NOTE

This slide deck represents a transcription of handwritten exercise notes by numerous teams at the AREA/DMDII event in Chicago, Feb 7-8, 2018.

Blank fields in the slides are intended to represent a lack of information provided in the handwritten materials returned.

Transcription errors may have occurred.

Team: 1

Industry: Aviation

Setting: Remote design review

Scenario:
Existing structural mockup and reviewing hydraulic designs of actuators within a wing assembly

Problem /Needs Statement

This statement defines the need/problem in a clear concise and Precise manner. It defines the scope of the issue and should also include the 5 W's(who, what, where, when, why). Should only be a couple of sentences long and not provide the solution.

Description of Problem/Need:
Traditionally used PPT, 2D, paper. Loses frame of references / miss clashes. 2D in 3D world / no concept of scale.

Scenario Template

The scenario is a essentially a story describing the activities and how the user interacts with the process.

Key pieces of information:

- Who is the user/operator?
- What is the Background and current state?
- What Choices must be made if any?
- What equipment, software, etc is being used? How/When?
- How is the operator interacting with the experience?

The information will them be mined for our Use Case template

The scenario should provide a complete solution to the problem/Needs Statement

Scenario Title:
Aviation design review of wing assembly
Text:
Who: Engineers
What: Options and consequences of each option
What: Hydraulic equipment needs to be accessible
What: space constraints
What: CATIA, AR Visio, PLM
How: Remote collaboration
-> Pointing
-> Moving
-> Annotate
-> Swap options
-> Repair walkthrough
-> Animation
-> Sticky note

Use Case Template

The Use Case Template is derived from the Scenario. It organizes the scenario into useful segments of information

User(s):

Engineer team

Process Steps:

1. Porting CATIA to AR format
2. Spatially register/anchor content
3. User collaboration

Equipment:

Physical mockup. AR/VR HMDs.

Wand / haptic

Software:

Collabo/communication AR visualisation

Data Inputs:

Format conversion software

CAD

User input

Data outputs:

Visualise annotations

Visualise clashes

Visualise errors

Keywords/Classification:

Part number, data conversion, design review, 3D clash avoidance, collaboration

Requirements/Needs Template

Derived from the Use Cases it should define the needs of the operator to be able to effectively accomplish the use case and meet all customer needs. Should define a need not necessarily call out a detailed hardware/software Requirement. That is left to the solution providers to creatively solve.

Data: Correct model format : input/output (updates)

Hardware:
HMD's, depth sensors, hi res autofocus camera
Software:
SLAM, computer vision, cloud point
System:
Hi speed / connected for remote collaboration, PLM, part database
User:
Voice and gesture interaction mechanism for menu & navigation

Value Propositions

This statement describes how the solution will benefit the various customers/stakeholders. Remember there are benefits beyond just dollars: quality, time, ergonomics, worker satisfaction, data visibility and richness of data gathered, etc.
Who does it benefit and how?

Value Propositions:

Save time & money.
Minimizing design change orders
Catch errors early
Benefits company as a more efficient accurate

Maturity Model/Implementation Template

This gives a high level view and timeline for implementation of the solution. It's goal is to provide a roadmap for rapid implementation of simpler solution to provide immediate return to lay the ground work for more complex and greater value implementation in the future.

Level 0 Standalone	Level 1 Connected app	Level 2 Richer information and interaction	Level 3 Fully closed loop and smart
Functional Description: Requirements: -Hardware -Software -Infrastructure -Process -Training Anticipated Returns:	Off the shelf Tablet Arkit None Onsite Menu instructions	HMD CAD update Annotations Remote collaboration Training on updates / annotations	Customized HMD Spatial AR app Highly connected -> PLM system -> End to end

Year 1				Year 2			
1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr

Extra Credit: SIPOC

A SIPOC can be a useful way for defining a problem/Process/System. It traces the full value chain from suppliers all the way through Customers to help identify customer/supplier needs and all inputs the process owners need to successfully deliver their product.

Suppliers	Inputs	Process	Outputs	Customers
Requirement/Needs				

Team: *02 or 06*

Point of contact:

Industry:

Setting:

Scenario:

Problem /Needs Statement

This statement defines the need/problem in a clear concise and Precise manner. It defines the scope of the issue and should also include the 5 W's(who, what, where, when, why). Should only be a couple of sentences long and not provide the solution.

Description of Problem/Need:

1. Customers in general, marketing teams, technical support teams and different users can benefit from our motivation case/demonstrations.
2. Authoring is a big concern.

Industry – especially complex industrial facility and equipment.
Who: Service technicians
What: Highlight AR and after service
Where: The boardroom and the shop floor
When: Any customers face their challenges and without AR involved yet
Why: We want to sell our own product and service
Convince industry of need to start adoption as point of Dig Tx strategy.
IoT drives the viability to the AR industry.

Scenario Template

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The scenario should provide a complete solution to the problem/Needs Statement

Scenario Title:
AR as an easy to implement high value capability.
Text:
Different hardware providers.
Different end users.
Different software/app developers
Foundation is end user defined requirements (SOR).
Can use different equipment and hardware and develop some software or protocol to achieve end users' specific purposes.
Baseline: we don't add extra burden for the operators by using our service.

End user requirements should define equipment and software needs but also include clear understanding of change requirements.

Use Case Template

The Use Case Template is derived from the Scenario. It organizes the scenario into useful segments of information

User(s):

Process Steps:
1.

Equipment:
Partner with equipment vendors
Software:
Internal developed and ready to use software
Data Inputs:
Convert existing operations, instructions, IoT
Data outputs:
Image capture, real-time IoT data
Keywords/Classification:
AR, inexpensive, integrated data, robust security, low-bandwidth

Requirements/Needs Template

Derived from the Use Cases it should define the needs of the operator to be able to effectively accomplish the use case and meet all customer needs. Should define a need not necessarily call out a detailed hardware/software Requirement. That is left to the solution providers to creatively solve.

Data:

Hardware:

Software:

System:

User:

Value Propositions

This statement describes how the solution will benefit the various customers/stakeholders. Remember there are benefits beyond just dollars: quality, time, ergonomics, worker satisfaction, data visibility and richness of data gathered, etc.
Who does it benefit and how?

Value Propositions:

1. Inexpensive – off the shelf
2. Easy stages of the adoption
3. Reduce travel requirement for experts
4. Distributed knowledge base

Maturity Model/Implementation Template

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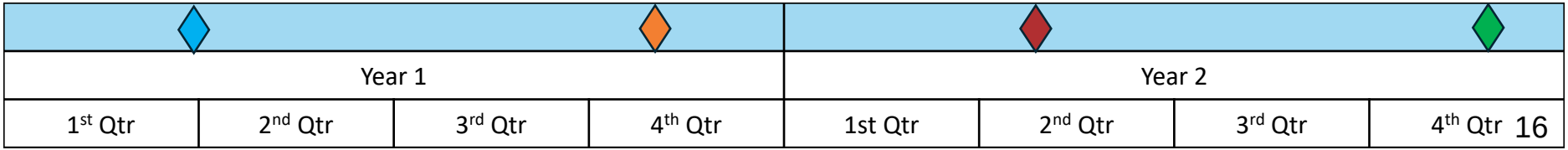
Level 0 Standalone	Level 1 Connected app	Level 2 Richer information and interaction	Level 3 Fully closed loop and smart
Functional Description: Requirements: -Hardware -Software -Infrastructure -Process -Training Anticipated Returns:	Handheld or wearable Phone/desktop / wifi Using existing IoT assets Early adoption reduces training burden	Interactive	



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Suppliers	Inputs	Process	Outputs	Customers
Requirement/Needs				

Team: 3

Point of contact:

Industry: Construction

Setting: City Building Planning

Scenario: Development approval for a new structure within a metro area

Problem /Needs Statement

This statement defines the need/problem in a clear concise and Precise manner. It defines the scope of the issue and should also include the 5 W's(who, what, where, when, why). Should only be a couple of sentences long and not provide the solution.

