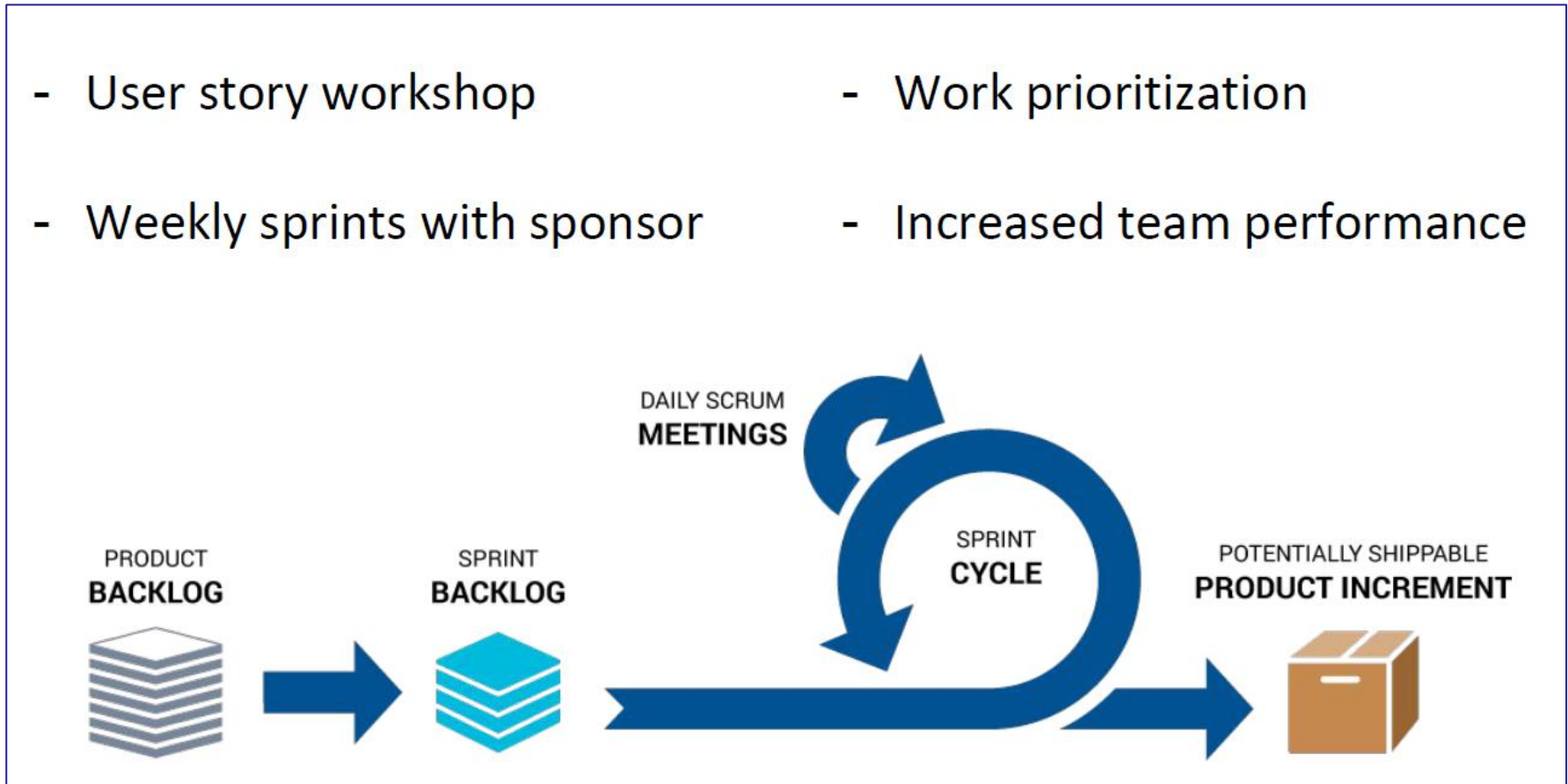


Following HoloLens: 1 min 12 sec



Agile Scrum Development Approach

- User story workshop
- Work prioritization
- Weekly sprints with sponsor
- Increased team performance



RDC's AR Development



RADM Haycock simulates replacing a Communication Circuit Board in the Engine Control System on an 87' WPM Motor Turbine Union while wearing a Microsoft HoloLens Augmented Reality headset

RDC's AR Development



CAUTION:
Carefully remove
COM 3 board by
placing fingers
on dots and
gently pulling
card in direction
of arrows.





