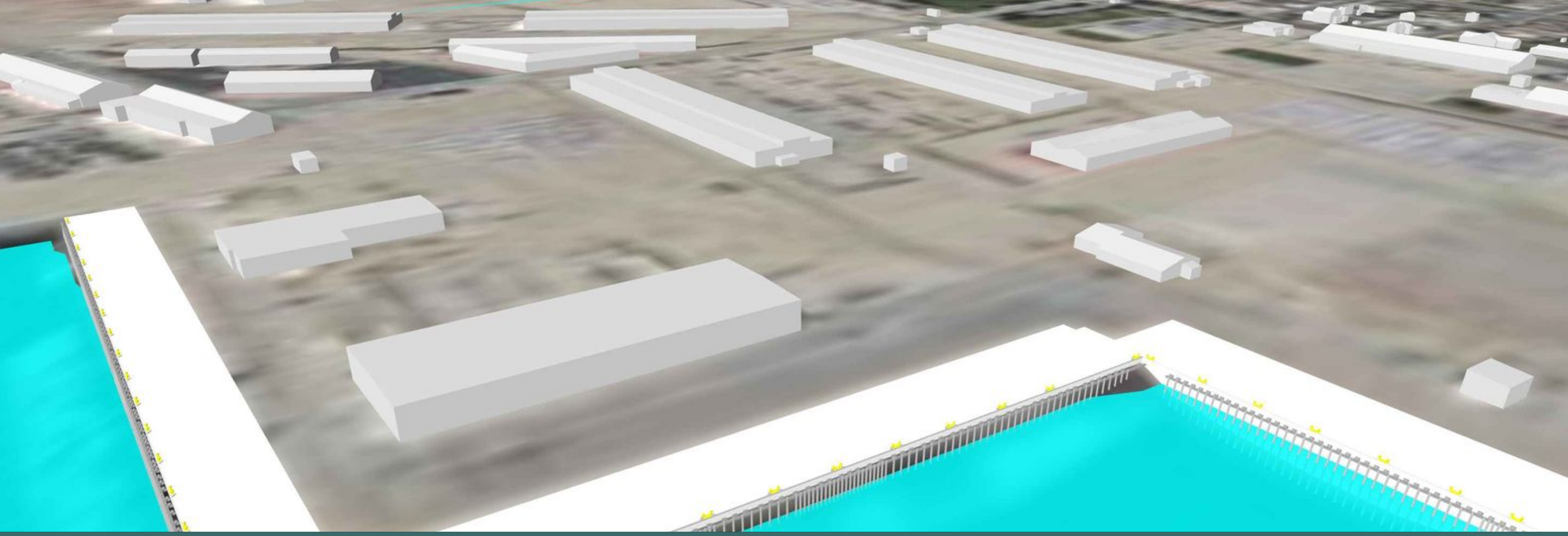

3D Virtual Environments for Data-Informed

A National Center for Manufacturing Sciences Demonstration Project

18 FEB 2020

NAVFAC Naval Facilities Engineering Command

NCMS National Center for Manufacturing Sciences

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INTRODUCTION

Data and metrics are the only way to make informed decisions about critical waterfront infrastructure. We call this **Data-Informed Decisions.**

The Navy has a handful of data warehouses and technical capabilities.

Web-based applications are bringing those data warehouses and technical capabilities together. Along with new visualization platforms, the Navy can begin implementing solutions that unleash data in powerful new ways to make **Data-Informed Decisions** about critical waterfront infrastructure.

In collaboration with NAVFAC EXWC, we combined multiple databases and technologies to update an existing Navy N4 Defense Business System application, SPIDERS* 3D to increase reliability, scalability, and predictability for **Data-Informed Decisions** about critical waterfront infrastructure.