Description of Problem/Need:

There is difficulty and errors in shared visual understanding and communication of designs, resulting in lost time, increased cost and poor quality within downstream processes, post-prototyping.

Scenario Template

The scenario is a essentially a story describing the activities and how the user interacts with the process.

Key pieces of information:

- Who is the user/operator?
- What is the Background and current state?
- What Choices must be made if any?
- What equipment, software, etc is being used? How/When?
- How is the operator interacting with the experience?

The information will them be mined for our Use Case template

The scenario should provide a complete solution to the problem/Needs Statement

Scenario Title:
Development approval for a new structure within a metro area

Text:
A real-estate developer is trying to prepare documents to present to the city board in order to receive approval for building permits. He wants to show and convey his vision of exterior design, placement in relation to other buildings and city services. And impact to pedestrian and vehicle travel.

Use Case Template

The Use Case Template is derived from the Scenario. It organizes the scenario into useful segments of information

User(s):

City Planner

Process Steps:

1. Assess outside environment (city context)
2. Toggles to city services layer
3. Toggles lighting/shadowing layer
4. Identifies problem in design and marks up visually – annotates area
5. City planner submits report of recommendation
6. Developer rebuilds model
7. Repeat

Compares to codes by pressing "Assess" button

Equipment:

AR device with geolocation and ability to work outdoors

Software:

Multi-user/networked
Annotation features
3D CAD models
Outdoor tracking models

Data Inputs:

Geolocation
City codes & ordinances
City map
Building models

Data outputs:

Variances

Keywords/Classification:

Requirements/Needs Template

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Data:

Ability to connect to and retrieve data from city databases. Ability to extract data from building information models.

Hardware:

Ability to handle large, complex data set. Ability to function at different light levels and outdoors.

Software:

3D tracking, annotation, spatial awareness, multi-user

System:

User:

Domain expert (building codes and design)

Value Propositions

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Who does it benefit and how?

Value Propositions:

- Reduce the time from concept to approval
- Increase chance of approval
- More holistic view

Maturity Model/Implementation Template

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Level 0 Standalone	Level 1 Connected app	Level 2 Richer information and interaction	Level 3 Fully closed loop and smart
Functional Description: Requirements: -Hardware -Software -Infrastructure -Process -Training Anticipated Returns:			

Year 1				Year 2			
1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr

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Suppliers	Inputs	Process	Outputs	Customers
Requirement/Needs				

Team: 4

Point of contact:

Industry:

Setting: Factory floor – precision optics manufacturing

Scenario:
Machine installation

Problem /Needs Statement

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Description of Problem/Need:

Scenario Template

The scenario is a essentially a story describing the activities and how the user interacts with the process.

Key pieces of information:

- Who is the user/operator?
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- What Choices must be made if any?
- What equipment, software, etc is being used? How/When?
- How is the operator interacting with the experience?

The information will them be mined for our Use Case template

The scenario should provide a complete solution to the problem/Needs Statement

Scenario Title:
Text:
Guidance
- Recording
  - Validation
  - Traceability
  - Record keeping
- Training handoff
  - During comm
  - After
  - New users
  - Validations

Use Case Template

The Use Case Template is derived from the Scenario. It organizes the scenario into useful segments of information

User(s):

Tech

Process Steps:

1. The user needs detailed info for calibration of equipment.
2. Select alignment app.
3. Orientation superimposed digitally for placement of equipment

Equipment:

Optic pro grinder.

Tablet AR enabled

Software:

Upskill? ScopeAR ? Custom?

Data Inputs:

Work instructions

Video, pics, CAD model

Data outputs:

Verifications, notes, audio, “as built”, time

Keywords/Classification:

In database for validation

Requirements/Needs Template

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Data: Calibration data, IoT data
Camera, 3D CAD overlay

Hardware:
    Tablet, depth map sensor, internal motion sensor unit
Software:
    Custom, Upskill
System:

User:
    Tech, operator

Value Propositions

This statement describes how the solution will benefit the various customers/stakeholders. Remember there are benefits beyond just dollars: quality, time, ergonomics, worker satisfaction, data visibility and richness of data gathered, etc.
Who does it benefit and how?

Value Propositions:

Faster, more accurate, less support needed, validation of data, better maintenance

Maturity Model/Implementation Template

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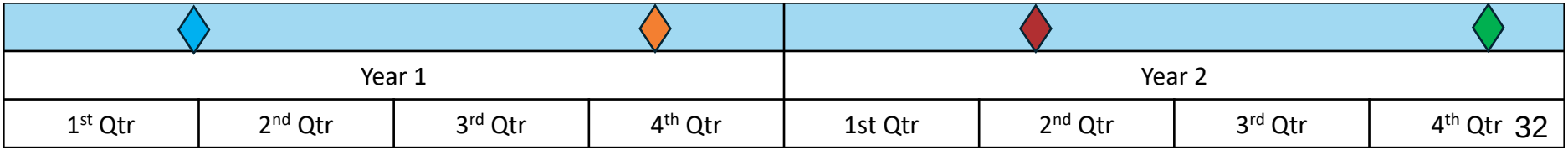
Level 0 Standalone	Level 1 Connected app	Level 2 Richer information and interaction	Level 3 Fully closed loop and smart
Functional Description: Requirements: - Tablet - Instructions - Limited data collection - Pictures Anticipated Returns:	- Wearable - Recording events, data - Download to records - Validation system	- More interaction - Sensor-based - IoT input - Tutorial overlays	- Machine learning elements - Feedback on interventions / diagnostics



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Suppliers	Inputs	Process	Outputs	Customers
Requirement/Needs				

Team: 5

Point of contact:

Industry: Industrial equipment

Setting: Assembly line

Scenario:
Welding/brazing components

Problem /Needs Statement

This statement defines the need/problem in a clear concise and Precise manner. It defines the scope of the issue and should also include the 5 W's(who, what, where, when, why). Should only be a couple of sentences long and not provide the solution.

Description of Problem/Need:
Waste was identified on an assembly line where an operator is running a brazing machine and defects are detected downstream. AR is enlisted to help this operator detect and correct issues on the machine in real time.

Who : worker
What: machine to braze
WhereL: assembly line
When: Shift work 45 second talet (sp?)time
Wht: Defects detected downstream. Need to reduce defects. Lean initiative.

Scenario Template

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Key pieces of information:

- Who is the user/operator?
- What is the Background and current state?
- What Choices must be made if any?
- What equipment, software, etc is being used? How/When?
- How is the operator interacting with the experience?

The information will them be mined for our Use Case template

The scenario should provide a complete solution to the problem/Needs Statement

Scenario Title:
Text:

An operator is at a station on an assembly line. The operator places components into a fixture on a machine where alignment is critical for successful operation.
During the placement, a wearable device is showing intuitive instructions.
Once successfully aligned it communicates to the user to activate the machine/.

Use Case Template

The Use Case Template is derived from the Scenario. It organizes the scenario into useful segments of information

User(s):
Machin Operator

Process Steps:
1. Receive parts
2. Align parts
3. Check alignment
4. Engage machine
5. Confirm completion

Equipment:
- Wearable headset
- Alignment sensor

Software:
- App on headset with alignment capabilities

Data Inputs:
- Alignment sensor
- Machine completion

Data outputs:
- Instructions to user
- Reports on user performance data
  - Timestamps
  - Defect ratios

Keywords/Classification:
- Assembly, alignment, computer vision, work instructions, analytics, IoT

If bad parts are made, this triggers recalibration

Requirements/Needs Template

Derived from the Use Cases it should define the needs of the operator to be able to effectively accomplish the use case and meet all customer needs. Should define a need not necessarily call out a detailed hardware/software Requirement. That is left to the solution providers to creatively solve.