DLA Contracting Vehicle

<http://www.dla.mil/TroopSupport/ConstructionandEquipment/FireandEmergencyServicesequipment.aspx>



DLA Troop Support
Construction and Equipment

Fire & Emergency Services Equipment
(FESE)
Tailored Logistic Support Program
(TLSP)

Customer Guidelines Document

DEFENSE LOGISTICS AGENCY
THE NATION'S COMBAT LOGISTICS SUPPORT AGENCY

HOME WHAT DLA OFFERS DOING BUSINESS WITH DLA ABOUT DLA CAREERS

DLA Troop Support Construction & Equipment

- Construction & Equipment Home
- What Construction & Equipment Offers
- Doing Business with C&E
- Contact Construction & Equipment
- Troop Support Home

Fire and Emergency Services Equipment





DLA Contracting Vehicle



FEDERAL RESOURCES

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Mallory Safety & Supply



CURTIS
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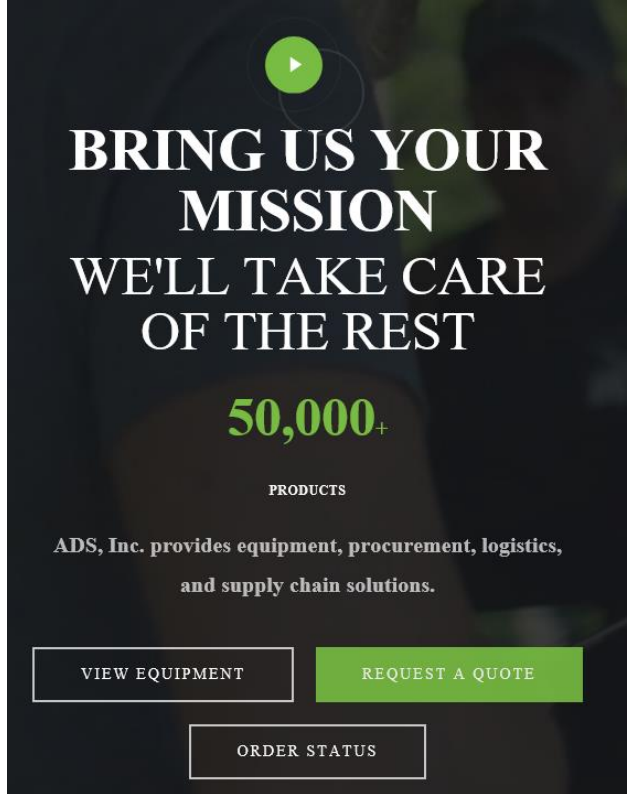
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Field Testing and User Evaluation



Limited User Evaluation: USCGC ALBACORE: Oct 2019 – Jan 2020



RDC Augmented Reality Project Path



Project 8107: Key Milestone/Deliverable Schedule

Project Start.....	30 Nov 17	✓
Augmented Reality Capabilities Market Research.....	6 Feb 18	✓
USCG Mission Support Use Case Selection.....	30 Mar 18	✓
Market Research/Technology Assessment Brief.....	19 Dec 18	✓
First Augmented Reality Agile Development Sprint and Demo.....	May 19	
Augmented Reality Use Case Roadmap.....	Jun 19	
Final Augmented Reality Agile Development Sprint and Demo.....	Oct 19	
Limited User Evaluation.....	Jan 20	
Augmented Reality Capabilities to Improve CG Mission Support Final Report and Brief.....	May 20	
Project End.....	May 20	

Harvard Business Review
A Manager's Guide to Augmented Reality

