AUGMENTED REALITY AND THE DIGITAL TWIN IN S1000D

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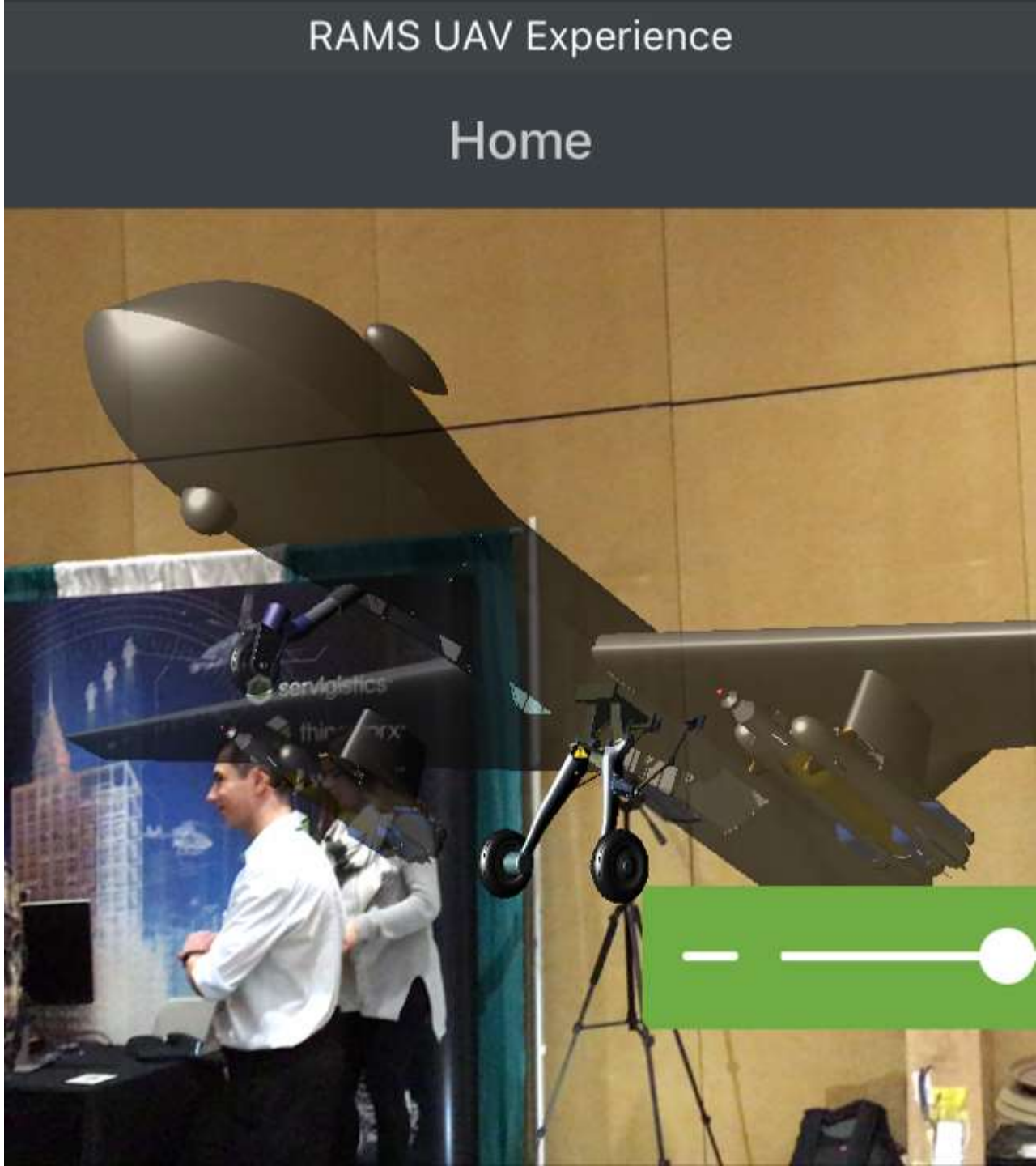


