

Achieving Astronomical Gains in Information Flow

QUEST to the Moon!

Anusha
Dixit



Alex
Leipold



Neehar
Peri



Uday
Warier



Emma
Wilkins





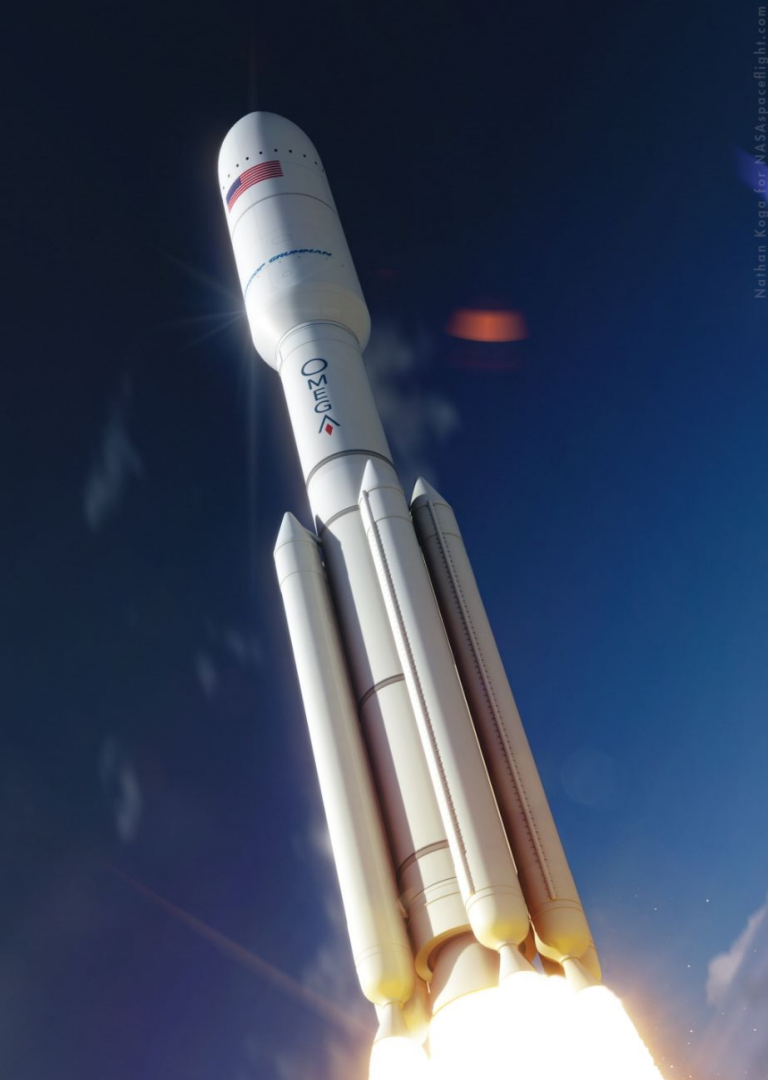
Background



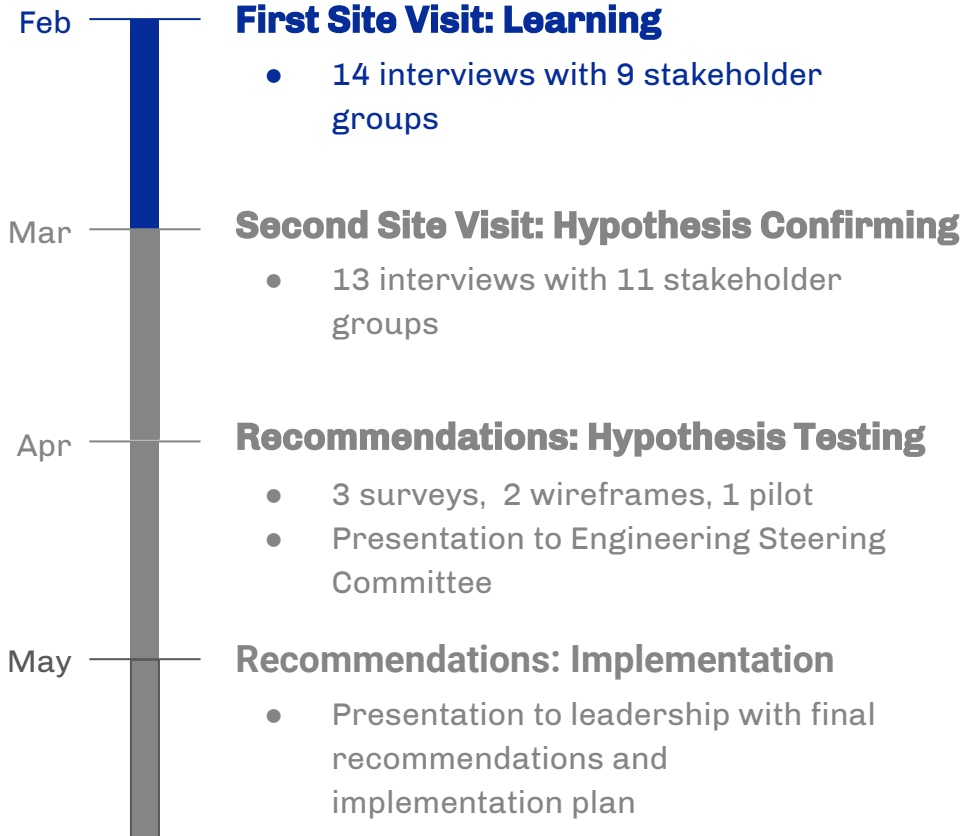
Client



NORTHROP GRUMMAN



Nathan Kego for NASA.spaceflight.com



Reduce Inventory Waste

Maintain Lessons Learned
Over Time

Update Documentation
with Visuals

Optimize Production
Objectives

Opportunities for Improvement

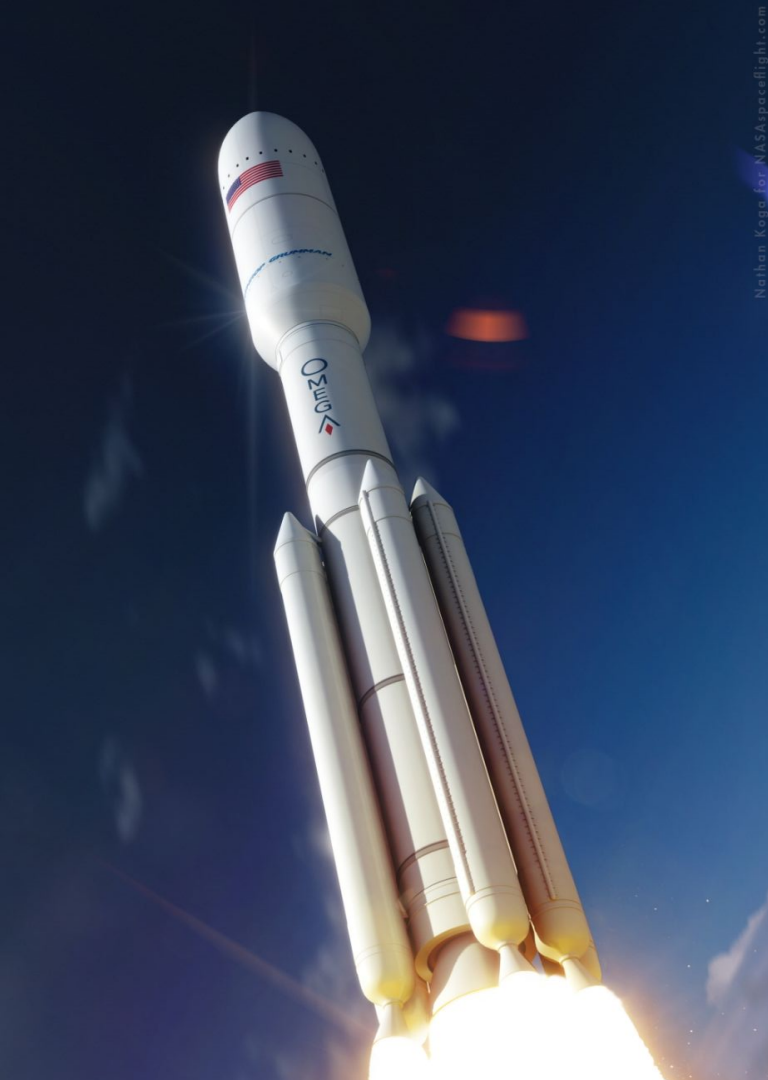
Streamline Handoff
Process

Prioritize Deviations Queue

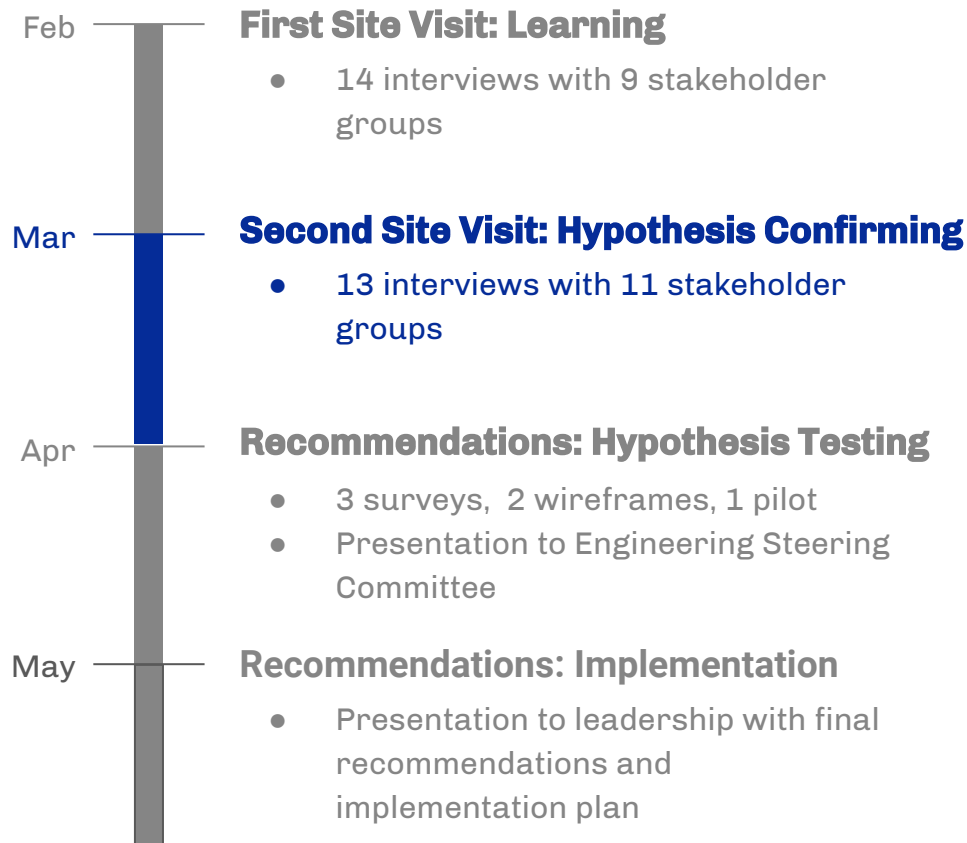
Establish Instant
Communication Platform