* Specialized Infrastructure Data Enterprise Reporting System

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AGENDA

Project

Background of the project, what problem are we solving, how are we making things better

3D Virtual Environment Application

Information on the application, how to use the tool

Demonstration

Live demonstration of the application

Way Ahead

Where do we go from here

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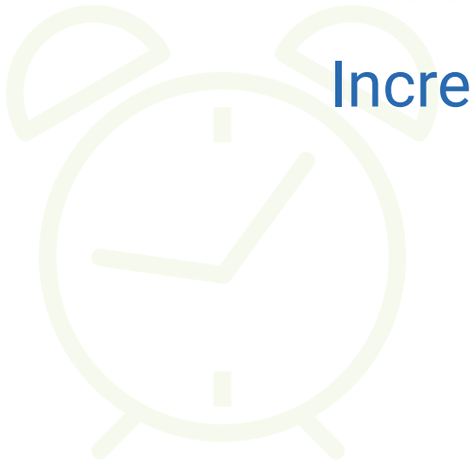
PROBLEM

Lack of Data Awareness Across the Enterprise

Reduces stakeholders ability make Data-Informed Decisions

Increases Risk for Critical Waterfront Infrastructure Projects



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The Problem x 3

Data Awareness across the enterprise is low. Tribal Knowledge at the deck plate is still being used to make critical decisions on waterfront infrastructure.

Tribal Knowledge

Making decisions based on specific past events is often an effective problem solving approach. Knowing what is going to happen because you have a “gut” feeling can accurately predict an outcome. Gut feelings and Tribal Knowledge are **NOT SCALABLE** and create a secondary problem when the Tribal Knowledge moves on.

Fear of What the Data Might Show

When data is used for decision making we have to make sure that the data is objective and complete. There are many instances where data is omitted from reporting because the result would show a negative result. In this instance the **Data-Informed Decision** result could be incorrect because not all of the data was correlated and used. This approach **REDUCES RELIABILITY** of decision making

Limited Easy Access to Data

When data is known, and the fear of data is not a factor the final issue is easy access to the data. If data is not easily accessible then Data-Informed Decisions are **UNABLE TO BE REPEATED.**

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The 3 Solves

The Navy data warehouses have very valuable information, and each is managed and reliable. Data is interconnected already in some fashion, but the end users need new tools to solve the 3 problems

Tribal Knowledge

Visualize Tribal Knowledge, and test the proposed ideas with data. Back test as much as possible to ensure proper datasets. Capture as much tribal knowledge visually for archival and training.

Fear of What the Data Might Show

Plan for alternatives instead of hiding and ignoring data. Show data corroboration from many points of view and many data points to develop comprehensive plans when the solution may be harder than anticipated.

Limited Easy Access to Data

Remove the barriers both technical and physical by unleashing the power of the data within the warehouses already available. Start with Maximo, iNFADS, and SPIDERS and begin showing all data points, in a 3D geospatial view, without having to search through binders or query data using code.

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Thought Exercise

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Point to the person in the room with the most "Tribal Knowledge" of the Waterfront infrastructure here at Port Hueneme

Example Tribal Knowledge Decision

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Answer these 3 questions about Port Hueneme

Total Waterfront Facilities

Linear Feet of Waterfront

Total Replacement Value of all Waterfront

Example Tribal Knowledge Decision

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If you had 50,000 dollars and had to create a project to repair one of two waterfront assets, assuming the mission was the same for both which would you repair?

Port Hueneme or Yokosuka

The Problems x 3 (IRL)

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Tribal Knowledge only goes so far, rarely does it cross physical location boundaries

The data might show you that 50k will not be enough to do anything in other locations

And unless you were a database developer you wouldn't know how to make the data from the source work for your decision

Data-Informed Decision Risk Matrix

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Risk Category	Data-Informed	Tribal Knowledge
COST		
Training		
Readiness		
Safety		
Quality		

Increasing Data Awareness through new Tools

Creating tools to visualize all three data warehouses in context with other models and geo-spatial data will reduce the reliance on Tribal Knowledge, discourage data omissions, and increase awareness of all data sources to the end users, **dramatically reducing time** to query and report for **Data-Informed Decisions**