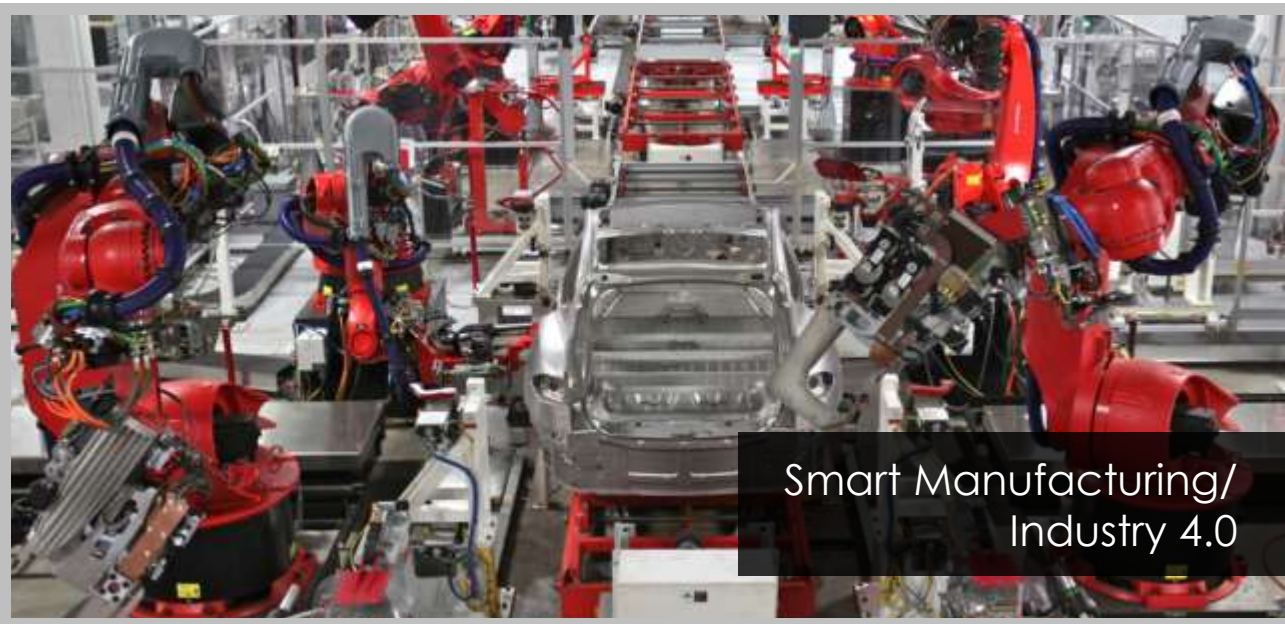
AGENDA

1. Introduction
2. The Industrial Internet of things (IoT) and the Digital Twin
3. What is Augmented Reality?
4. The convergence of these technologies in the service lifecycle. What does this mean to maintainers?
5. How does that impact S1000D?
6. What do we need to do to be ready?
7. Q&A


Fundamentally the **PHYSICAL and DIGITAL**
worlds have **converged** into a single new reality

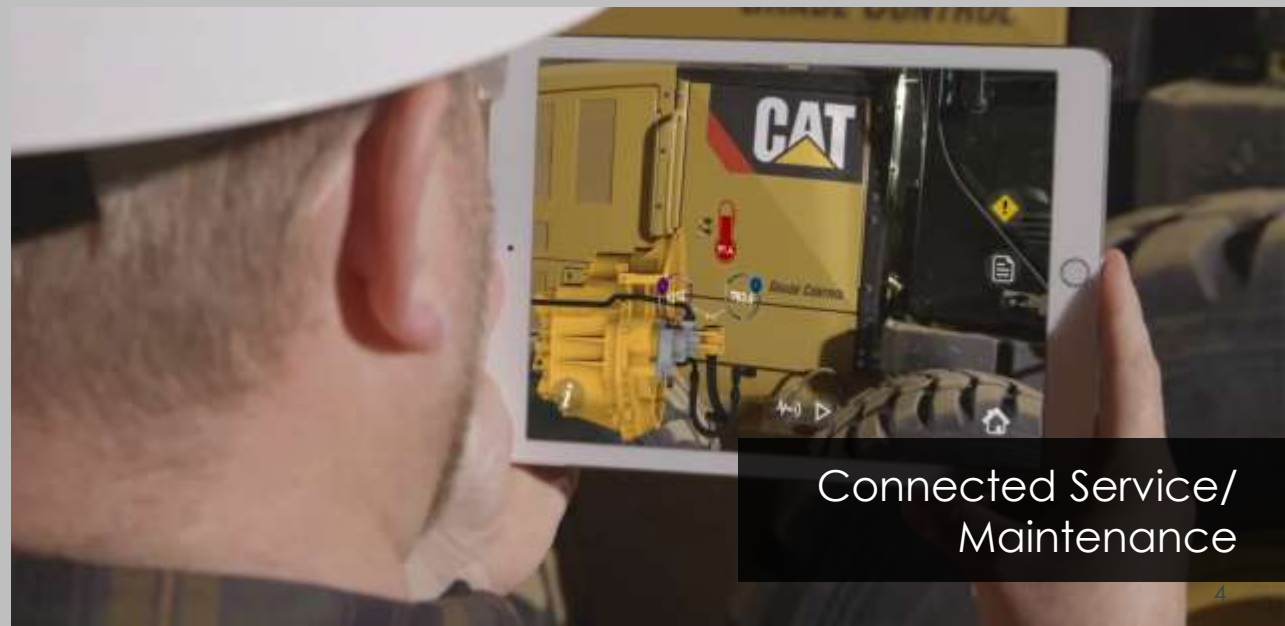
BROAD IMPACT OF PHYSICAL & DIGITAL CONVERGENCE