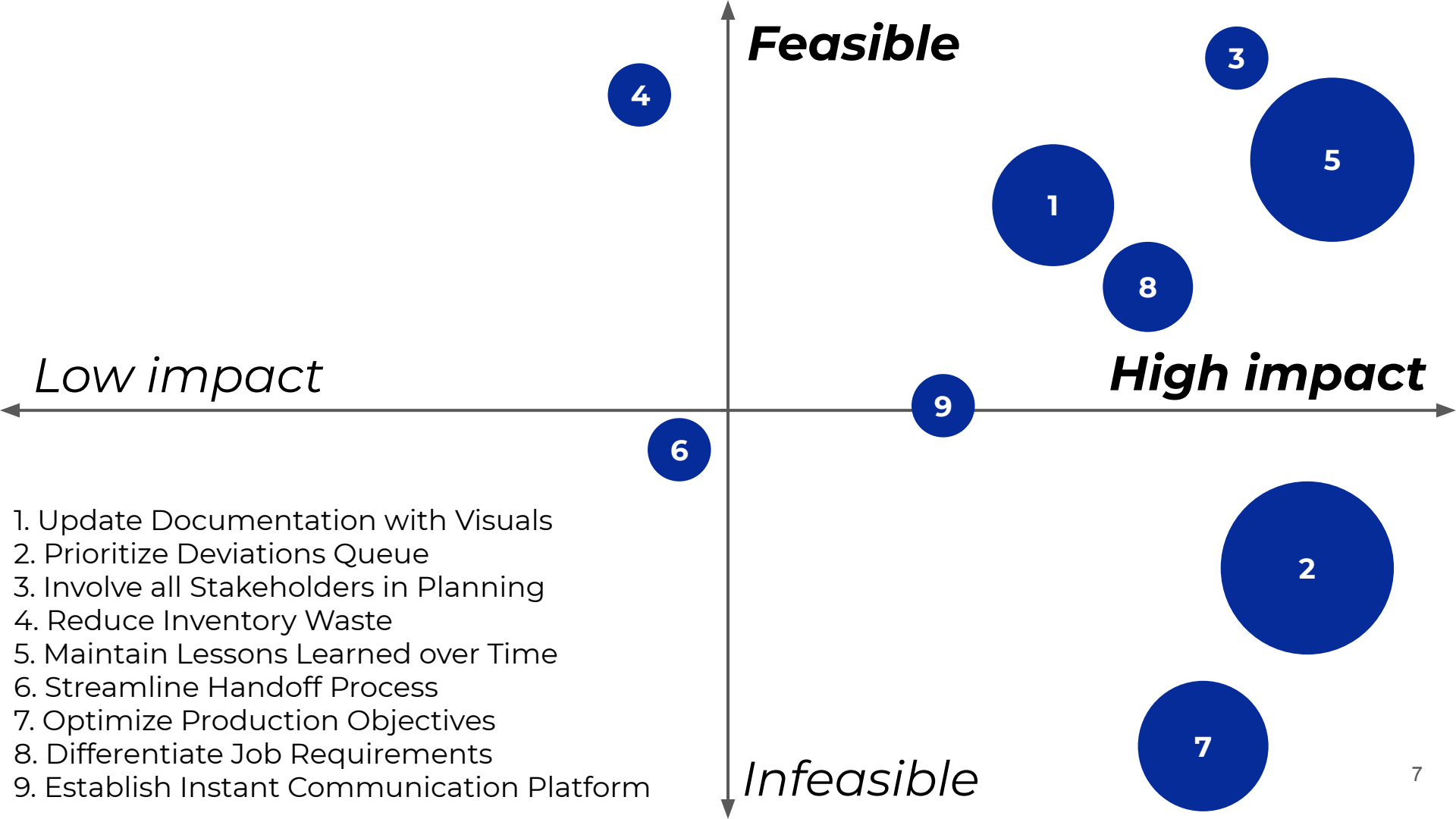
Involve all Stakeholders in
Planning

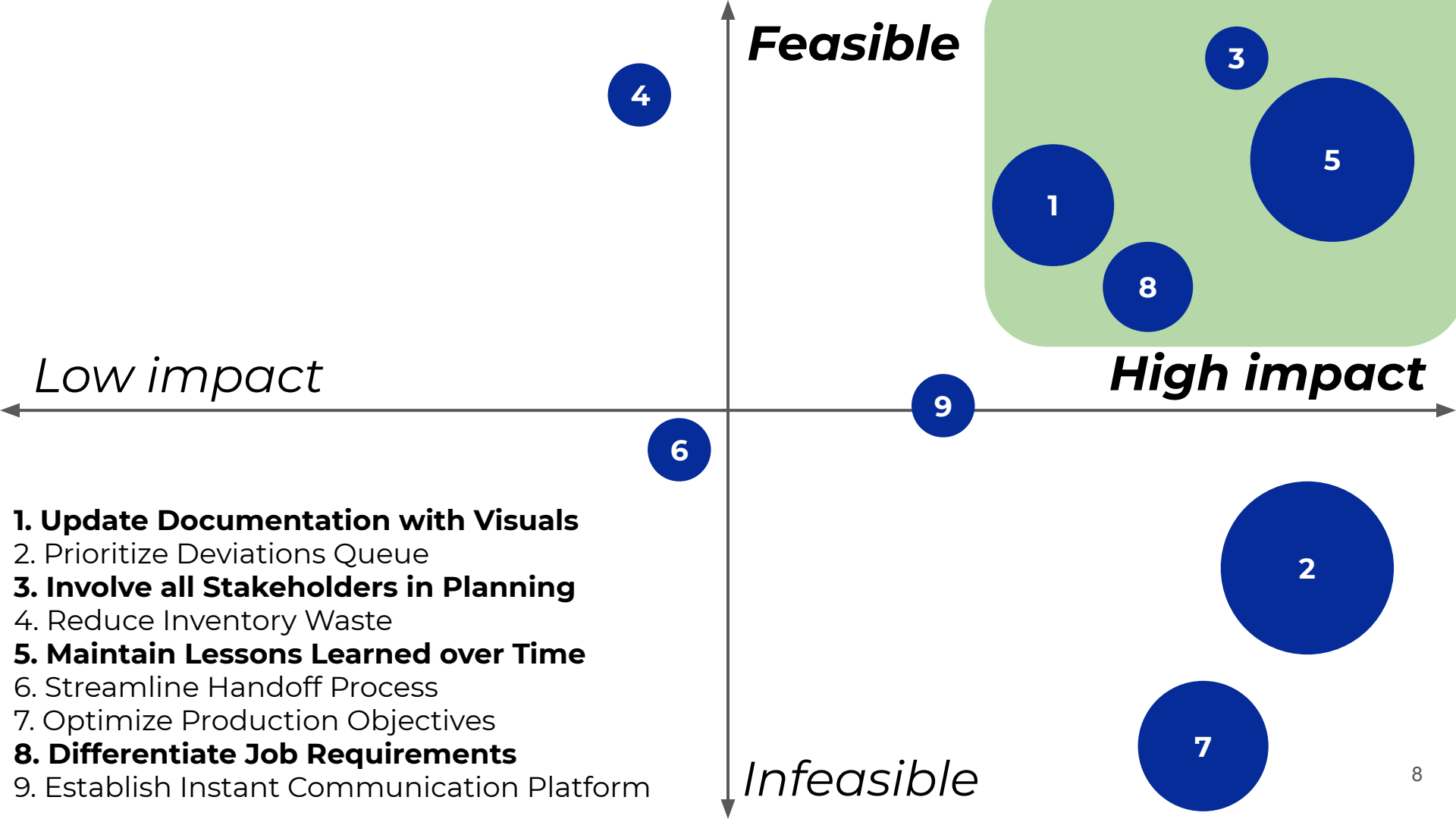
Differentiate Job
Requirements

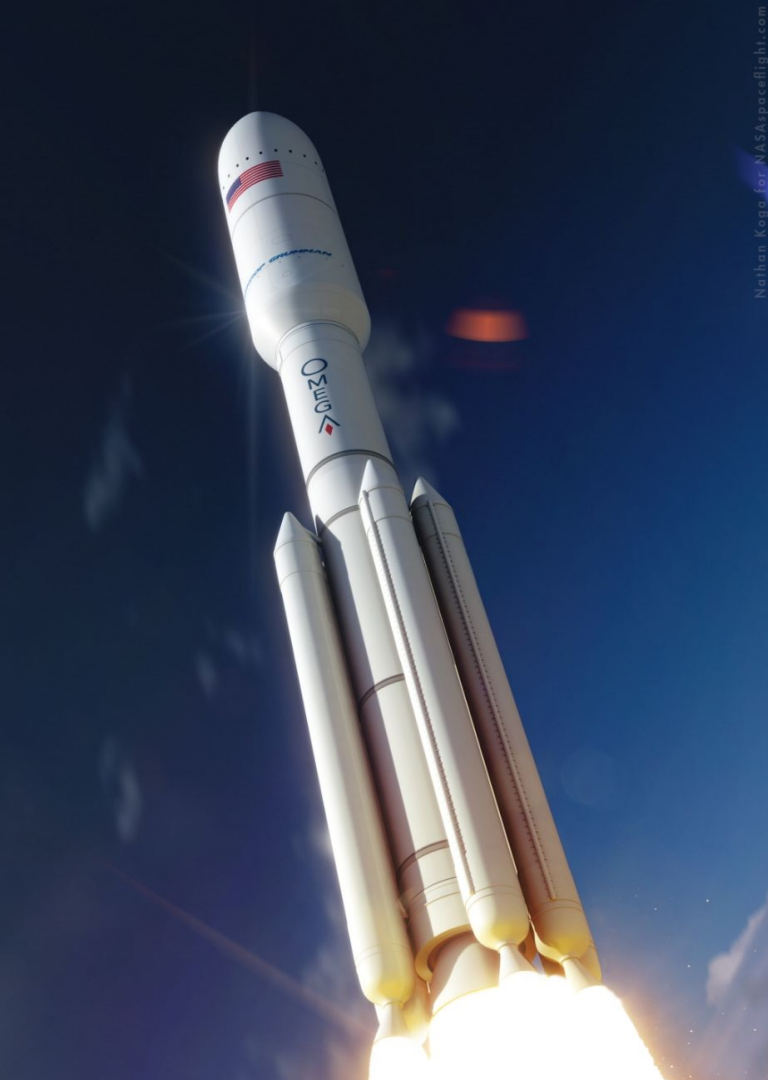


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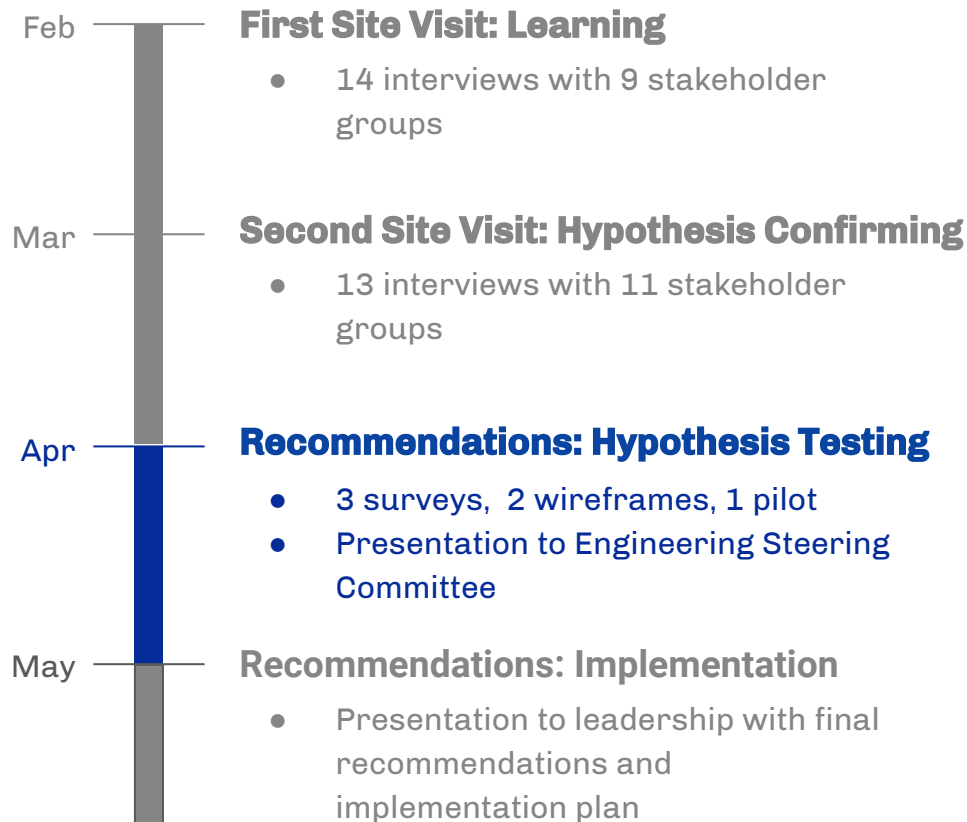








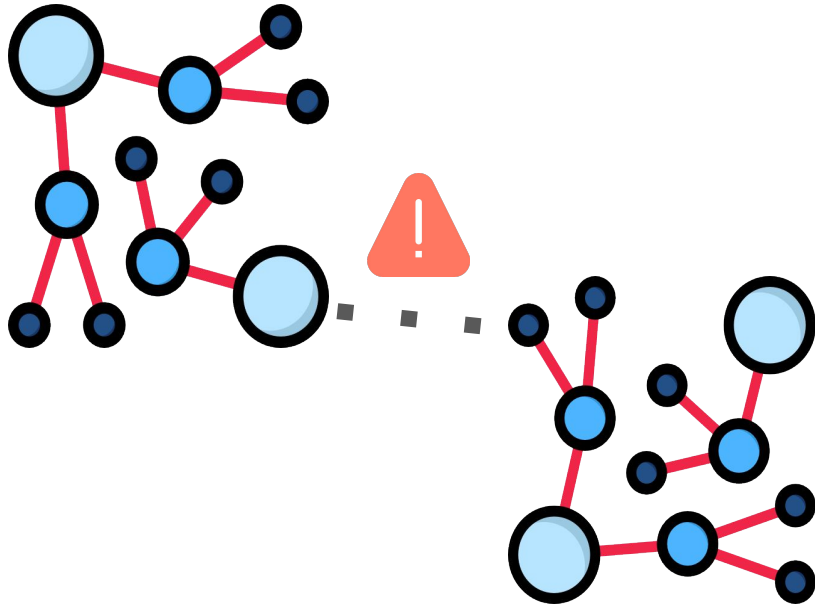
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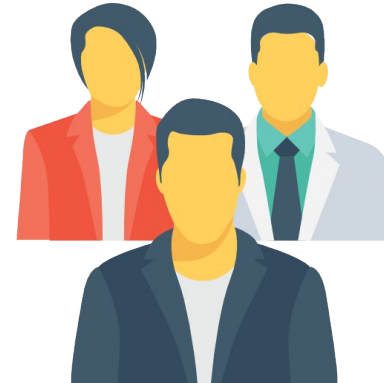
Short-Term Recommendation #1



Kickoff Meetings



Current State



Kickoff meetings do not include all stakeholders and lack a unified structure

Meeting Agenda Template

KICKOFF MEETING MOCK AGENDA

Date: Time: Location:

INFORMATION ABOUT CONTRACT

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed ornare ornare feugiat. Nulla facilisi. Pellentesque suscipit dolor augue, sit amet suscipit lacus cursus nec. Proin cursus libero at finibus rutrum, sodales.

RESPONSIBILITIES OF STAKEHOLDERS

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed ornare ornare feugiat. Nulla facilisi. Pellentesque suscipit dolor augue, sit amet suscipit lacus cursus nec. Proin cursus libero at finibus rutrum, sodales.

CUSTOMER REQUIREMENTS

Pellentesque suscipit dolor augue, sit amet suscipit lacus cursus nec. Proin cursus libero at finibus rutrum, sodales.

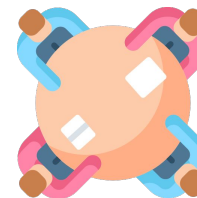
SME WITH PAST EXPERIENCE

Name:
Email:
Phone:
KMS link:

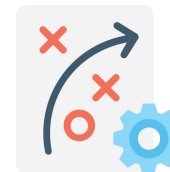
PROJECT TIMELINE

- June 2020
XXX
- July 2020
XXX
- August 2020
XXX
- September 2020
XXX

Ideal State



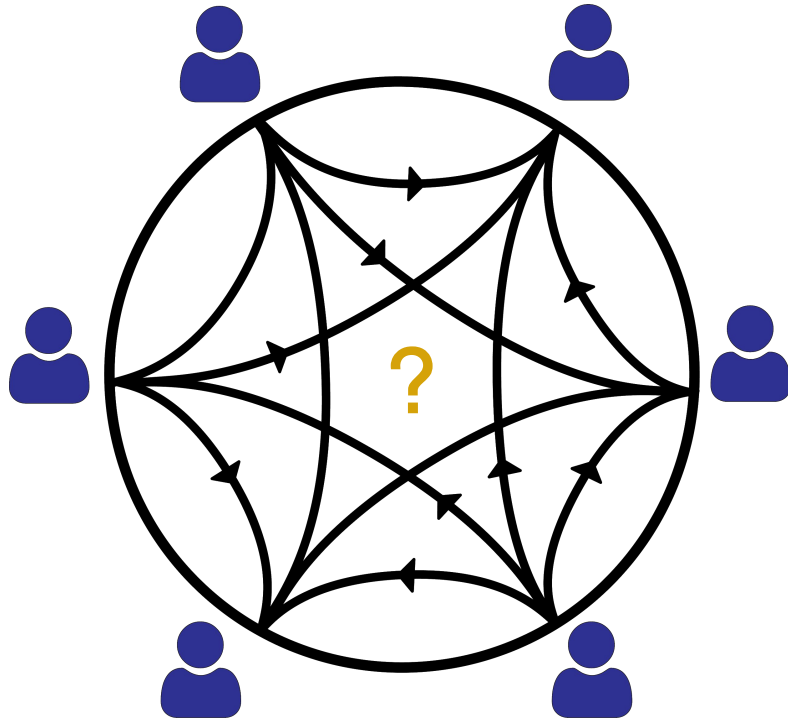
Engage **all** stakeholders at start of program



Improved planning and scheduling

Short-Term Recommendation #2