Data:

Alignment data, parts inventory

Hardware:

Hands-free heads up display, IT-based alignment sensor/laser

Software:

Software platform

System:

Wireless connectivity between wearable & sensor

User:

Lightweight, comfortable, long battery life, not too hot, eyeglass friendly

Value Propositions

This statement describes how the solution will benefit the various customers/stakeholders. Remember there are benefits beyond just dollars: quality, time, ergonomics, worker satisfaction, data visibility and richness of data gathered, etc.
Who does it benefit and how?

Value Propositions:
Increased throughput – reduces alignment time.
Reduce defects, material loss
Possible worker safety improvement

For companies looking to increase throughput, reduce defects and eliminate material loss, the ALIGN system assists workers in making each part better than the last

- **A**ugmented
- **L**aser line
- **I**ndicator Integrated
- **G**uidance
- **N**etwork

Maturity Model/Implementation Template

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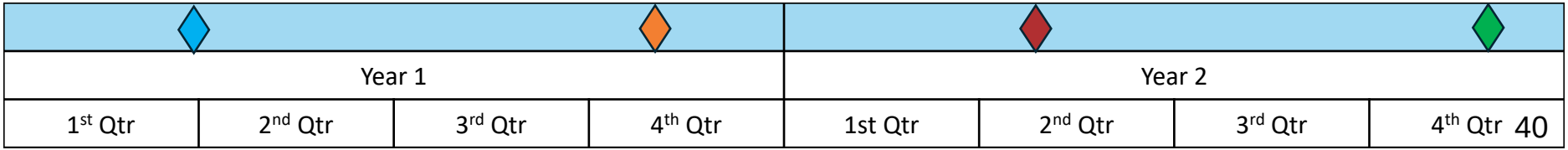
Level 0 Standalone	Level 1 Connected app	Level 2 Richer information and interaction	Level 3 Fully closed loop and smart
Functional Description: Just show image of correct alignment. Anticipated Returns:	Sensor integrated for red/green indication.	Tailoring contextual & dynamic feedback to user needs.	



Extra Credit: SIPOC

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Suppliers	Inputs	Process	Outputs	Customers
ALIGN inc Wearable HW Inc Machine Vision Inc	Alignment specs User feedback			
Requirement/Needs				

Team: 7

Industry: Machine manufacturing

Setting: Commercial office

Scenario:
Fault notification is issued requiring service technician.
Technician determines paper jam could have been caused by multile causes. Troubleshooting is necessary.

Problem /Needs Statement

This statement defines the need/problem in a clear concise and Precise manner. It defines the scope of the issue and should also include the 5 W's(who, what, where, when, why). Should only be a couple of sentences long and not provide the solution.

Description of Problem/Need:

Scenario Template

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Key pieces of information:

- Who is the user/operator?
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- How is the operator interacting with the experience?

The information will them be mined for our Use Case template

The scenario should provide a complete solution to the problem/Needs Statement

Scenario Title:
Troubleshoot Xerox machine
Text:
Determine cause of fault and perform necessary procedure utilizing AR technology. User would be service technician. The background of the system is within a complicated mechanical with small and precise components.
Determine what tech manuals need to be referenced. Maintenance device connects to printer to determin fault codes and frequency. Technician interacts by wearing a head mounted display. They would then scan a barcode that would then pull up the initial work order for the machine.

Use Case Template

The Use Case Template is derived from the Scenario. It organizes the scenario into useful segments of information

User(s):
Technician

Process Steps:
1. Identify device
2. Troubleshoot
3. Perform maintenance procedure
4. Verification of work performed

Equipment: Diagnostic tool
Head wearable AR device

Software:
AR software, AI software

Data Inputs:
Machine bar code, fault ID database

Data outputs:
Recommended troubleshooting step.
Parts inventory
Keywords/Classification:

Requirements/Needs Template

Derived from the Use Cases it should define the needs of the operator to be able to effectively accomplish the use case and meet all customer needs. Should define a need not necessarily call out a detailed hardware/software Requirement. That is left to the solution providers to creatively solve.

Data: Manuals, fault tree, parts list, 3D models, experts

Hardware: head-wearable, printer interface systems, parts ordering system

Software: AR tracking software, remote AR

System: Xerox infrastructure, inventory system, support team, telemetry & R&D (analytics)

User: Technician

Value Propositions

This statement describes how the solution will benefit the various customers/stakeholders. Remember there are benefits beyond just dollars: quality, time, ergonomics, worker satisfaction, data visibility and richness of data gathered, etc.
Who does it benefit and how?

Value Propositions:
Reduced time taken for repair. Quicker turnaround for successful completion.
This would benefit both the customer and company.

Maturity Model/Implementation Template

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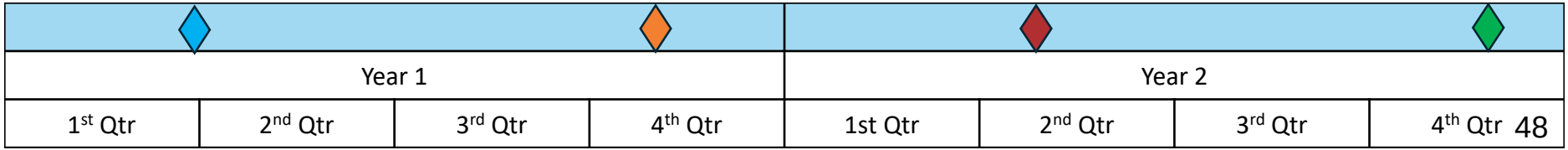
Level 0 Standalone	Level 1 Connected app	Level 2 Richer information and interaction	Level 3 Fully closed loop and smart
Functional Description: PDF document Requirements: Anticipated Returns:	Laptop connects device and performs fault analysis.		1) Telephone call with fault code. 2) 2. Connected device and real-time IoT data



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Suppliers	Inputs	Process	Outputs	Customers
- Auto inventory - Auto pack of SHID	- Maintenance history log	- Operational check-up	- Working machine - Parts orders	- Faster turnaround - Lower hourly cost (cumulative)
Requirement/Needs				
- Cloud database	- Communication device - Database	- Check-up procedure	- Inventory management system	- Customer service org

Team: 08

Point of contact:

Industry:

Setting:

Scenario:

Problem /Needs Statement

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Description of Problem/Need:

Lack of digestible info on complex products need effective ways to global customer base for training / product qualification.

Scenario Template

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Key pieces of information:

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The information will them be mined for our Use Case template

The scenario should provide a complete solution to the problem/Needs Statement

Scenario Title:
New product training - customer
Text:
Airline service mechanics in the field need to be provided with AR-supported Illustrated Parts Catalogue (IPC) and Aircraft Maintenance Manual (AMM) relevant to maintenance certification.
AR-based training material educating service people on the new product.
Introduct of new capabilities procedure by tablet or wearable.
Multiple people required to join the same session.
3D overlay + step by step instructions.
Animations annotated.
Remote collaboration enabled.

Use Case Template

The Use Case Template is derived from the Scenario. It organizes the scenario into useful segments of information

User(s):

Service Technician.

Service instructor/Trainer

Process Steps:

1. Code scan on equipment to start training procedure
2. Trainee guided through step-based training
3. Test based on training material
4. Virtual celebration or restart

Equipment:

Wearable (HMD), tablet

Software:

Training app applicable to different hardware

Data Inputs:

IPC, AMM, simulation data (refer to scenario)

Data outputs:

Pass/ fail

User-specific logging

Keywords/Classification:

Requirements/Needs Template

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Data:

Hardware:

Software:

System:

User:

Value Propositions

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Who does it benefit and how?