IoT/Smart,
Connected Products



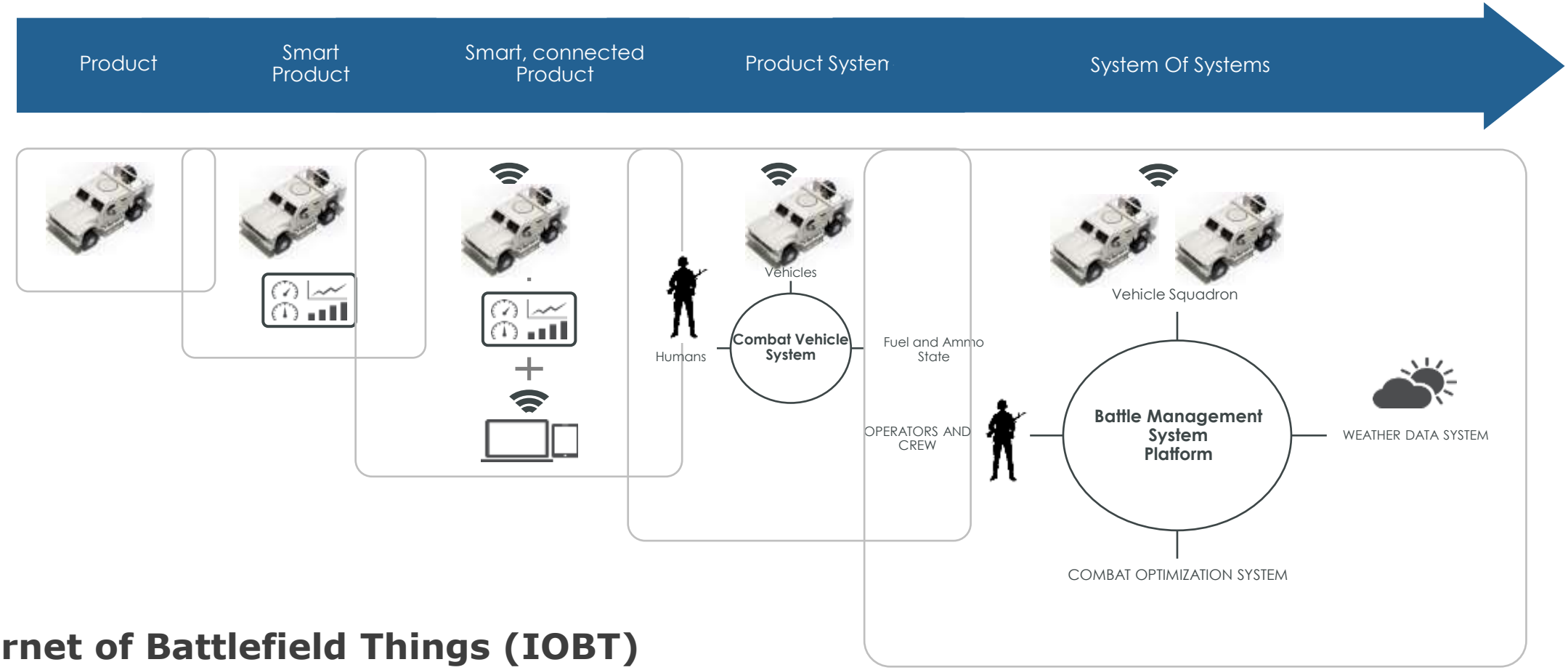
Smart Manufacturing/
Industry 4.0

Smart Cities, Fields, &
Worksites



Connected Service/
Maintenance

WHAT IS THE IOT?