Roles and Responsibilities



Current State

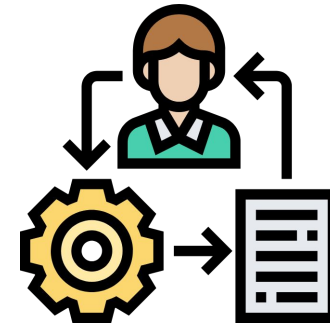
- 1 Employee roles are fluid over a project
- 2 Personnel changes lead to confusion

Complex processes lead to **bottlenecks** in identifying roles and responsibilities

Roles and Responsibilities

	Role A	Role B
Deliverable #1	R	C
Deliverable #2	A	
Deliverable #3	C	A
Deliverable #4	I	R
Responsible		
Accountable		
Consulted		
Informed		

Ideal State



Maintain record of **dynamic** roles and responsibilities through **RACI Matrix**

Validation

70% believe kickoff meetings would generate **“a great deal” of value**

60% believe the role definition process is **“somewhat effective”**

Could “give downstream stakeholders **advance warning** of a need for resources”



Long-Term Recommendation



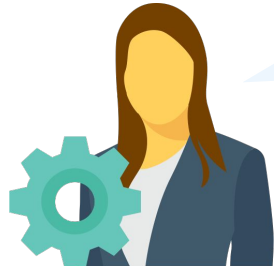
Knowledge Management

Current State

Ideal State



How did we use that piece of machinery 3 years ago?



How did we design that part in the last project we had with this client?

Use a Knowledge Management System to capture **key decision points** and **lessons learned**



Your Videos

Dashboard

Upload

Edit

Comments

Video Name

Video Description

Tags

tooling

mixing / casting

insulation

lining

assembly

casting

testing

final assembly

ignition

TSRM

Generated Narration Leave As Is Edit

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Text and video-based knowledge management system (KMS)



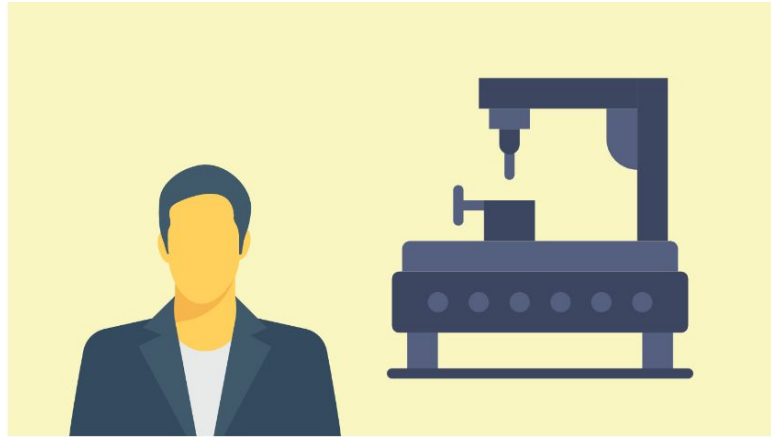
Ease of upload



Ease of modification



Ease of searchability



Project C: Using Machine 2 for Process C

Shelly F.
8/25/2020

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Comments



Mark B.