Value Propositions:

Maturity Model/Implementation Template

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Level 0 Standalone	Level 1 Connected app	Level 2 Richer information and interaction	Level 3 Fully closed loop and smart
Functional Description: Requirements: -Hardware -Software -Infrastructure -Process -Training Anticipated Returns:	Centralised product/training info Virtual class		

Year 1				Year 2			
1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr

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Suppliers	Inputs	Process	Outputs	Customers
Requirement/Needs				

Team: 09

Industry: Factory Automation

Setting: New equipment commission

Scenario:

Problem /Needs Statement

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Description of Problem/Need:
Multi-vendors need to commission their machines to interact with each other with optimal settings to maximise yield and quality.

Multi-system vendors of system, interactions between machines. Not working together, on site.

Right first time commissioning of multi-vendor system
Multi-vendor – Ensure integration of filter, conveyor valve
Validation
AR to physical integrate tuning
Image recognition and control of seeing

Scenario Template

The scenario is a essentially a story describing the activities and how the user interacts with the process.

Key pieces of information:

- Who is the user/operator?
- What is the Background and current state?
- What Choices must be made if any?
- What equipment, software, etc is being used? How/When?
- How is the operator interacting with the experience?

The information will them be mined for our Use Case template

The scenario should provide a complete solution to the problem/Needs Statement

Scenario Title:

System component.
Tuning.
Looking at each component.
Setting, IoT feed input into machine learning to correctly tuning adjustment.
Data interoperability & API
Interoperability for data interface.

Use Case Template

The Use Case Template is derived from the Scenario. It organizes the scenario into useful segments of information

User(s):

Engineer team

Use cases:

- Installation and verification
- Integration and validation
- End user validation & training

- System integrator
  - Vendor installation

Equipment:

- Standard

Software:

- Visual recognition to obtain data from machine
- AR
- Wifi on-site to obtain data

Data Inputs:

Data outputs:

Keywords/Classification:

Requirements/Needs Template

Derived from the Use Cases it should define the needs of the operator to be able to effectively accomplish the use case and meet all customer needs. Should define a need not necessarily call out a detailed hardware/software Requirement. That is left to the solution providers to creatively solve.

Data:

Hardware:

Software:

System:

User:

Value Propositions

This statement describes how the solution will benefit the various customers/stakeholders. Remember there are benefits beyond just dollars: quality, time, ergonomics, worker satisfaction, data visibility and richness of data gathered, etc.
Who does it benefit and how?

Value Propositions:

Maturity Model/Implementation Template

This gives a high level view and timeline for implementation of the solution. It's goal is to provide a roadmap for rapid implementation of simpler solution to provide immediate return to lay the ground work for more complex and greater value implementation in the future.

Level 0 Standalone	Level 1 Connected app	Level 2 Richer information and interaction	Level 3 Fully closed loop and smart
Functional Description: Requirements: -Hardware -Software -Infrastructure -Process -Training Anticipated Returns:			

Year 1				Year 2			
1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr

Extra Credit: SIPOC

A SIPOC can be a useful way for defining a problem/Process/System. It traces the full value chain from suppliers all the way through Customers to help identify customer/supplier needs and all inputs the process owners need to successfully deliver their product.

Suppliers	Inputs	Process	Outputs	Customers
Requirement/Needs				

Team: 10

Industry:

Setting:

Scenario:
Furnace repair

Problem /Needs Statement

This statement defines the need/problem in a clear concise and Precise manner. It defines the scope of the issue and should also include the 5 W's(who, what, where, when, why). Should only be a couple of sentences long and not provide the solution.

Description of Problem/Need:

- Furnace isn't working at home. It is not good to call a repair person.
- Lack of information on diagnostics and repair (lack of skill)
- Is it time to escalate or not?

Scenario Template

The scenario is a essentially a story describing the activities and how the user interacts with the process.

Key pieces of information:

- Who is the user/operator?
- What is the Background and current state?
- What Choices must be made if any?
- What equipment, software, etc is being used? How/When?
- How is the operator interacting with the experience?

The information will them be mined for our Use Case template

The scenario should provide a complete solution to the problem/Needs Statement

Scenario Title:
Furnace scenario
Text:
User – Average person
Furnace in need of repair
- you'd HAVE to call a repair man

Choices:
- Call a repair guy
- Try on your own

Hardware/software
- Furnace & tools
- Phone, tablet or HMD
- Diagnostic info
- Instructions

Use Case Template

The Use Case Template is derived from the Scenario. It organizes the scenario into useful segments of information

User(s):

Average person

Process Steps:

1. Recognize failure
2. Initial diagnostic steps
3. Determine escalation (QR code?)
   - Provide service contacts
   - Push diagnostic data to service contacts

Equipment:

Smartphone, tablet, HMD

Software:

Decision tree

Access to important information

Data Inputs:

Make & model

Barcode reader

Error codes

Data outputs:

- Step by step guide
- Diagnostic info
- Permit req
- Contact guide
- Warnings/alerts

Keywords/Classification:

Requirements/Needs Template

Derived from the Use Cases it should define the needs of the operator to be able to effectively accomplish the use case and meet all customer needs. Should define a need not necessarily call out a detailed hardware/software Requirement. That is left to the solution providers to creatively solve.

Data:

Hardware:

Software:

System:

User:

Value Propositions

This statement describes how the solution will benefit the various customers/stakeholders. Remember there are benefits beyond just dollars: quality, time, ergonomics, worker satisfaction, data visibility and richness of data gathered, etc.
Who does it benefit and how?

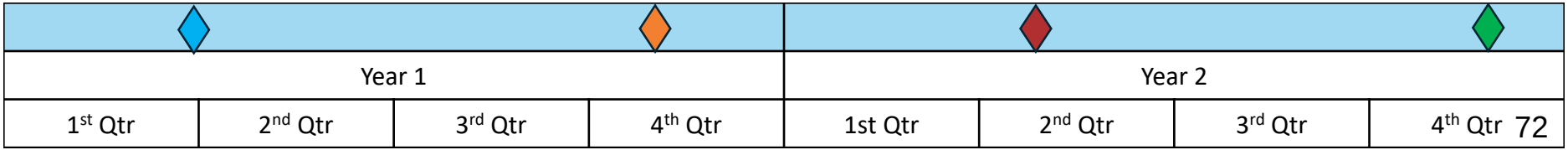
Value Propositions:

Faster response times
Fewer errors
Improved safety
No need to travel
Earlier awareness
Peace of mind
Help more customers
Happier customer
Reduce cost

Maturity Model/Implementation Template

This gives a high level view and timeline for implementation of the solution. It's goal is to provide a roadmap for rapid implementation of simpler solution to provide immediate return to lay the ground work for more complex and greater value implementation in the future.

Level 0 Standalone	Level 1 Connected app	Level 2 Richer information and interaction	Level 3 Fully closed loop and smart
Functional Description: Repair aid Requirements: -Hardware : smart device -Software : dedicated app -Infrastructure : N/A -Process : Load & run app -Training: Walk through survey/questionnaire Anticipated Returns: Complete repairs	Natural language interface Internet connection Connect to expert Service contacts	Predict product performance	Predicts and corrects problems Recognize or predict a failure Orders parts needed ahead of time Has parts delivered before failure



Extra Credit: SIPOC

A SIPOC can be a useful way for defining a problem/Process/System. It traces the full value chain from suppliers all the way through Customers to help identify customer/supplier needs and all inputs the process owners need to successfully deliver their product.

Suppliers	Inputs	Process	Outputs	Customers
Manufacturer	Make & model Diagnostic info	Repair procedures (furnace)	Correct repair steps Needed parts Technician contacts	
Requirement/Needs				
		Not knowing what to do Knowledge on certifications		

Team: 11

Industry: Manufacturing

Setting: Hand assembly

Scenario:
Manufacturing assembly task

Problem /Needs Statement

This statement defines the need/problem in a clear concise and Precise manner. It defines the scope of the issue and should also include the 5 W's(who, what, where, when, why). Should only be a couple of sentences long and not provide the solution.