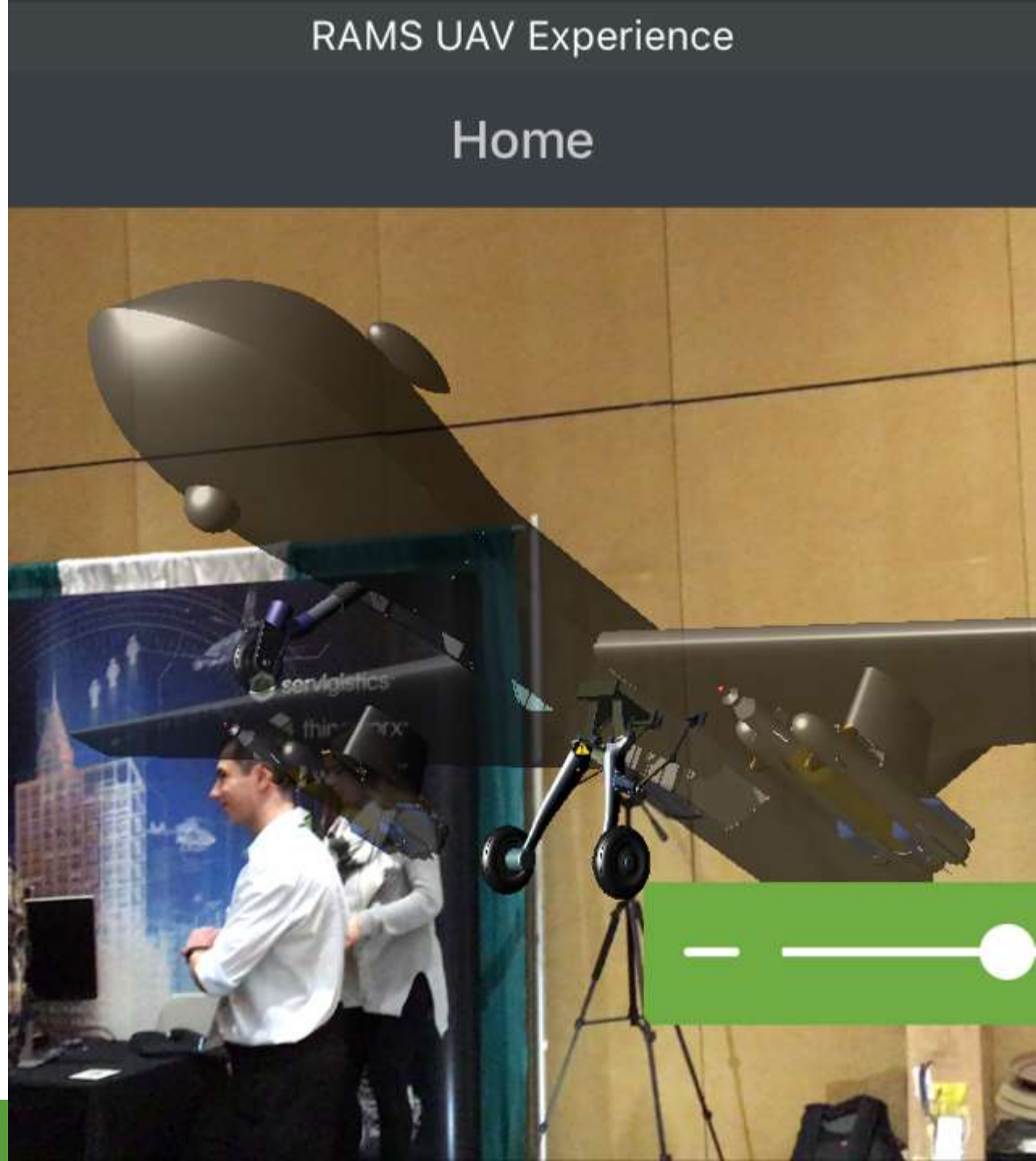
Internet of Battlefield Things (IOBT)
https://www.arl.army.mil

"The **changing nature of products** is disrupting value chains, **forcing companies to rethink and retool** nearly everything they do."