2 weeks ago

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Shelly F.

2 weeks ago

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Ask A Question

Type something...

Text and video-based
knowledge management
system (KMS)



Ease of
upload



Ease of
modification



Ease of
searchability



Upload Video

Filter By:



Recent Video Views:



Project B Relevant Videos:



Text and video-based
knowledge management
system (KMS)



Ease of
upload



Ease of
modification



Ease of
searchability

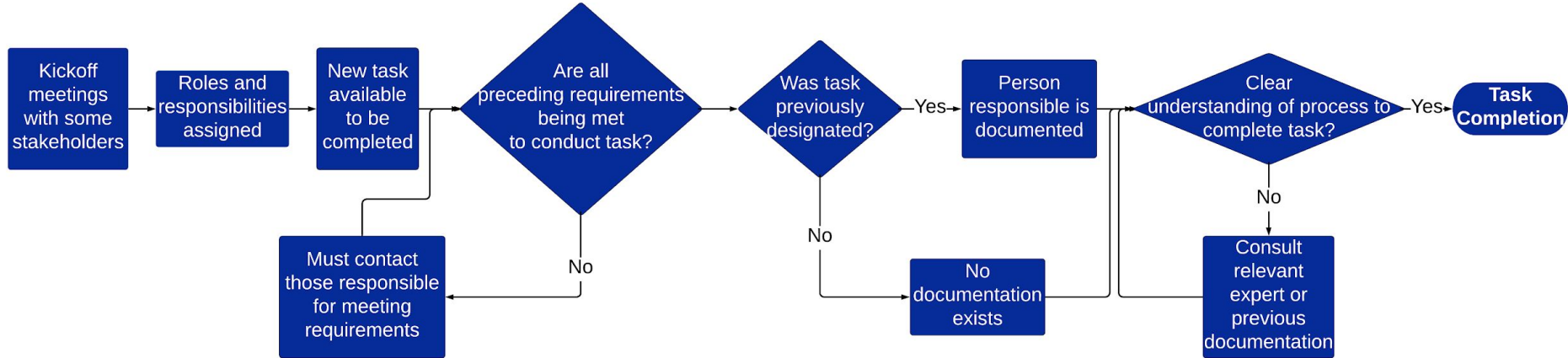
Validation

79% are aware of the current text-based lessons learned repository

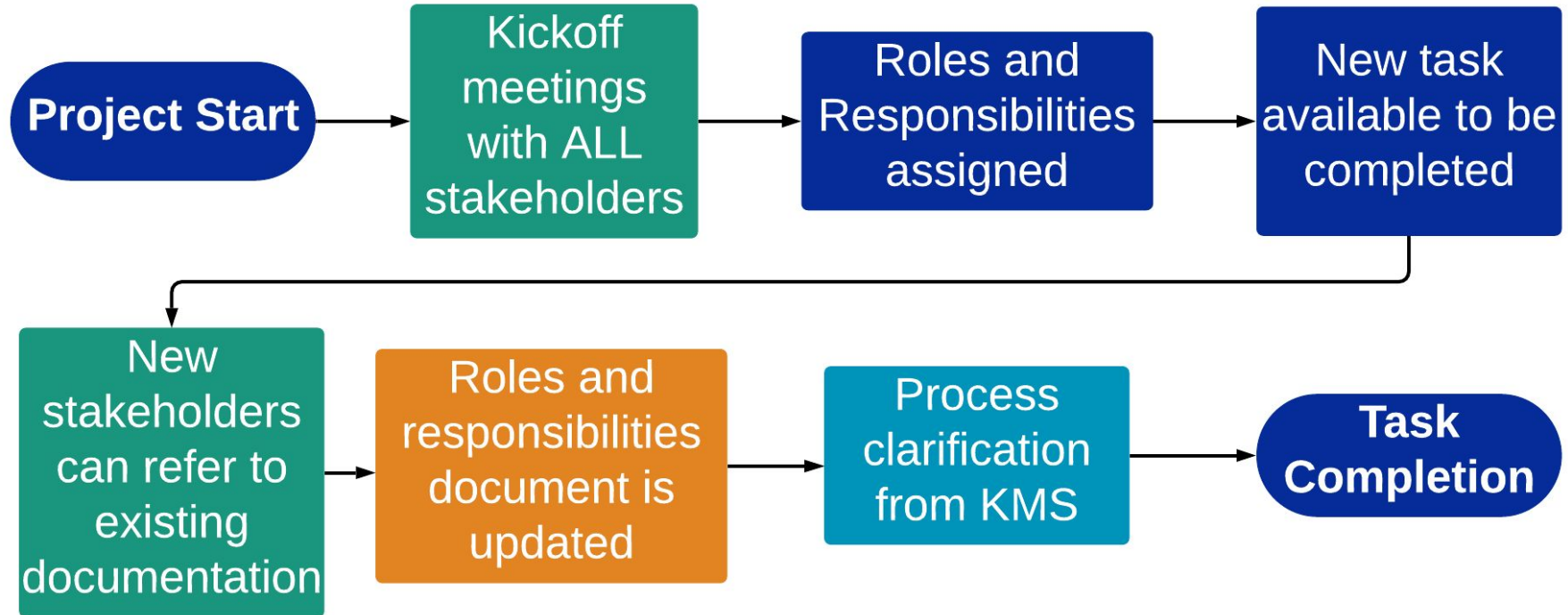
63% indicated that they don't regularly use this repository

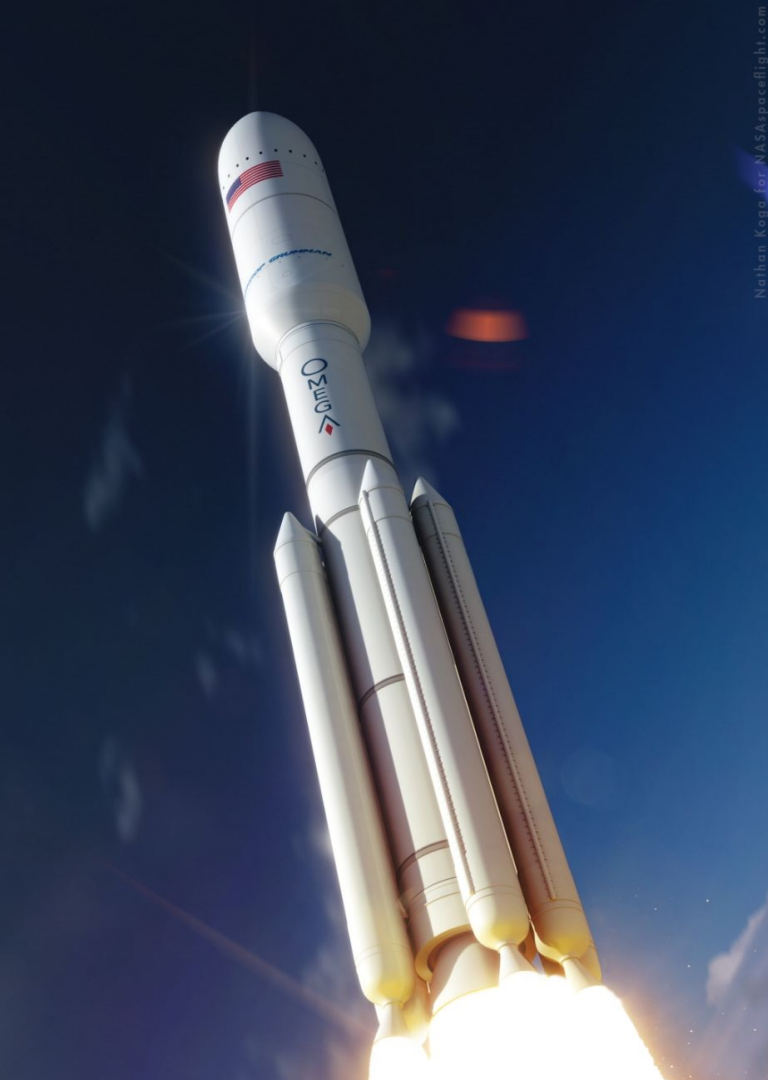
“This system **would be great** because the current system(s) have information everywhere and it's difficult to find what you're truly looking for”