Description of Problem/Need:
Cabling – routing wall to box, 2 different technicians

Part identification
Quality verification
Work instructions
Operator/inspector/engineer
Plans : materials and people
Real time
Rework process
Training tool
Aggregate info

Move from AR to VR then back "old a part"
Camera good build/bad build
Ability to see exactly where process went wrong
Eliminate tribal knowledge
Right first time
Can you get to specifics (80% of this cable installed wrong)
Measurement to evaluate standards
Interactive planning
Segregation of duties

Scenario Template

The scenario is a essentially a story describing the activities and how the user interacts with the process.

Key pieces of information:

- Who is the user/operator?
- What is the Background and current state?
- What Choices must be made if any?
- What equipment, software, etc is being used? How/When?
- How is the operator interacting with the experience?

The information will them be mined for our Use Case template

The scenario should provide a complete solution to the problem/Needs Statement

Scenario Title:
Manufacturing quality
Text:
Operator arrives at station
Not consisten order of operations
Part identification
None distributed work
Non consistent issue resolution
No clear rework process/reactive v proactive
Work instructions may not match current environment

Use Case Template

The Use Case Template is derived from the Scenario. It organizes the scenario into useful segments of information

User(s):

Assembly technician

Process Steps:

1. Technician selects required procedure
2. Verify parts for step
3. Tech reads 2D work instruction
4. Performs work instruction (harness)
5. Verify completion
6. Inspection -> quality buy off

Equipment:

Shop floor computer, tablet, handheld

Software:

MES, planning, design

Data Inputs:

Purchase order, buy off, BOM, verifications, knowledge transfer(data)

Data outputs:

Buy off, efficiency measurements

Keywords/Classification:

Requirements/Needs Template

Derived from the Use Cases it should define the needs of the operator to be able to effectively accomplish the use case and meet all customer needs. Should define a need not necessarily call out a detailed hardware/software Requirement. That is left to the solution providers to creatively solve.

Data: Ability to read/view:

Purchase order, part number (BOM), requirements of build (temp, external factors, internal factors, hardware, connectivity)

Hardware:

Ability to process data quickly, implement of hard stop, ability to use / manoevre 3D CAD model, withstand drops/harsh environment, low cost, battery life

Software:

Ability to process data quickly, connected tooling/inter systems (i.e. recognition of correct tools to steps)

System:

Ability to interconnect all steps, systems and tools

User:

Ability: multi-lingual, swapable hardware, intuitive for use, annotation/interaction with work instruction, intuitive authoring platform, real time view of builds

Value Propositions

This statement describes how the solution will benefit the various customers/stakeholders. Remember there are benefits beyond just dollars: quality, time, ergonomics, worker satisfaction, data visibility and richness of data gathered, etc.
Who does it benefit and how?

Value Propositions:

Maturity Model/Implementation Template

This gives a high level view and timeline for implementation of the solution. It's goal is to provide a roadmap for rapid implementation of simpler solution to provide immediate return to lay the ground work for more complex and greater value implementation in the future.

Level 0 Standalone	Level 1 Connected app	Level 2 Richer information and interaction	Level 3 Fully closed loop and smart
Functional Description: Requirements: -Hardware -Software -Infrastructure -Process -Training Anticipated Returns:			

Year 1				Year 2			
1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr

Extra Credit: SIPOC

A SIPOC can be a useful way for defining a problem/Process/System. It traces the full value chain from suppliers all the way through Customers to help identify customer/supplier needs and all inputs the process owners need to successfully deliver their product.

Suppliers	Inputs	Process	Outputs	Customers
Requirement/Needs				

Team: 12

Point of contact:

Industry:

Setting:

Scenario: Assembly assistance

Problem /Needs Statement

This statement defines the need/problem in a clear concise and Precise manner. It defines the scope of the issue and should also include the 5 W's(who, what, where, when, why). Should only be a couple of sentences long and not provide the solution.

Description of Problem/Need:

Scenario Template

- An assembly line worker arrives at a major automotive manufacturer that has retooled the line for a new product. This has introduced new manufacturing processes, quality assurance inspection procedures, and new tools.
- The objective is to hit a certain set of product throughput with quality metrics.
- Using an augmented reality system, the worker is able to access step by step task guidance of the new assembly process that has been created for this new product. Line workers are working with production parts on the line as a part of the line ramp-up process.
- The worker is also presented with information related to their individual and line-level takt time to ensure that the desired productivity metrics are being met on the AR device.
- When an andon alert occurs, the line supervisor can determine using streaming video and audio from the affected station and resolve issues on the fly. If the issue cannot be resolved, the right person can be dispatched to the station.
- Line workers are able to close the loop with design and process engineering by providing feedback from their stations to share insights to improve the process. Live sessions are also possible with the engineering team to enhance this knowledge capture and sharing.
- Line workers are also trained to use smart tools that capture certain metrics, such as torque readings from a Bluetooth enabled torque wrench.
- Once the technician reaches the desired rate of productivity and quality, the AR application is re-configured and hardened to be used in an everyday assembly task.

Use Case Template

The Use Case Template is derived from the Scenario. It organizes the scenario into useful segments of information

Step by step task guidance

- A user requires detailed assistance to perform an operation.
- The worker is presented with a set of work instructions that are enhanced by videos of the procedure being performed by an expert.
- Depending on the process, additional 2D reference materials such as PowerPoint presentations, data from Excel spreadsheets, and/or PDF manuals will be available to the user.
- The AR device can also provide access to 3D models from the engineering design process that is overlaid on top of the parts and tools that the worker is using.
- The worker can use voice, gesture, buttons, and/or sensor-driven interactions to navigate the user interface.
- If needed, a livestreaming session with the remote expert to get guidance on how to complete a particular task.

Requirements/Needs Template

Derived from the Use Cases it should define the needs of the operator to be able to effectively accomplish the use case and meet all customer needs. Should define a need not necessarily call out a detailed hardware/software Requirement. That is left to the solution providers to creatively solve.

Step by step task guidance

- A user requires detailed assistance to perform an operation.
- The worker is presented with a set of work instructions that are enhanced by videos of the procedure being performed by an expert.
- Depending on the process, additional 2D reference materials such as PowerPoint presentations, data from Excel spreadsheets, and/or PDF manuals will be available to the user.
- The AR device can also provide access to 3D models from the engineering design process that is overlaid on top of the parts and tools that the worker is using.
- The worker can use voice, gesture, buttons, and/or sensor-driven interactions to navigate the user interface.
- If needed, a livestreaming session with the remote expert to get guidance on how to complete a particular task.

Value Propositions

This statement describes how the solution will benefit the various customers/stakeholders. Remember there are benefits beyond just dollars: quality, time, ergonomics, worker satisfaction, data visibility and richness of data gathered, etc.
Who does it benefit and how?

Value Propositions:

Maturity Model/Implementation Template

This gives a high level view and timeline for implementation of the solution. It's goal is to provide a roadmap for rapid implementation of simpler solution to provide immediate return to lay the ground work for more complex and greater value implementation in the future.

Level 0 Standalone	Level 1 Connected app	Level 2 Closing the loop with engineering	Level 3 Fully immersive and tracked
Functional description: sharing text-based work instructions with photos and videos Requirements: Hands-free device Software with integrations to the process management systems (e.g. MES and andon alert systems) Availability of connectivity and endpoint security Process engineers bought into equipping the line workers with AR Workers trained to use the AR system Anticipated returns: Shortened workforce ramp time 3 months to achieve (assuming infrastructure is ready)	Functional description: Task guidance with photos, videos, and live streaming with connections to the MES Connections with non-immersive content systems Requirements: Level 0, plus the ability to connect to content management systems and MES to display takt time	Information going back to the process engineers – metadata related to work as well as phots/videos/quality metrics being made available to the users	Full connection to the PLM – 2D/3D engineering and process changes are propagated to the workers dynamically Quality is being tracked by onboard sensors at the line and issues are caught before final inspection Smart tools and data from the line is feeding into real-time manufacturing execution systems and reconfiguring station-level takt times as necessary

Year 1				Year 2			
1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr

Extra Credit: SIPOC

A SIPOC can be a useful way for defining a problem/Process/System. It traces the full value chain from suppliers all the way through Customers to help identify customer/supplier needs and all inputs the process owners need to successfully deliver their product.