Harvard Business Review

DIGITAL TWIN

- A digital representation of the physical product
- 1 to 1 relationship
- Multiple stakeholders who care about different attributes of that digital twin
  - Quality/Reliability
  - Service
  - Warranty
  - Development/R&D
- Map physical and digital product characteristics to fully understand and predict the products behavior

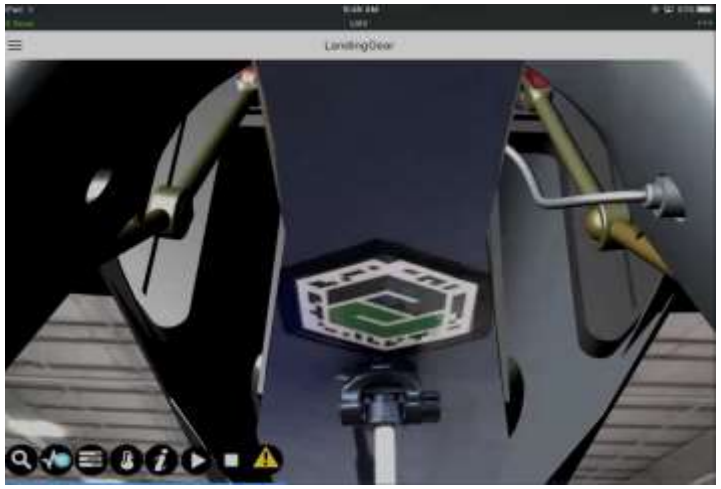


WHAT IS AUGMENTED REALITY (AR)

A technology that superimposes a computer-generated image on a user's view of the real world, thus providing a composite view.

A synthesis/merging of the digital and physical products

An environment that allows an enhanced view of the actual product through superimposing digital data and imagery.



HOW DO AR AND IOT INTERSECT?

- To provide a contiguous representation of the digital thread throughout the product lifecycle
- Map physical and digital product characteristics **utilizing a digital twin** to fully understand and predict the products behavior
- Leverage advances in IOT, machine connectivity and IOT platforms in order to:
  - Create 360° situational awareness of the products under your control
  - Enable you to act swiftly and decisively
  - Maximize your investments in PLM, MRO and Spare Parts Inventory
  - Balance operational demand vs materiel availability
  - Improve KPI's such as First time fix rates= (FTFR), Mean Time to Repair (MTTR), Systems Availability (Ao), Mean logistics Delay Times (MLDT) etc..
- Hands free AR applications
  - Optimize the workforce
  - Focus on performance

S1000D CONSTRUCTS AND AR EXPERIENCES

- S1000D Construct
- AR Context Builder
- AR Experience

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ID Status

Prelims

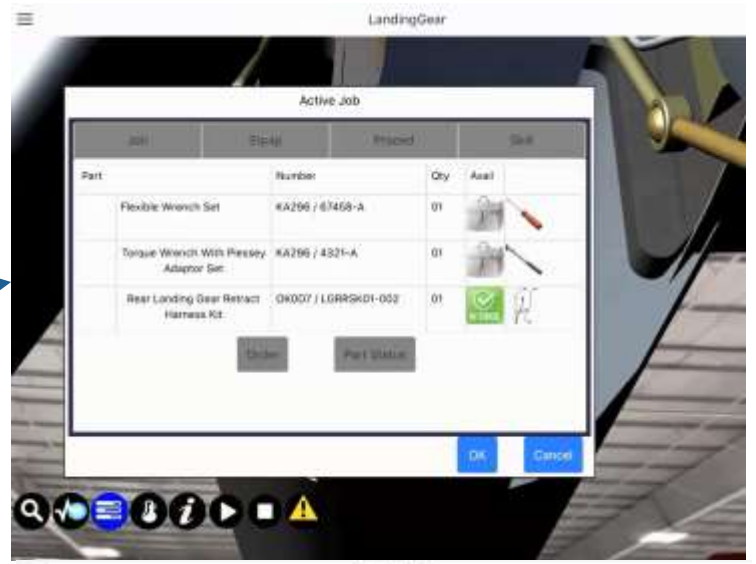
Proced

Closeup

DMC linkages

Xpath Expressions

That create context between the components of the DM and the AR experience



EXAMPLE AR CONSTRUCT BUILDER

Simple UI Design

Easy to use “drag and drop” user interface environment for ease of authoring in a codeless environment