Original Process Flow

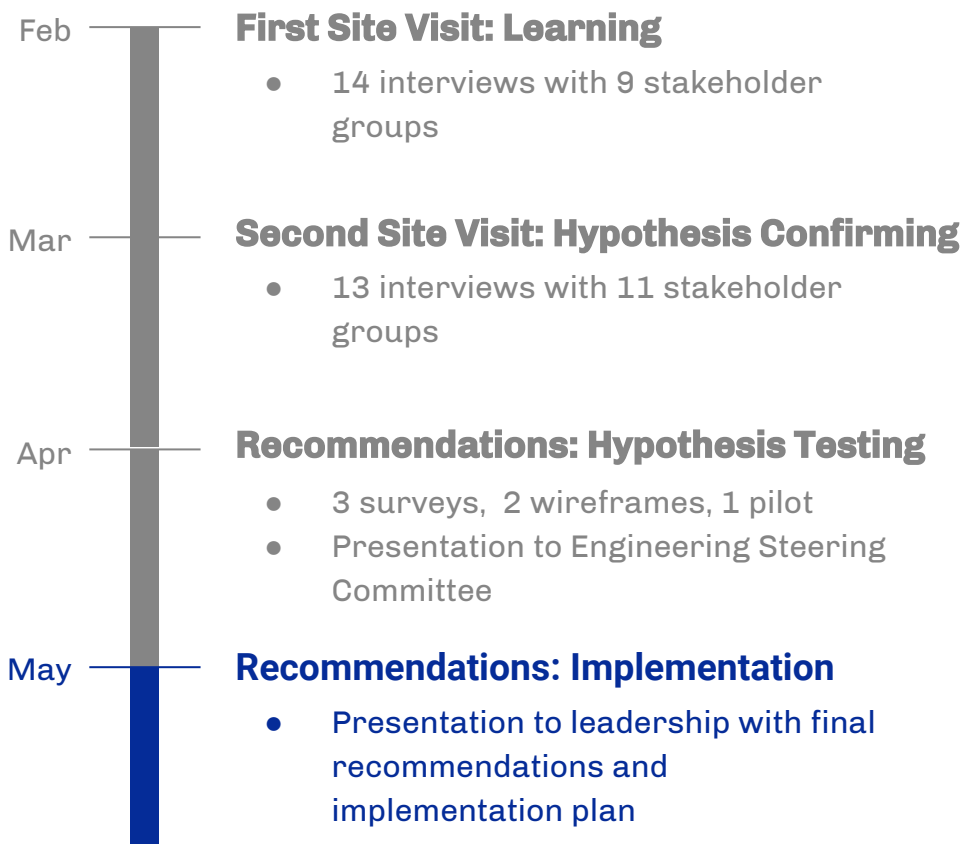


Improved Process Flow



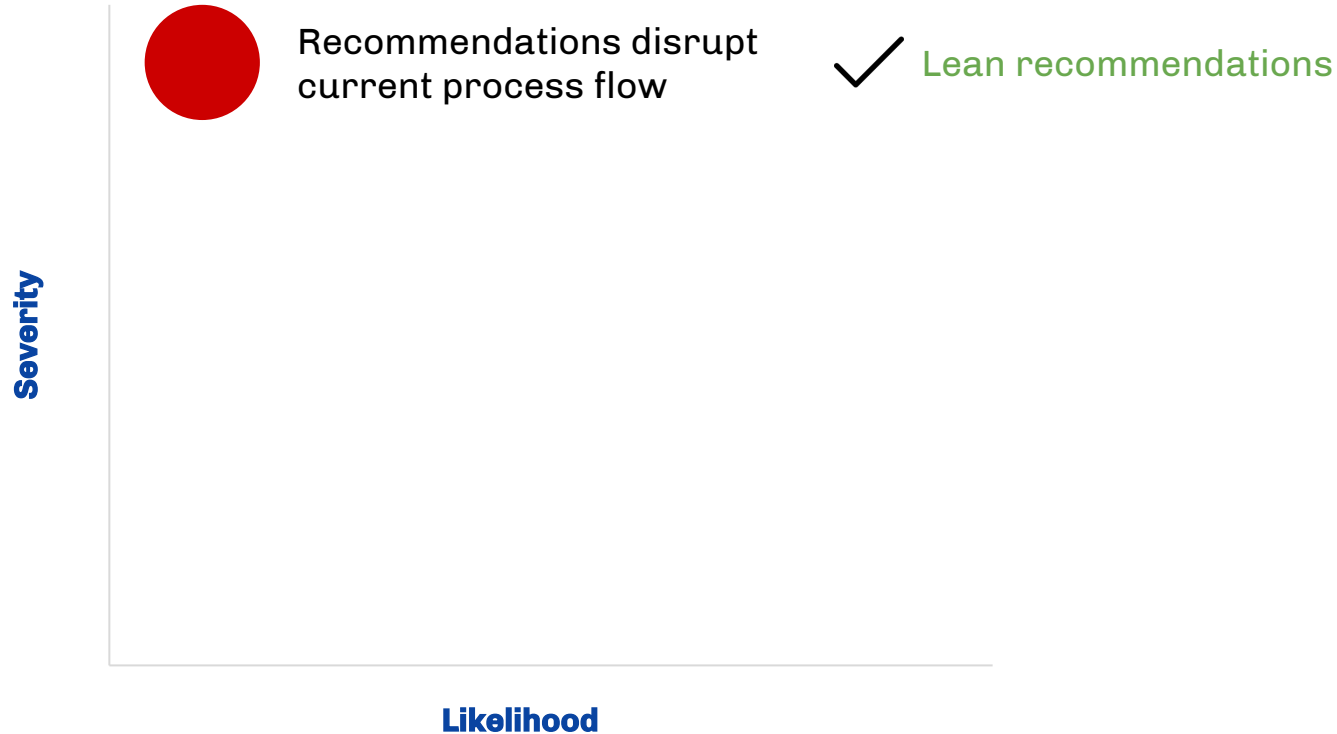


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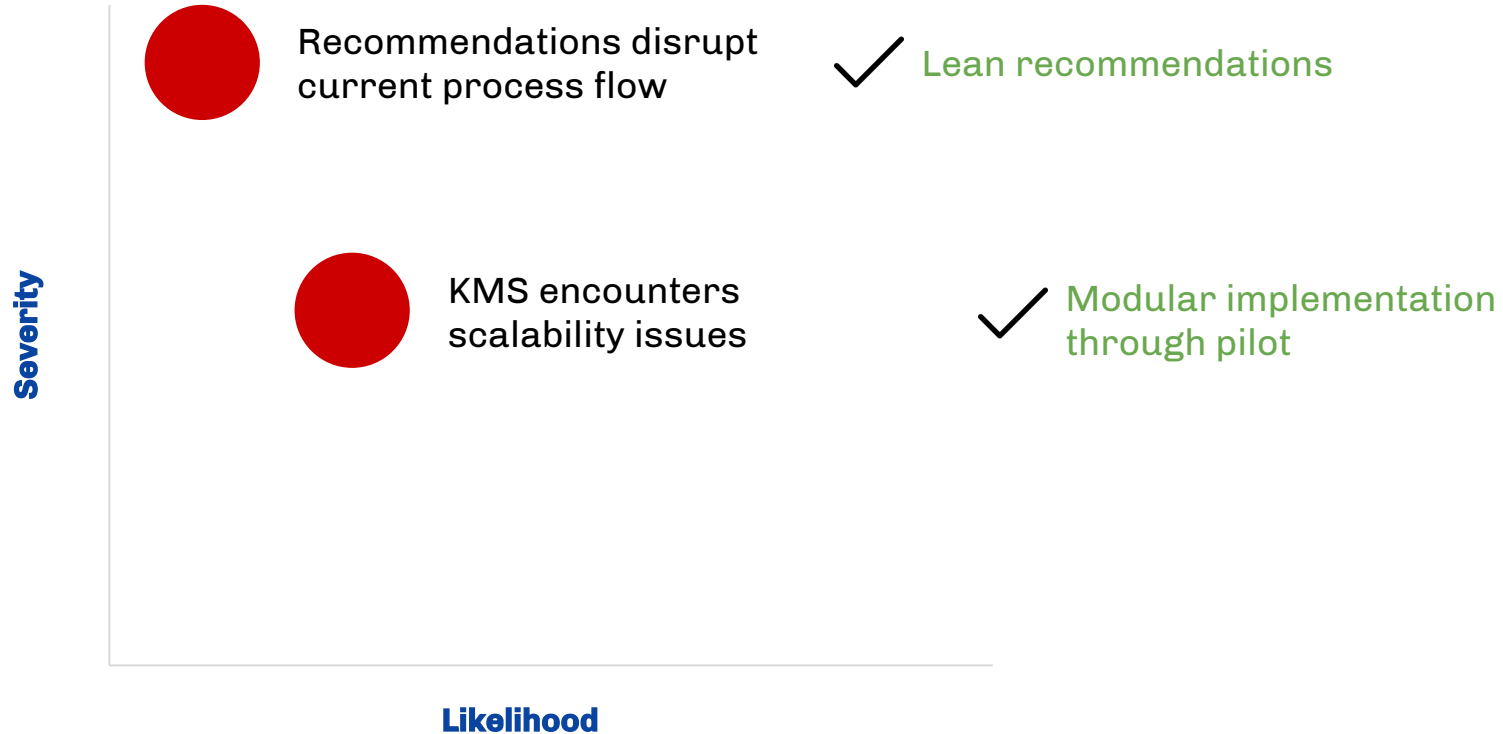