Suppliers	Inputs	Process	Outputs	Customers
Requirement/Needs				

Team: 13

Industry: Shipbuilding & maintenance

Setting: Standard maintenance

Scenario: Engine room (ship)

Problem /Needs Statement

This statement defines the need/problem in a clear concise and Precise manner. It defines the scope of the issue and should also include the 5 W's(who, what, where, when, why). Should only be a couple of sentences long and not provide the solution.

Description of Problem/Need:

Need to perform maintenance of operational military ship enclosed engine room. High turnover of technicians/junior workforce.

Who: Maintenance technician
When: Operator has maintenance indicator/system failure indicated
Why: Mission requirement / military ops

Scenario Template

The scenario is a essentially a story describing the activities and how the user interacts with the process.

Key pieces of information:

- Who is the user/operator?
- What is the Background and current state?
- What Choices must be made if any?
- What equipment, software, etc is being used? How/When?
- How is the operator interacting with the experience?

The information will them be mined for our Use Case template

The scenario should provide a complete solution to the problem/Needs Statement

Scenario Title:
Operator maintenance task
Text:
An inexperienced operator is capable of performing simple tasks that are performed frequently but needs additional assistance for maintenance that is performed infrequently.

AR is used for the more complex, less frequent maintenance tasks. When complex issues arise, the operator uses remote assistance to aid in performing the task.

Use Case Template

The Use Case Template is derived from the Scenario. It organizes the scenario into useful segments of information

User(s):

New, low skilled entry level maintenance technician + engineer (remote support)

Process Steps:

1. Logon to orient device to equipment (engine)
2. Select maintenance task to perform
3. Perform maintenance tasks
4. Record key steps (i.e. torques)
5. Task signoff / completion
6. Document key analytics

Equipment:

Device (wifi capable)

Software:

Routine task-based software with remote support / assist capabilities with digital toolkit available

Data Inputs:

Engineering work instruction (authored maintenance content

Data outputs:

Completion of maintenance including key analytics

Keywords/Classification:

Maintenance

Requirements/Needs Template

Derived from the Use Cases it should define the needs of the operator to be able to effectively accomplish the use case and meet all customer needs. Should define a need not necessarily call out a detailed hardware/software Requirement. That is left to the solution providers to creatively solve.

Data: Data storage on device

Hardware:
- Inclusive to all devices, network

Software:
- Off-line/on-line, record key data, network

System:
- IoT, secure equipment

User:
- Remote assistance / user friendly

Value Propositions

This statement describes how the solution will benefit the various customers/stakeholders. Remember there are benefits beyond just dollars: quality, time, ergonomics, worker satisfaction, data visibility and richness of data gathered, etc.
Who does it benefit and how?

Value Propositions:

Increase in consistency, quality and decrease length of time to perform the task. This will reduce the risk of future breakdowns.
Documentation of maintenance performed and key parameters.
Reduce training times

Maturity Model/Implementation Template

This gives a high level view and timeline for implementation of the solution. It's goal is to provide a roadmap for rapid implementation of simpler solution to provide immediate return to lay the ground work for more complex and greater value implementation in the future.

Level 0 Standalone	Level 1 Connected app	Level 2 Richer information and interaction	Level 3 Fully closed loop and smart
Functional Description: Requirements: -Hardware -Software -Infrastructure -Process -Training Anticipated Returns:			

Year 1				Year 2			
1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr

Extra Credit: SIPOC

A SIPOC can be a useful way for defining a problem/Process/System. It traces the full value chain from suppliers all the way through Customers to help identify customer/supplier needs and all inputs the process owners need to successfully deliver their product.

Suppliers	Inputs	Process	Outputs	Customers
Engineers	Engineering work instructions Authored AR content	Ensure maintenance	Completed maintenance tasks and document tasks completed	Management Equipment owner
Requirement/Needs				
	AR device		Completed maintenance tsaks	

Team: 14

Industry: Aerospace

Setting: Inspection of landing gear

Scenario:
On-site inspection task

Problem /Needs Statement

This statement defines the need/problem in a clear concise and Precise manner. It defines the scope of the issue and should also include the 5 W's(who, what, where, when, why). Should only be a couple of sentences long and not provide the solution.

Description of Problem/Need:
Landing gear is a critical component and requires inspection by LM at suppliers before bringing landing gear into factory.

Problem: Requires travel to supplier site for a short duration inspection.

Scenario Template

The scenario is a essentially a story describing the activities and how the user interacts with the process.

Key pieces of information:

- Who is the user/operator?
- What is the Background and current state?
- What Choices must be made if any?
- What equipment, software, etc is being used? How/When?
- How is the operator interacting with the experience?

The information will them be mined for our Use Case template

The scenario should provide a complete solution to the problem/Needs Statement

Scenario Title:
Collaborative landing gear inspection
Text:

- A supplier plan representative will arrange time and schedule the inspection with Lockheed quality team
- During the inspection, the supplier plan representative will use their wearable AR device and connect to to Lockheed's collaborate inspection software with inspection checklist
- The supplier representative will follow the instpection steps while Lockheed watches and records the inspection
- If there are issues, then the team works through the issues collaboratively
- Once complete, they perform digital sign-off

Use Case Template

The Use Case Template is derived from the Scenario. It organizes the scenario into useful segments of information

User(s):

Supplier Plan Representative

Process Steps:

1. Arrange time with Lockheed Martin (LM) and start remote telepresence
2. Begin inspection template
3. Capture result of inspection steps with signoff images if needed
4. Generate final report / signoff

Equipment:

Wearable AR device

Internet at inspection location

Software:

Remote telepresence to wearable with inspection

Data Inputs:

Work order to inspect

Inspection list

Data outputs:

Inspection results (digital images and notes)

Keywords/Classification:

Collaborative inspection

Requirements/Needs Template

Derived from the Use Cases it should define the needs of the operator to be able to effectively accomplish the use case and meet all customer needs. Should define a need not necessarily call out a detailed hardware/software Requirement. That is left to the solution providers to creatively solve.

Data:

Step by step inspection instructions

Hardware:

Wearable device

Software:

Remote telepresence to wearable with inspection checklist

System:

Lockheed QA system

User:

Supplier plan rep with Lockheed Remote Expert

Value Propositions

This statement describes how the solution will benefit the various customers/stakeholders. Remember there are benefits beyond just dollars: quality, time, ergonomics, worker satisfaction, data visibility and richness of data gathered, etc.
Who does it benefit and how?

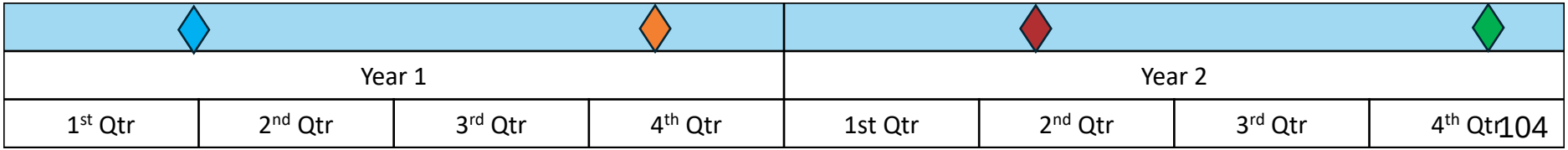
Value Propositions:

- Reduced Travel cost
- Reduced Labor cost (doing other)
- ReducedInventory cost (supplier)
- Documented QA process
- Traceability
- Future machine learning to aid via images

Maturity Model/Implementation Template

This gives a high level view and timeline for implementation of the solution. It's goal is to provide a roadmap for rapid implementation of simpler solution to provide immediate return to lay the ground work for more complex and greater value implementation in the future.