Content Integration

Seamlessly integrate existing 3D content and data to present augmented service work instructions

AR Animations

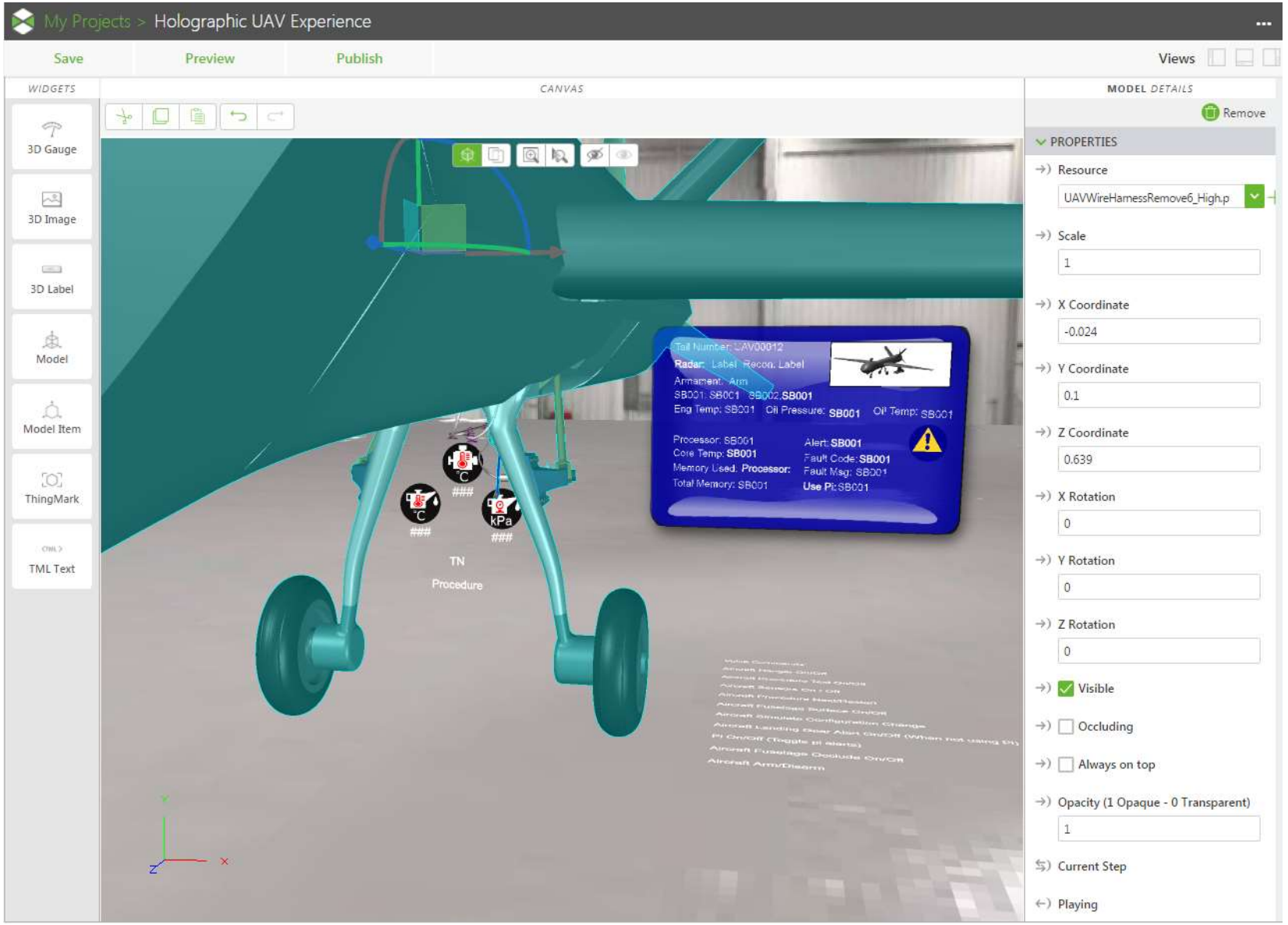
Create animated Augmented Reality experiences quickly and effortlessly