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PROJECT

Project Overview

Our proejct updated the SPIDERS 3D application to include project timelines, 3D Presentation mode, and 3D Data Slides

Project Timeline

To associate 3D pictures with existing Microsoft Project based event timelines

3D Presentation Mode

To visualize steps of event timelines, visualize problems, visualize concept of alternatives, and visualize solutions

3D Data Slides

To visualize tabular data in presentation mode to enable **Data-Informed Decisions**

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Introduction to updated SPIDERS 3D

SPIDERS 3D is a geospatial and model-based shore infrastructure asset management application that allows users to easily create accurate visualizations of weapon platform-based logistics scenarios simply using a web browser.

The app includes tools to help users create these visuals. The following is an overview of the product features.

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PRODUCT FEATURES

Snapshots

This tool saves 3D Models and Camera position and creates a downloadable image as well.

Whiteboards

This tool has all the capabilities of snapshot, and adds the ability to annotate and highlight an image.

Timeline

This tool allows the user to add tasks from a Microsoft Project Schedule. The user is able to associate snapshots and whiteboards to the project tasks.

PRODUCT FEATURES

3D Presentation

This tool allows the user to organize the snapshots and whiteboards into a specified order like slides in a PowerPoint presentation to create an interactive web-enabled 3D storyboard

3D Data Slides

This tool allows users to create snapshots and associate visual representations of tabular data that are easy to set and easy to understand

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3D Data Slides

Will make Data-Informed Decisions easier by removing unnecessary steps and complications

GOALS

Create innovative web and 3D-based communications

Remove collaboration barriers and capture tribal knowlege

Increase pace and quality of decision making

Increase Data Awareness and Availabilty

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OUR METHODOLOGY

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Approach

Developed new software to visualize tabular data within the 3D scene and snapshots on the web using open standards software and SPIDERS 3D

Participants

NAVFAC

NCMS

SSD

DEMONSTRATION

FEATURES

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DEMONSTRATION

3D Data Slides

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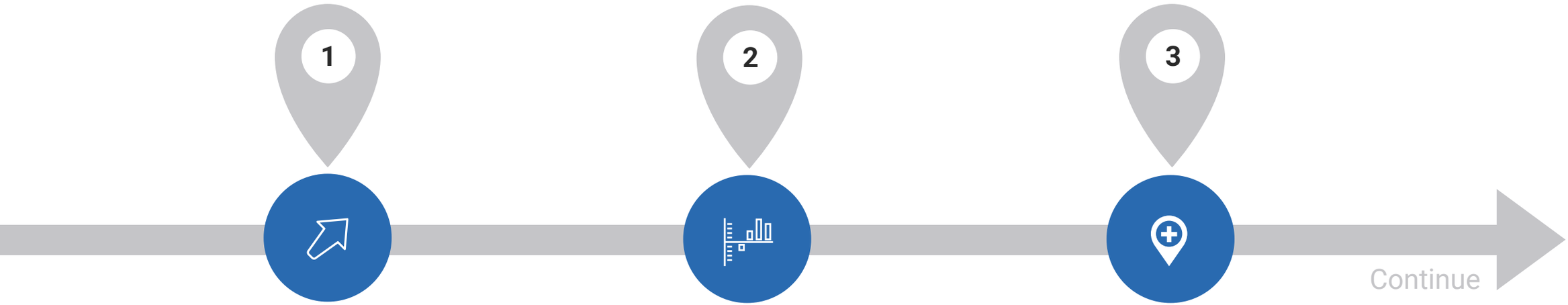
WAY AHEAD



Publish Data and 3D Models

For each waterfront infrastructure asset, update database to include links from the 3D models to all data points in the SPIDERS, Maximo, and iNFADS

Define Baselines

During scale up it would benefit the Navy to officially study the baseline metrics for measuring the impact of the tool to better predict the ROI across NAVFAC and Shore Enterprise