Level 0 Standalone	Level 1 Connected app	Level 2 Richer information and interaction	Level 3 Fully closed loop and smart
Paper inspection with pictures and printed reports. Anticipated Returns: Quality / safety	Digitized report created by supplier via phone/tablet Feedback between supplier and Lockheed Martin	"Our solution"	Give instructions to supplier Check in real time via artificial intelligence



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Suppliers	Inputs	Process	Outputs	Customers
Requirement/Needs				

Team: 15

Industry: Telecommunications

Setting: Field technician

Scenario:
Dealing with outliers due to aging workforce and tribal knowledge.

Problem /Needs Statement

This statement defines the need/problem in a clear concise and Precise manner. It defines the scope of the issue and should also include the 5 W's(who, what, where, when, why). Should only be a couple of sentences long and not provide the solution.

Description of Problem/Need:

1. Aging workforce – tribal knowledge
2. Documentation is not accurate
3. "Individually invented" solution
    1. Old equipment – undocumented
4. In ability to document new work processes
    1. (knowledge dissemination & transfer)

Scenario Template

The scenario is a essentially a story describing the activities and how the user interacts with the process.

Key pieces of information:

- Who is the user/operator?
- What is the Background and current state?
- What Choices must be made if any?
- What equipment, software, etc is being used? How/When?
- How is the operator interacting with the experience?

The information will them be mined for our Use Case template

The scenario should provide a complete solution to the problem/Needs Statement

Scenario Title:

Documenting outlier procedures

Text:

Field technician encounters an outlier situation. It is not documented and needs to be resolved. Currently field technician may be able to solve but it is not practical to capture and transfer this knowledge .

Currently field tech reps use tablet and phones to make notes on the solutions.

Use Case Template

The Use Case Template is derived from the Scenario. It organizes the scenario into useful segments of information

User(s):
Field Tech Rep

Process Steps:

1. Encounter outlier issue (undocumented)
2. Diagnose situation
3. Developers workaround
4. Implements solution
5. Capture new process step
6. Initiate write-back to the central database

Equipment:
- Handheld/headmounted

Software:
- Proprietary database – partly ???

Data Inputs:
- Flag the need to document the process

Data outputs:
- New process

Keywords/Classification:
- Field technician
- Outlier
- Process
- Documentation
- Success metric
- How-to
- Product category

Requirements/Needs Template

Derived from the Use Cases it should define the needs of the operator to be able to effectively accomplish the use case and meet all customer needs. Should define a need not necessarily call out a detailed hardware/software Requirement. That is left to the solution providers to creatively solve.

Data: Location, work order, customer, product / equipment

Hardware:

Handsfree/HMD, storage, connectivity, endless battery life, display
Software:
Image recognition 2D/3D, voice and gesture interface, read/write
System:

User:
Field tech rep, creators

Value Propositions

This statement describes how the solution will benefit the various customers/stakeholders. Remember there are benefits beyond just dollars: quality, time, ergonomics, worker satisfaction, data visibility and richness of data gathered, etc.
Who does it benefit and how?

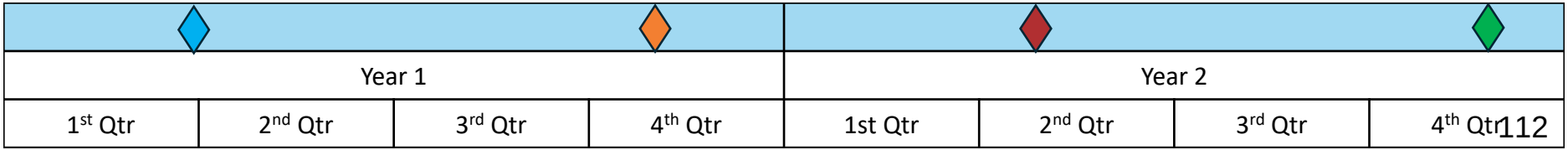
Value Propositions:

Reduce 2nd calls
Lowered training efforts
Boosts field rep confidence
Customer satisfaction

Maturity Model/Implementation Template

This gives a high level view and timeline for implementation of the solution. It's goal is to provide a roadmap for rapid implementation of simpler solution to provide immediate return to lay the ground work for more complex and greater value implementation in the future.

Level 0 Standalone	Level 1 Connected app	Level 2 Richer information and interaction	Level 3 Fully closed loop and smart
Functional Description: Requirements: -Hardware - tablet Anticipated Returns:	HMD	HMD + connectivity LTE	3D mapping



Extra Credit: SIPOC

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Suppliers	Inputs	Process	Outputs	Customers
Requirement/Needs				

Team: 16

Industry: Construction

Setting: Installation/repair

Scenario:
Operator discovers a conflict between installation and design. Requires engineering support to resolve.

Problem /Needs Statement

This statement defines the need/problem in a clear concise and Precise manner. It defines the scope of the issue and should also include the 5 W's(who, what, where, when, why). Should only be a couple of sentences long and not provide the solution.

Description of Problem/Need:
In the construction environment, on-site workers often encounter installation conflicts that require engineering support to solve. Time is critical because construction is stopped and means are required to evaluate multiple potential solutions. Virtual prototyping and AR could avoid costly trial and error approaches.

Scenario Template

The scenario is a essentially a story describing the activities and how the user interacts with the process.

Key pieces of information:

- Who is the user/operator?
- What is the Background and current state?
- What Choices must be made if any?
- What equipment, software, etc is being used? How/When?
- How is the operator interacting with the experience?

The information will them be mined for our Use Case template

The scenario should provide a complete solution to the problem/Needs Statement

Scenario Title: Engineering virtual prototyping

Text:
Construction industry tradesperson encounters installation interference that resulted from a design change. The current solution process requires trial and error approach using physical mockups / prototypes. The industry want to use virtual prototyping and AR to evaluate multiple potential solutions to avoid costly physical prototyping and accelerate the solution process.
CAD tools for virtual prototyping and AR visualization hardware and software would be chosen. Hardware tools must be suitable for use by on-site workers.

Use Case Template

The Use Case Template is derived from the Scenario. It organizes the scenario into useful segments of information

User(s):

1) Engineering designers (virtual prototyping)
2) Installation crews – AR to evaluate solutions

Process Steps:

1. Installer identifies conflict
2. Installer capture images to describe issue and transmits to engineering.
3. Engineering develops potential solutions using virtual prototyping methods
4. Installer evaluates potential solutions using AR to validate fit and function and select most efficient solution
5. Installer captures as-built condition to feed back to product model/design

Equipment:

- Scanner / camera
- CAD / prototyping tool (3D modelling)
- AR visualization hardware

Software:

- CAD/ 3D modelling
- Visualization software
- Remote assistance tool for real-time interaction

Data Inputs:

- Original 3D design
- On-site conditions (visual, audio…)

Data outputs:

- 3D virtual prototype solutions
- As-installed result/design

Keywords/Classification:

- Virtual prototype
- Conflict resolution
- Visualization tool

Requirements/Needs Template

Derived from the Use Cases it should define the needs of the operator to be able to effectively accomplish the use case and meet all customer needs. Should define a need not necessarily call out a detailed hardware/software Requirement. That is left to the solution providers to creatively solve.