Risk Mitigation

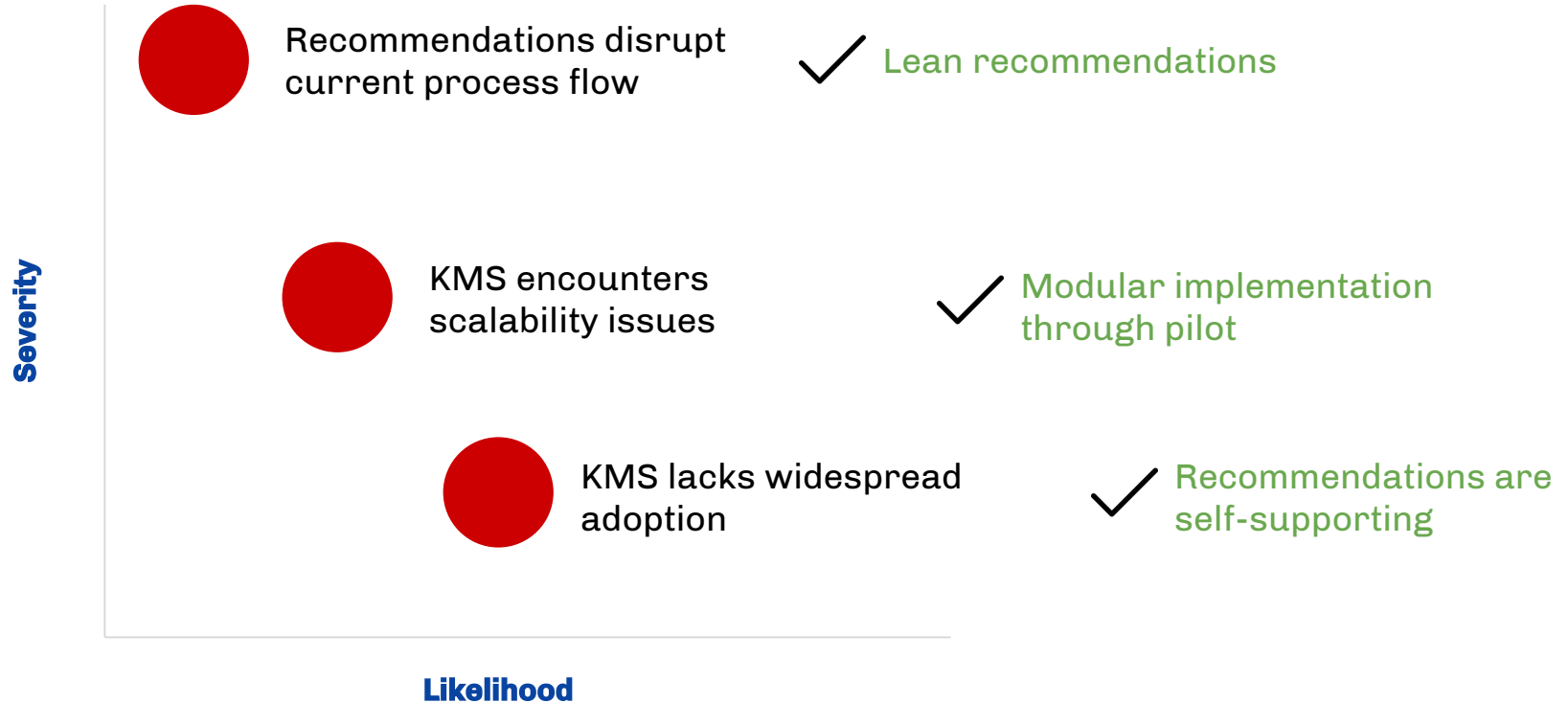
Risk Mitigation



Risk Mitigation



Risk Mitigation



Financial Considerations



Financial Considerations

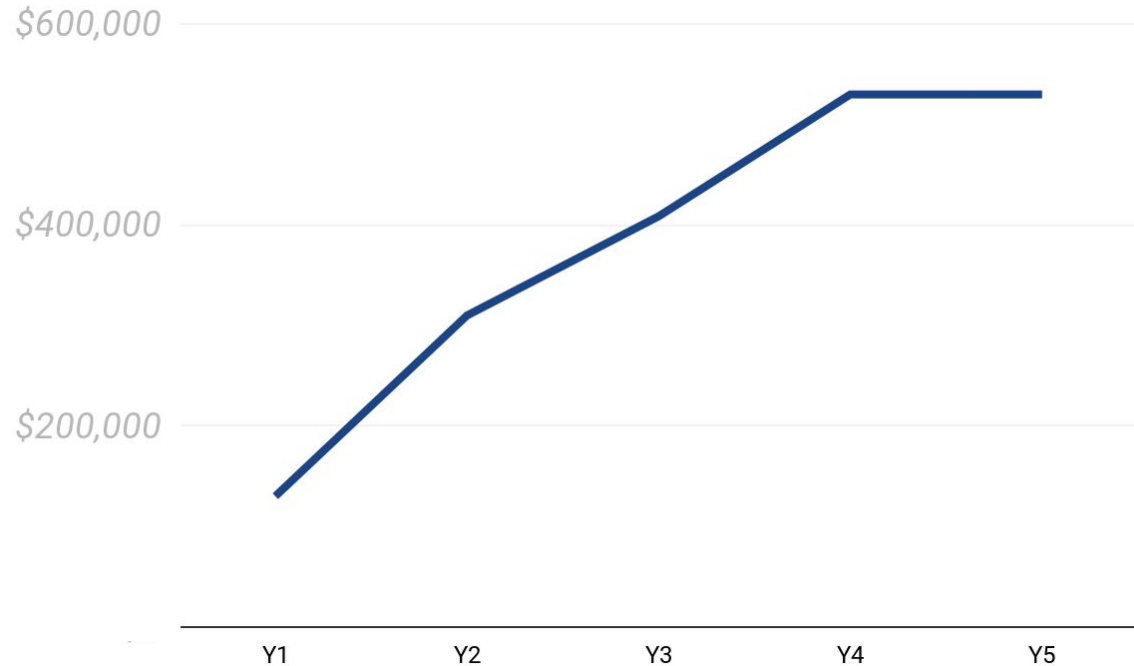
\$380,000

In average annual savings

PRODUCTIVITY GAINS

PROACTIVITY GAINS

ROOT CAUSE ANALYSIS



Impact

Background

Short-Term #1

Short-term #2

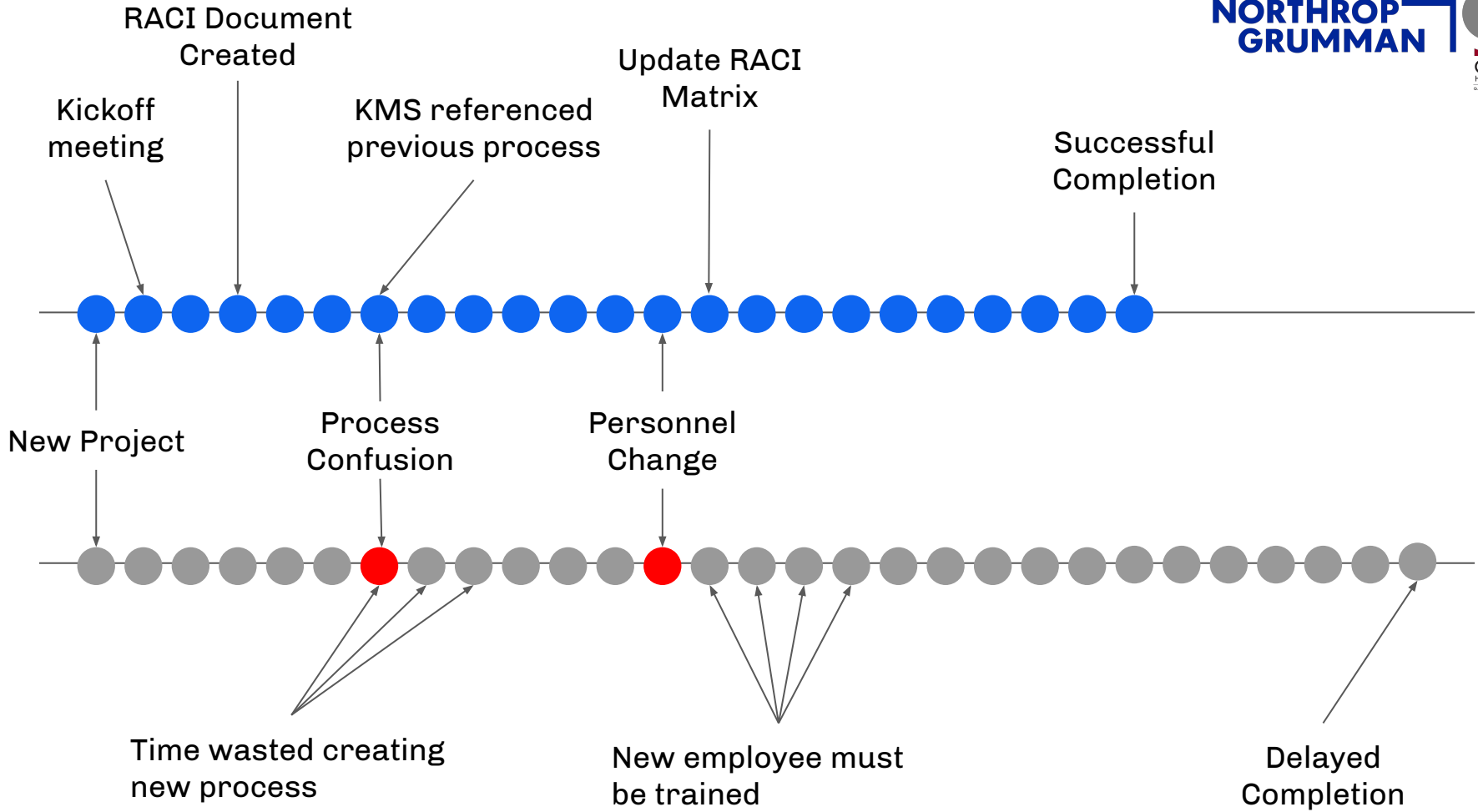
Long-term

Risk Mitigation

Financial Considerations

Impact





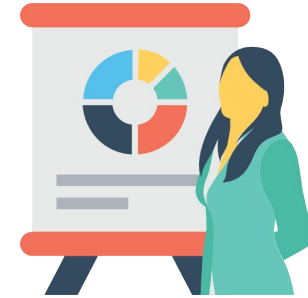
Benefits



Increase
Productivity



Capture Employee
Knowledge



Facilitate Continuous
Improvement

Thank you!



Appendix





Appendix A: Video-based KMS



Upload Video

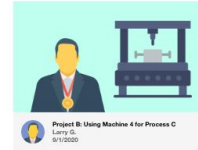
Filter By:



Recent Video Views:



Project B Relevant Videos:



Machine 1 Relevant Videos:



Videos by Arthur M.:





Upload Video

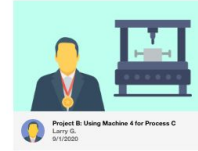
Filter By:



Recent Video Views:



Project B Relevant Videos:



Machine 1 Relevant Videos:



Videos by Arthur M.:





Upload Video

Process C

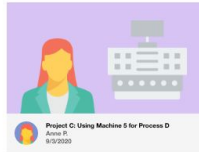
Machine 2

Machine 5

Relevant Videos According to Search:



Other Videos You Might Be Interested In:



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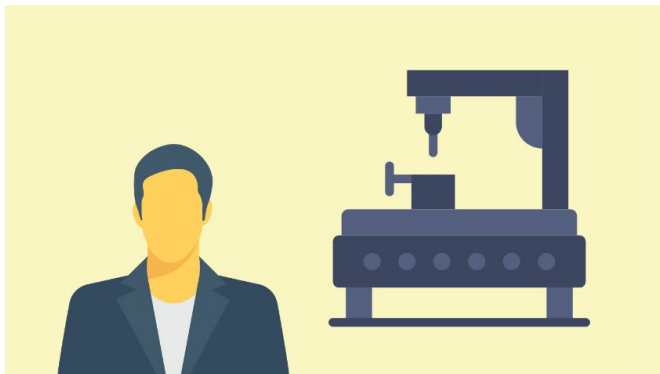
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Project C: Using Machine 2 for Process C
Shelly F.
8/25/2020

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Comments



Mark B. 2 weeks ago
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Shelly F. 2 weeks ago
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Upload

Edit

Comments

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Filter ▼

Video	Title	Visibility	Restrictions
<input type="checkbox"/> 	Project A: Using Machine 4 for Process B Mark B. 8/27/2020	Draft	None
<input checked="" type="checkbox"/> 	Project A: Using Machine 5 for Process B Mark B. 8/27/2020	Visible	Project A Employees
<input type="checkbox"/> 	Project A: Using Machine 6 for Process B Mark B. 8/27/2020	Visible	None
<input type="checkbox"/> 	Project A: Using Machine 1 for Process B Mark B. 8/27/2020	Visible	None

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Edit

Comments

Filter

Video


Title

Visibility

Restrictions

1 — 2 — 3 — 4

Step 1 Step 2 Step 3 Step 4



Drag and drop a file here
or

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Comments

Filter ▼

Video

Title

Visibility

Restrictions



Video Name

Required Field

Video Description

Required Field

Tags

- tooling
- mixing / casting
- insulation
- lining
- assembly
- casting
- testing
- final assembly
- ignition
- TSRM

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Appendix B: Text-based KMS



Filter By Project

Select ▼

Search All...