Apply Updates

Work with NAVFAC to apply updates and features from this pilot project to the production SPIDERS 3D tool. Allowing all users with a CAC card to benefit from the pilot project

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RECAP

1. **NCMS PROJECT** | project background

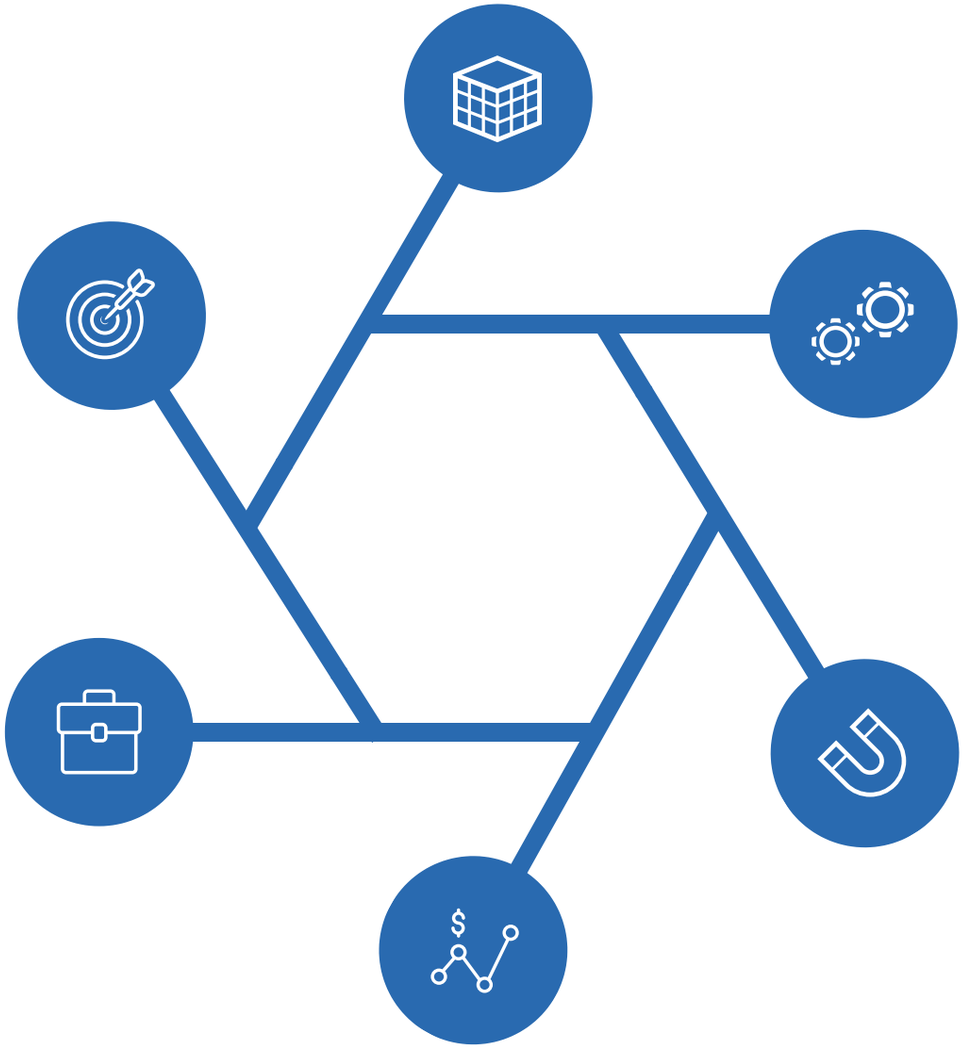
2. **PROBLEM** | there is a lack of data awareness across the enterprise

3. **3D VIRTUAL ENVIRONMENT** | easy, effective, decision making tool

4. **FEATURES** | overview of created tools

5. **DEMONSTRATION** | live demonstration

6. **WAY AHEAD** | leverage the possibilities



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THANK YOU FOR YOUR TIME

QUESTIONS?

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