Internet of Things

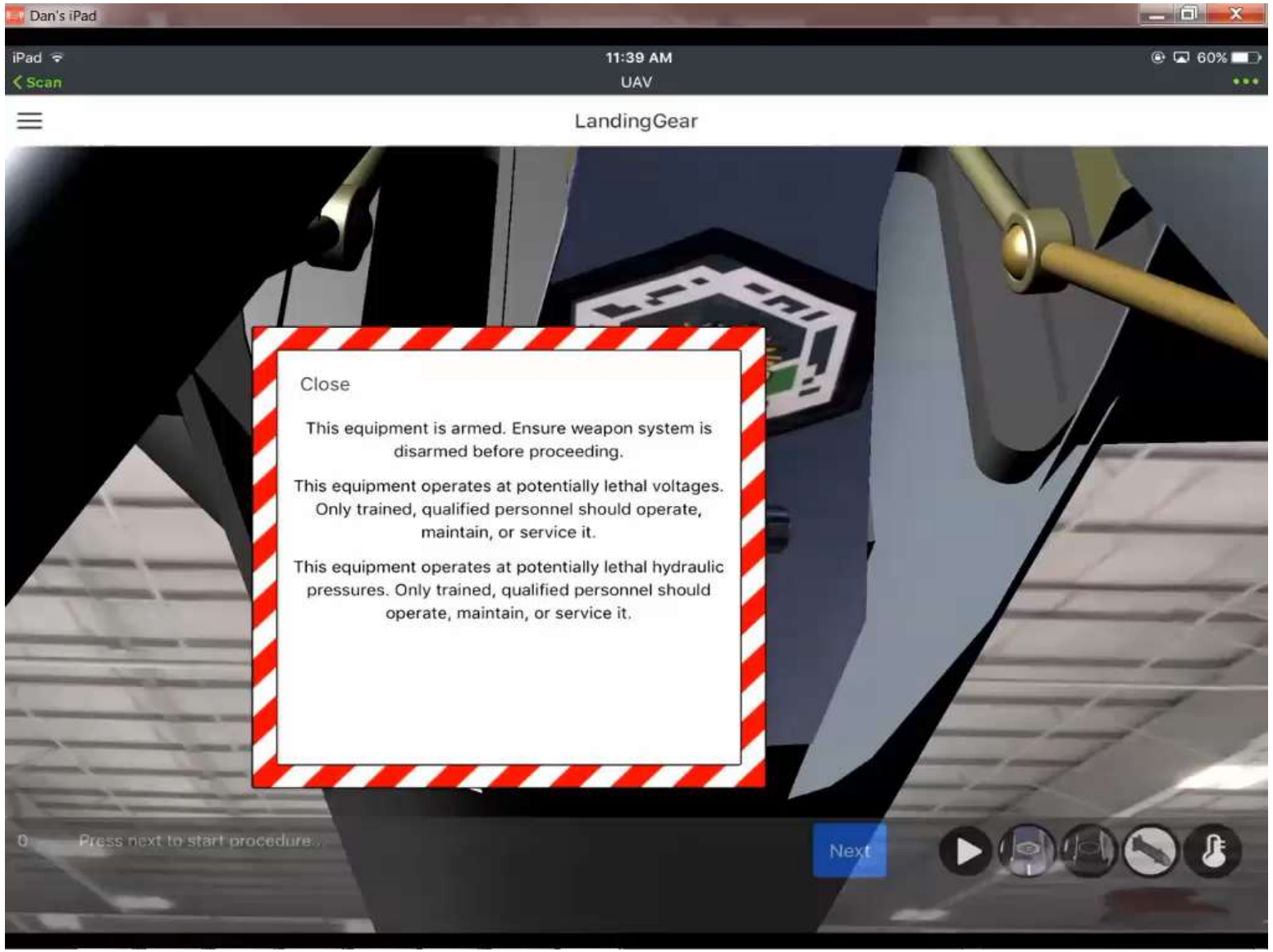
Integrate IoT sensor data and enterprise system data from “Things” to enable Augmented Reality data visualization