Search

Sort By

Select ▼

New Question

Your Previous Questions

 Name Surname 1h ago

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 Name Surname 1h ago

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 Name Surname 1h ago

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SEND



Filter By Project

Select

Filter By Client

Select

Filter By Date

Select

Sort By

Select

Search...

Search



Name Surname

1h ago

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Name Surname

1h ago

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Write a Response...



Name Surname

1h ago

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Write a Response...



Name Surname

1h ago

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Name Surname

1h ago

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut ero labore et dolore magna aliqua. Ut enim ad minim veniam!



Name Surname

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut ero labore et dolore magna aliqua. Ut enim ad minim veniam!

Write a Response...





Filter By Project

Select

Search All...

Search

Sort By

Select

New Question

Question:

Required Field

Topics

- tooling
- mixing / casting
- insulation
- lining
- assembly
- casting
- testing
- final assembly
- ignition
- TSRM



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CONTACT US

+XXX XXX XXXX
somenorthropemail@NG.com
Office 347 Bldg. 5

ADDITIONAL HELP

How to Upload Videos
How to Tag Videos
How to Filter Results
FAQ

INFORMATION

About Northrop Grumman KMS
Terms & Conditions
Online Help

Enter Secure Email Address To Receive Assistance:

Please be aware that this is a secure software.
Terms & Conditions
Please do not enter personal email.

Email Address

SEND



Appendix C: KMS Pilot

Name	Date	Customer Requirement	Description of Problem	Description of Solution
Example Project Engineer #1	4/2/20	Impulse vs. Volume	Customer requests material X with an impulse of Y within certain volume Z	Used material A instead, achieved maximum impulse possible within volume constraint



Appendix D: Cost-Benefit

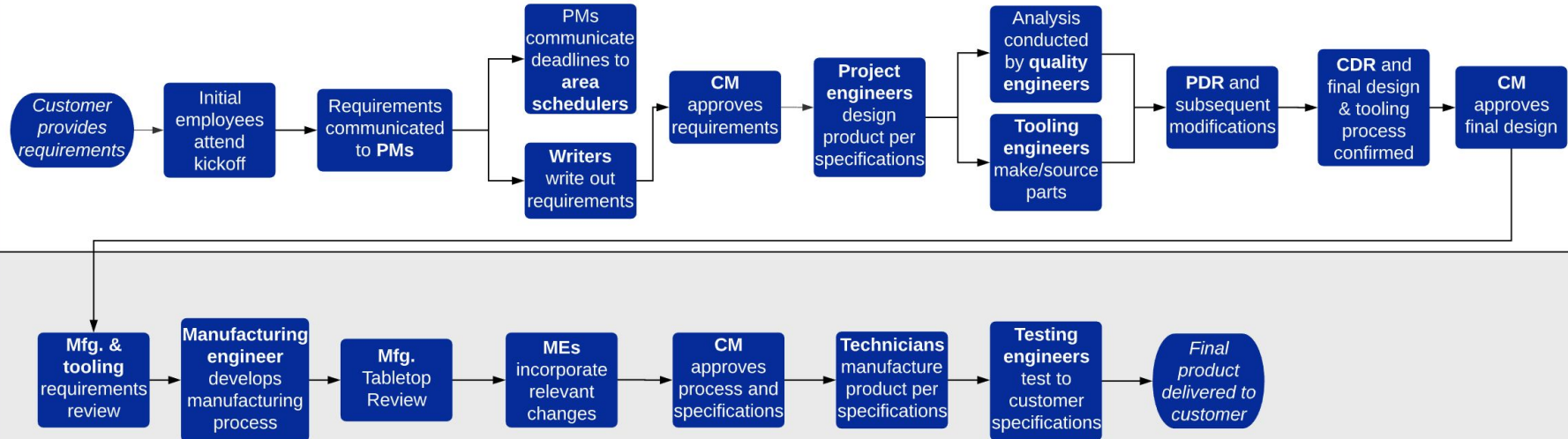
Key Assumptions

Cost of Body Camera	\$315 (including body strap attachment)
Number of Buildings Using Cameras	28
Hours for Command Media Update	80
KMS Development Costs	\$36,000 (200 hours at Engineering exempt rate)
Yearly Maintenance Costs	\$63,000 (annual budget for engineering software)
Hours to Develop Training Resources	40
Number of Stakeholders Trained	79 (ME, PE, PM) in first month; 124 in seventh month

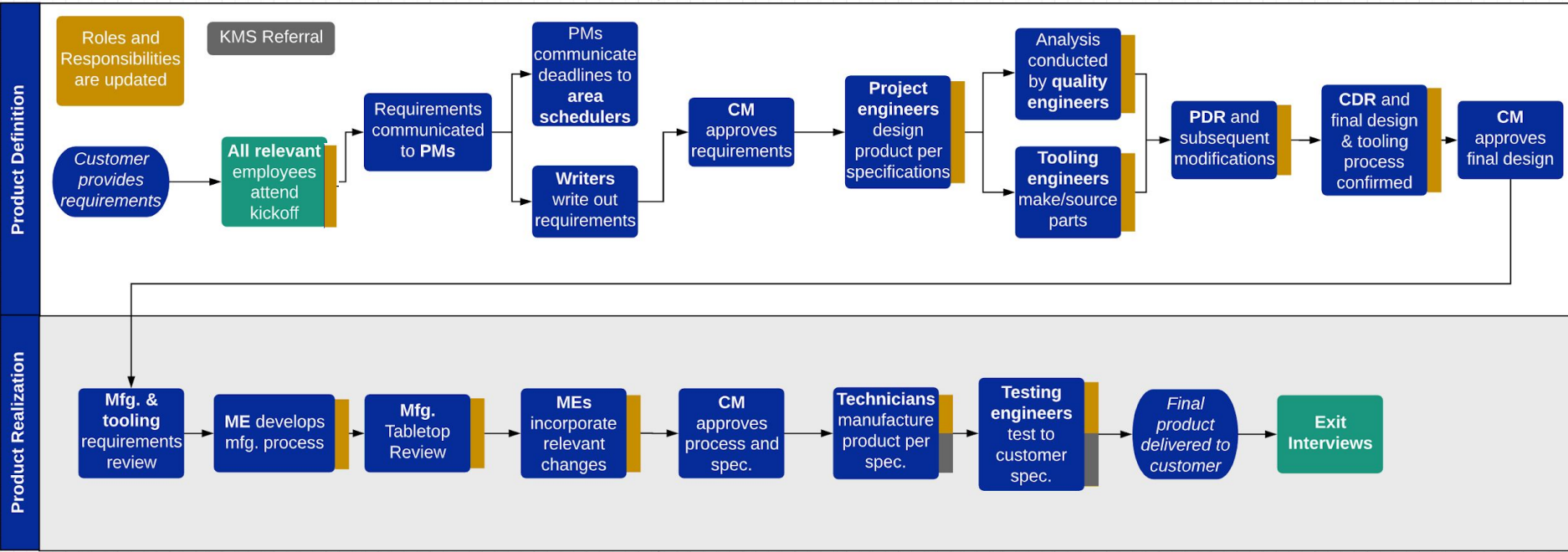


Appendix E: Process Flow

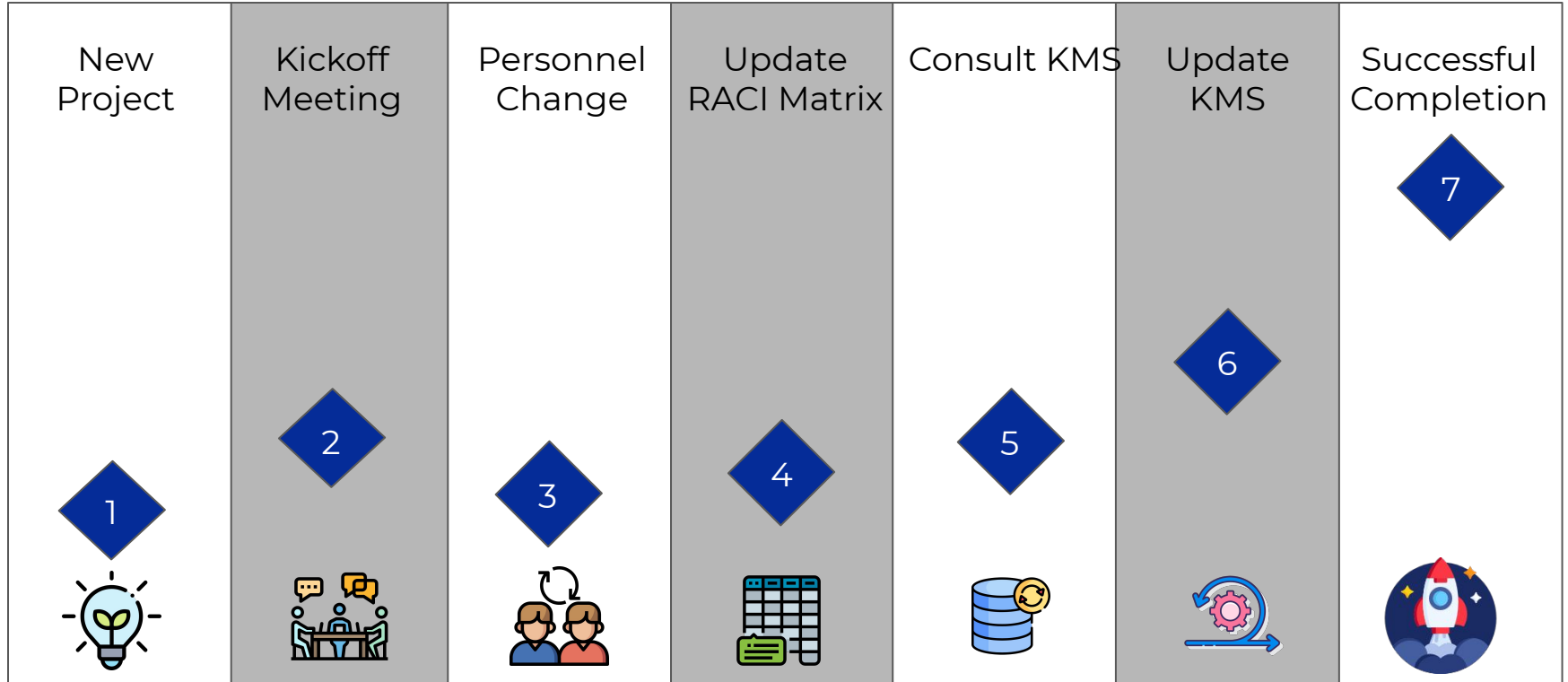
Initial Process Flow Chart



Final Process Flow Chart



Journey Map



2 Roles & Responsibilities

	Project Manager	Configuration Management	Project Engineers
Product Specification Documents	R	A	I
Design Analysis Results	A		C,I
Tooling Design Process Release	C	A	C,I
Model/Drawing Release	C	A	R

- Responsible for completing that step in the process
- Accountable for ensuring that step is completed
- Consulted prior to the completion of that step
- Informed of the results once that step is completed

Identified Deviations

- 1 Modifications of customer requirements
- 2 Changes in team personnel

Recommendation



Financial Opportunity

\$XXX,XXX

Net Present Value of
Recommendations

X.X Years

Payback period

XX%

IRR

Graph to come



Status Presentation 2

QUEST to the Moon



A

[spotify.com/artist/
AlexTheBavarian](https://open.spotify.com/artist/AlexTheBavarian)



Nandos
Peri-Peri



Emma
Cooley



Under
Wear-ier

Status Presentation 2

QUEST to the Moon



Inertia
Winn-Dixie



[spotify.com/artist/
AlexTheBavarian](https://open.spotify.com/artist/AlexTheBavarian)



Neehar
Peri



Emma
Cooley



Under
Wear-ier

Filter By Project

Select ▾

Filter By Client

Select ▾

Filter By Date

Select ▾

Sort By

Select ▾

Search...