Data:

Hardware:

Ruggedized tablet suitable for use in an industrial environment

Software:

Real time remove video transmission, location logging, enterprise secure user authentication

System:

Small and portable, long battery life, hands free, always connected

User:

Easy to use, limited learning required

Value Propositions

This statement describes how the solution will benefit the various customers/stakeholders. Remember there are benefits beyond just dollars: quality, time, ergonomics, worker satisfaction, data visibility and richness of data gathered, etc.
Who does it benefit and how?

Value Propositions:
Improve overall efficiency of the construction process by:
1. Enabling rapid problem identification and solution process
2. Minimizing stop work durations
3. Avoiding costly trial and error cycles that use physical prototypes
4. Avoiding multiple process cycles by sharing accurate and complete problem descriptions and values

Maturity Model/Implementation Template

This gives a high level view and timeline for implementation of the solution. It's goal is to provide a roadmap for rapid implementation of simpler solution to provide immediate return to lay the ground work for more complex and greater value implementation in the future.

Level 0 Standalone	Level 1 Connected app	Level 2 Richer information and interaction	Level 3 Fully closed loop and smart
Functional Description: Still photos Drawings (solutions) Sneaker net Anticipated Returns:	Phone conversations 3D CAD solutions Wifi connected	Scan data Virtual prototypes (multiple)	Design feedback; as-built to base design

Year 1				Year 2			
1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr

Extra Credit: SIPOC

A SIPOC can be a useful way for defining a problem/Process/System. It traces the full value chain from suppliers all the way through Customers to help identify customer/supplier needs and all inputs the process owners need to successfully deliver their product.

Suppliers	Inputs	Process	Outputs	Customers
Requirement/Needs				

Team: 17

Point of contact:

Industry: Any discrete manufacturing

Setting: Engineering/Development

Scenario: Design review

Problem /Needs Statement

This statement defines the need/problem in a clear concise and Precise manner. It defines the scope of the issue and should also include the 5 W's(who, what, where, when, why). Should only be a couple of sentences long and not provide the solution.

Description of Problem/Need:
Review the detailed design to ensure that the design implementation has met the requirements. All lifecycle stakeholders – designers, engineers, mfg, customer/user, logistics. Held early in the lifecycle in a collaborative manner.
Why AR? Size/scale of design. Good comparison to real life model. Interactive capabilities. Real time modification impacts. Real time analysis of design. Form/fit/function.
Eng design review -> immersive eng design review

Scenario Template

The scenario is a essentially a story describing the activities and how the user interacts with the process.

Key pieces of information:

- Who is the user/operator?
- What is the Background and current state?
- What Choices must be made if any?
- What equipment, software, etc is being used? How/When?
- How is the operator interacting with the experience?

The information will them be mined for our Use Case template

The scenario should provide a complete solution to the problem/Needs Statement

Scenario Title: Design review procedure

Text:
Designers/engineers/program mgr.
All review the design package. Design revisions as needed.
CAD/CAM/PLM/tablet/headsets.
Using the model to ensure design is complete.
Remote assistance/collaboration enabler.
Navigate around the model, check form, fit, function.
Modify as necessary. ECPs.

Use Case Template

The Use Case Template is derived from the Scenario. It organizes the scenario into useful segments of information

User(s): Designers/Engineers

_____

Process Steps:

1. Convene the participants
2. Bring in design / load the design
3. Position the design in review space
4. Conduct review
5. Modify/markup model as necessary
6. Check measurements/tolerances
7. Check for producibility
8. Check for maintainability

Equipment:
The digital enterprise system. Wearables, tablets, mobile devices.

Software: PLM. Visualisation sw.

Data Inputs: Design/CAD model. Requirements. Environments.

Data outputs: Reviewed desing with markups

Keywords/Classification: Design

Requirements/Needs Template

Derived from the Use Cases it should define the needs of the operator to be able to effectively accomplish the use case and meet all customer needs. Should define a need not necessarily call out a detailed hardware/software Requirement. That is left to the solution providers to creatively solve.

Data:

Hardware:

Software: SEE PREVIOUS CHART

System:

User:

Value Propositions

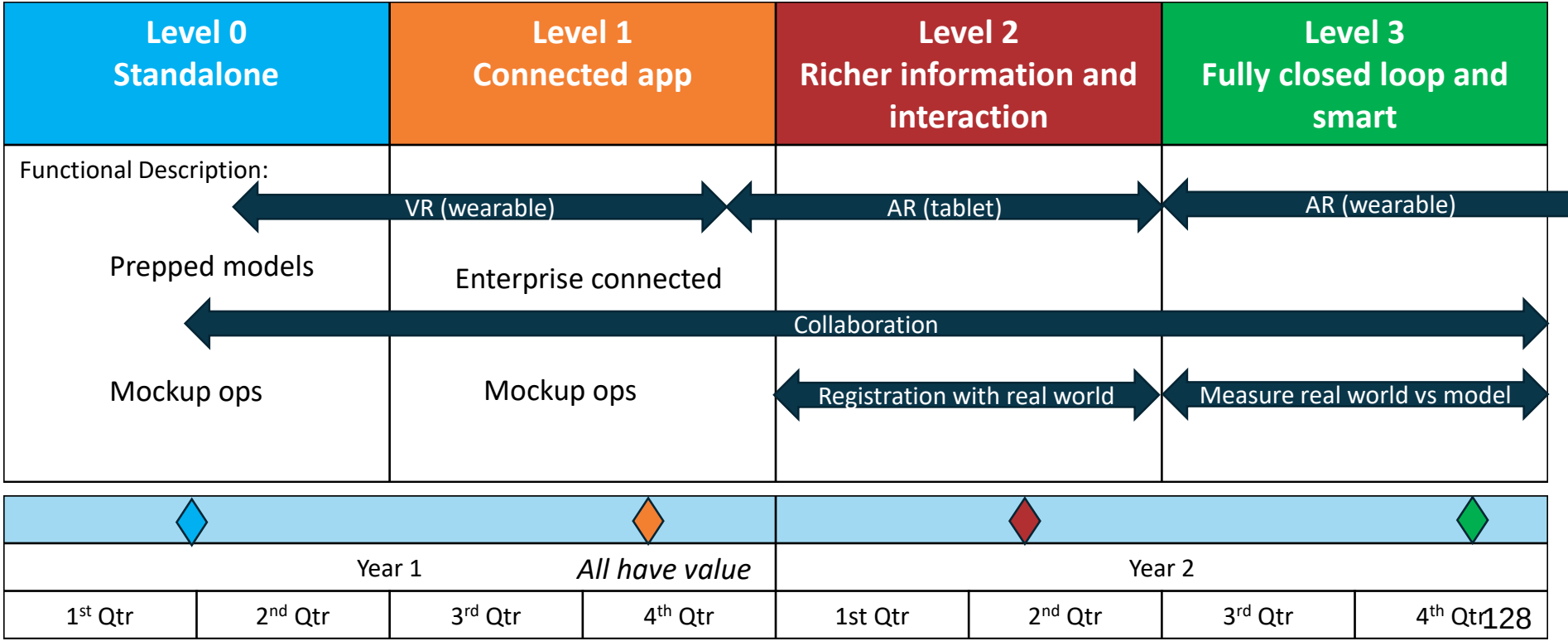
This statement describes how the solution will benefit the various customers/stakeholders. Remember there are benefits beyond just dollars: quality, time, ergonomics, worker satisfaction, data visibility and richness of data gathered, etc.
Who does it benefit and how?

Value Propositions:

Better design. Less costly and less time from concept to design. Less design meetings. Ensures requirements are met early in life cycle.

Maturity Model/Implementation Template

This gives a high level view and timeline for implementation of the solution. It's goal is to provide a roadmap for rapid implementation of simpler solution to provide immediate return to lay the ground work for more complex and greater value implementation in the future.



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Suppliers	Inputs	Process	Outputs	Customers
Requirement/Needs