Add Identifiers

Place ThingMarks onto the product or “floor” to enable product identification and visual tracking

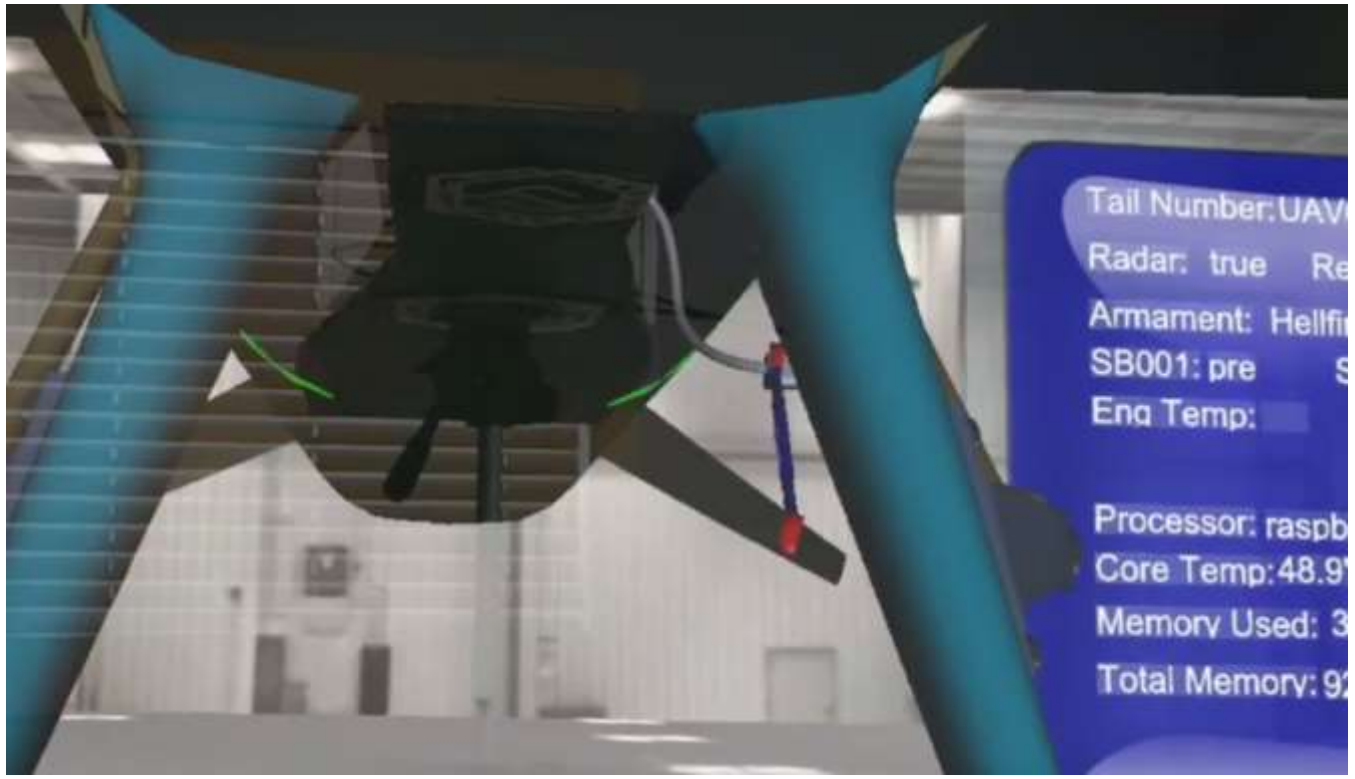


WHAT DOES THAT MEAN FOR S1000D?



SO WHERE IS IT HEADED?

- Products that self identify
- Products that converse with the user
- Devices that mix reality
- Devices that direct the human to best service the equipment
- Devices that are 100% hands free
- Part/product centric data



SUGGESTION ON PATH FORWARD

- Perhaps AR experiences can be treated like other “packages” of information
- Possible extension/adaption of the S1000D Package Module concept?
- Allows for re use of existing S1000D objects…
- Need implementation guidelines and naming conventions for additional object types
- Provision for sensors and sensor data (may re use what's in process DM)
- Remember these are not books or publications, it’s a different paradigm…

QUESTIONS?