Search



Name Surname 7h ago

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Name Surname 7h ago

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Write a Response...



Name Surname 7h ago

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Name Surname 7h ago

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Survey Insights

Kickoff Meetings

64%

n = 14

indicated that kickoff meetings would generate “a great deal” of value

KMS

86%

n = 14

are aware of the current text-based repository

71%

don't regularly use it

Journey Map

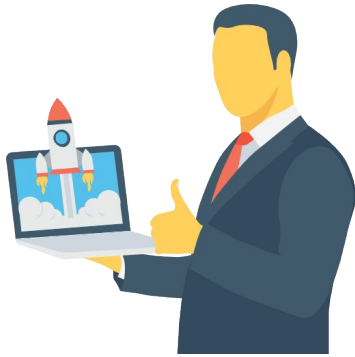
- Pick a stakeholder (i.e PE) and go through a hypothetical project
 - Start of a new project- attends kickoff meeting
 - Updates role and responsibilities
 - Receives customer requirements and drafts initial design
 - Runs into problem, uses KMS to solve it, updates KMS with lessons learned
 - Personnel change with other PE's- delegates responsibilities differently based on roles change
 - Ending state attained much faster as a result of recommendations (happy project engineer)

Client

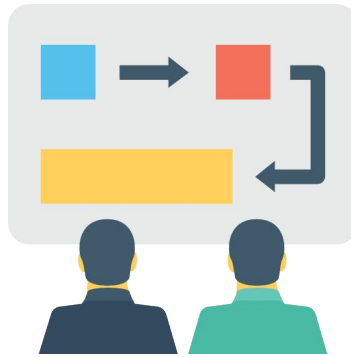
NORTHROP
GRUMMAN

The logo graphic consists of a thick blue horizontal line that starts to the right of the word 'NORTHROP' and extends to the right edge of the frame. From the right end of this horizontal line, a thick blue vertical line descends downwards, extending past the bottom of the word 'GRUMMAN'.

Scope



Focusing on **improving information flow** at Elkton, MD site



Primary sources of disruption are **process deviations** and **manufacturing deviations**



Aim to streamline information flow and **minimize** any gaps

Knowledge Management

Current State

Current lessons learned repository lacks widespread use.

Our Recommendation

Text and video-based
knowledge management
system (KMS)



Ease of
upload

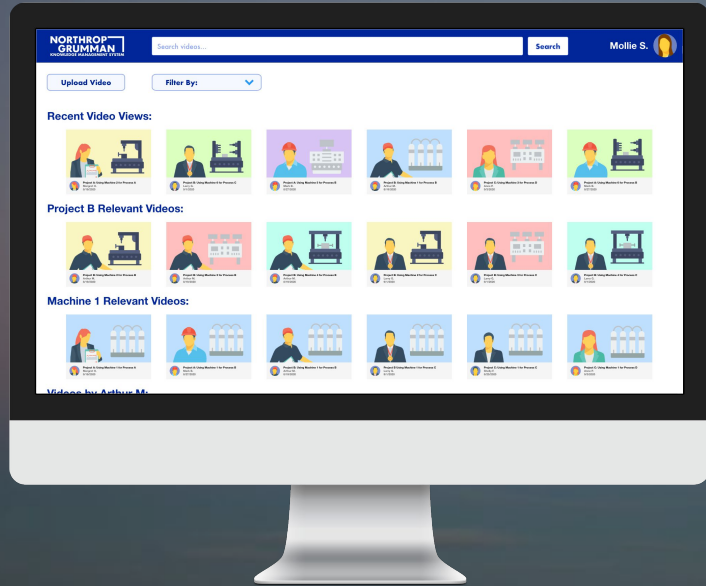


Ease of
modification

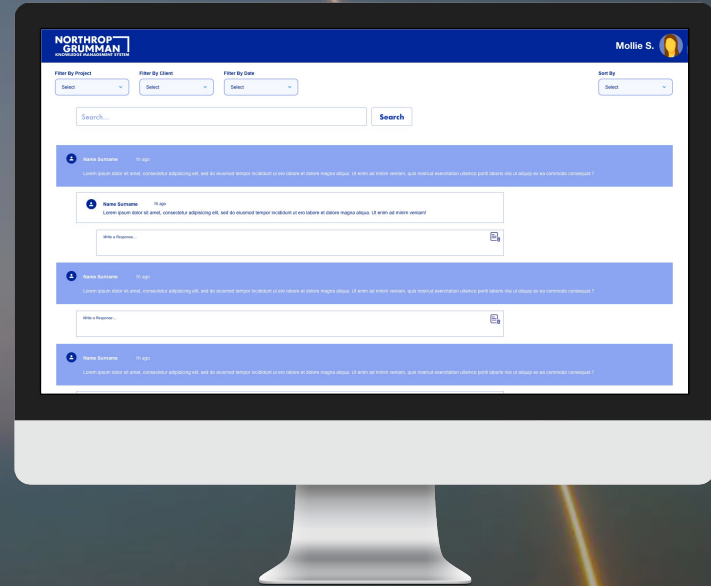


Ease of
searchability

Video-Based



Text-Based





Upload Video

Process C

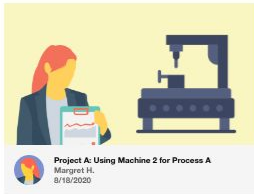
Machine 2

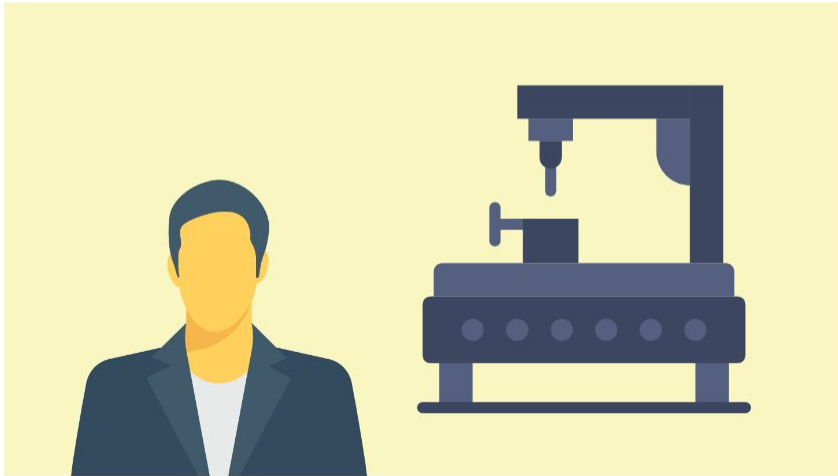
Machine 5

Relevant Videos According to Search:



Other Videos You Might Be Interested In:





Project C: Using Machine 2 for Process C
Shelly F.
8/25/2020

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Generated Narration



Hide



Show

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Comments



Mark B.

2 weeks ago

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Shelly F.

2 weeks ago

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Ask A Question



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Video	Title	Visibility	Restrictions
<input type="checkbox"/> 	<p>Project A: Using Machine 4 for Process B</p> <p>Mark B. 8/27/2020</p>	Draft	None
<input checked="" type="checkbox"/> 	<p>Project A: Using Machine 5 for Process B</p> <p>Mark B. 8/27/2020</p>	Visible	Project A Employees
<input type="checkbox"/> 	<p>Project A: Using Machine 6 for Process B</p> <p>Mark B. 8/27/2020</p>	Visible	None
<input type="checkbox"/> 	<p>Project A: Using Machine 1 for Process B</p> <p>Mark B. 8/27/2020</p>	Visible	None



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Video

Title

Visibility

Restrictions



Step 1

2

Step 2

3

Step 3

4

Step 4

Video Name

Required Field

Video Description

Required Field

Tags

tooling

mixing / casting

insulation

lining

assembly

casting

testing

final assembly

ignition

TSRM

Generated Narration



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Edit

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Search All...

Search

Sort By

Select 

New Question

Your Previous Questions



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Filter By Project

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Write a Response... 

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Write a Response... 

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Filter By Project

Select 

Search All...

Search

Sort By

Select 


New Question

Question:

Required Field

Topics

- tooling
- mixing / casting
- insulation
- lining
- assembly
- casting
- testing
- final assembly
- ignition
- TSRM

 Drag and drop a file here
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Video-Based KMS

Text-Based KMS

1 Kickoff Meetings

Current State

Kickoff meetings do not include all stakeholders and lack a unified structure

Our Recommendation



Engage all stakeholders at
start of program



Establish program
norms and expectations



Improved planning
and scheduling

- Date, time, location of meeting
- Overall info about contract (PM considerations)
- Relevant stakeholders
 - Responsibilities for each stakeholder
 - Timeline of responsibilities
- Overall project timeline/requirements
 - Deadline for each step
- List of customer requirements
- SMEs for each area (refer back to KMS)

2 Roles & Responsibilities

Current State

Costly delays from deviations in roles & responsibilities due to:

- 1 Modifications of customer requirements
- 2 Changes in team personnel

Our Recommendation



Dynamic roles and responsibilities documented through RACI Matrix

Risk Mitigation

1. Recommendations are major changes that may disrupt current process flow in unanticipated ways
 - a. Likelihood: Low, Severity: High
 2. Employees may not use KMS to the extent that they need to
 - a. Likelihood: Medium, Severity: Low
 3. KMS might not scale to all stakeholders
 - a. Likelihood: Low/Medium Severity: Medium
1. Recommendations built as lean as possible to correspond with current flow
 2. Mitigation- KMS built into other recommendations, implementation of KMS will be in currently used system
 3. Modular implementation of KMS with pilot, so NG can see what works for which stakeholders