

Leveling Up Your Digital Engineering Storytelling

27th Annual National Defense Industrial Association Systems and Mission Engineering Conference

Daniel Hetteema, Director, DEM&S
Mimi Davidson, Contractor Support to OUSD(R&E)
Office of Systems Engineering and Architecture
Office of the Under Secretary of Defense
for Research and Engineering

Norfolk, Virginia
October 2024





The Digital Engineering Dilemma





“The stories we tell literally change the world. If you want to change the world, you need to change your story.”

Michael Margolis





Story vs. Narrative

STORY	NARRATIVE
Specific event	Abstract concept
Beginning, middle, end	No clear start, middle, end
Circumstance, choice, consequence	Context, emotion, evidence
Infinite sea of stories	Singular shared narrative
Closed loop	Open loop
Pearls	String of pearls
Life raft	Ocean liner

“He who controls the narrative, controls the universe.”

GEORGE ORWELL



Tell Me Your Story



Who's in the audience?





Mimi Davidson: Cultural Transformation Architect & Narrative Innovator



DEM&S Task Order Lead
and
Storyteller

TEAM AMERICAN SYSTEMS
SUPPORT TO OUSD(R&E)



Professional Overview

Mimi Davidson is a seasoned Task Order Lead at SAIC, managing the Digital Engineering and Modeling & Simulation (DEM&S) task area within OUSD(R&E), as a contractor with SAIC. She excels in driving digital transformation and technological advancement in the defense sector.



25+ Years of Experience

GENERAL DYNAMICS
Information Technology



presently...

SAIC®





Real-World Impact: DE Storytelling Successes

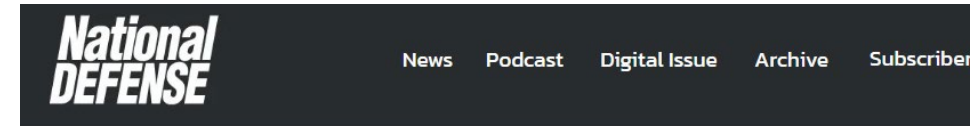
Digital Engineering success in Hypersonic program execution for 2 DARPA programs with an Industry partner (Raytheon).

Program 1 implemented Digital Engineering to address organizational and technical challenges in tech roadmap and mission timelines

- Resulted in clearer technology maturity planning
- Clearer understanding of the tech delivery by Customer, enabling advancement of the contract. The dynamic visibility (per DE) a view of the latest state; never outdated

Program 2 implemented Digital Engineering to secure customer buy-in to traceability of design decisions, uncertainties, and margins. Also aligned cross-functional and cross-customer teams towards common objectives

- Resulted in shorter design time from contract award to CDR
- Resulted in higher visibility and trust between customer and technical teams



EMERGING TECHNOLOGIES

July 29, 2024 NDIA Article

BREAKING: U.S. Hypersonic Programs Using Last Century's Engineering Techniques

7/29/2024

By Stew Magnuson



Hypersonic weapons might be a technology of the future but at least four of the Pentagon's six ongoing development programs are failing to take full advantage of modern engineering techniques, a Government Accountability Office report released July 29 found.



Start with the Positive, Not the Negative

As **problem solvers** we think problem first, solution second...

As **storytellers** we want to think *SOLUTION* first, *PROBLEM* second!

- Focus on benefits and outcomes first to engage your audience positively
- Position your solution as the hero of the story
- What has digital engineering created that wasn't possible 5 to 10 years ago?





Stories and the Brain

OXYTOCIN

+ *belonging*

The brain releases oxytocin in response to characters that increases empathy and connection as well as compassion and trust

CORTISOL

- *fight, flight, freeze*

The brain releases cortisol when it experiences conflict which increases attention and memory



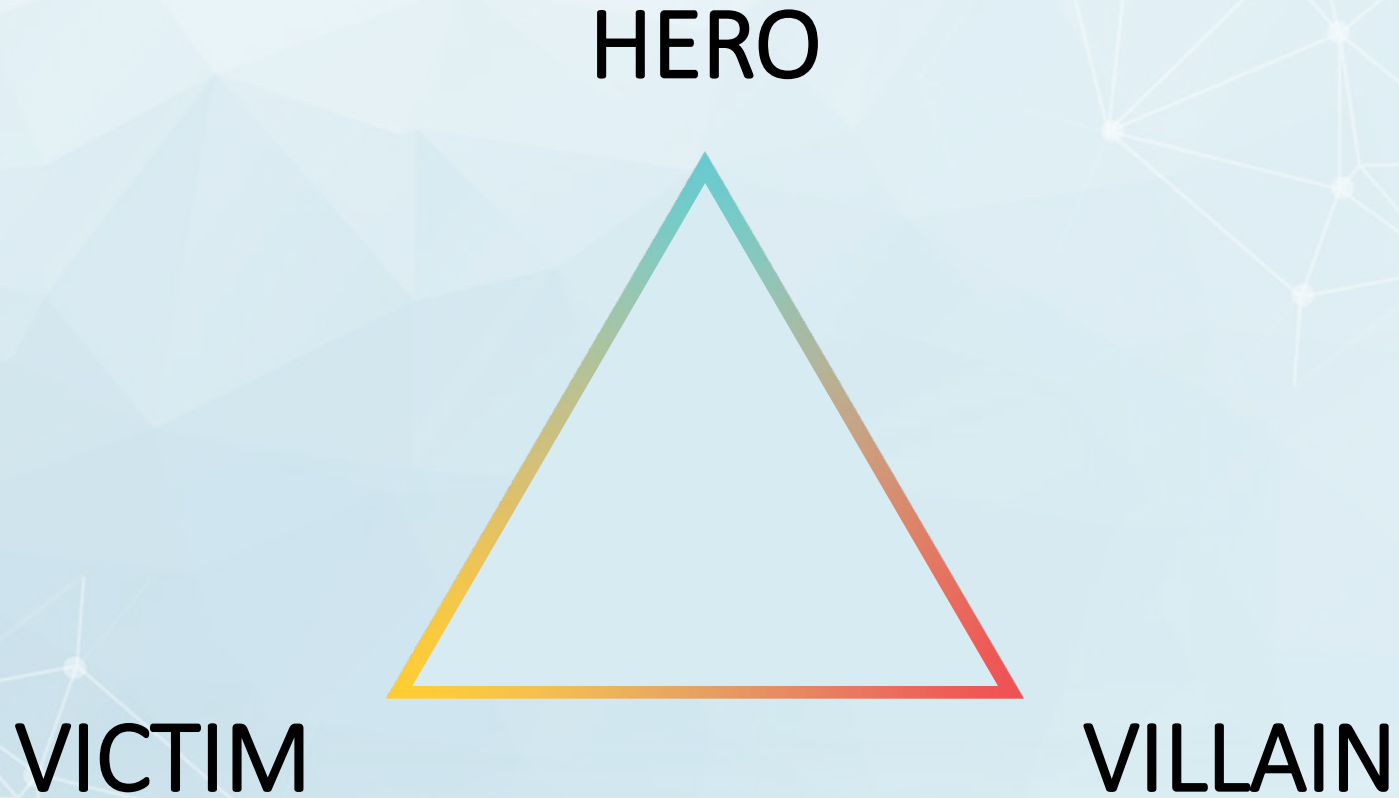
DOPAMINE

+ *reward*

The brain releases dopamine in response to an emotionally charged event, resolution of conflict, or even recognition of a pattern, creating a pleasurable response and ease of memory and recall



Everybody Wants to Be the Hero...





Poll the Audience



*Raise your hand
if you like
change.*

*Raise your hand
if you like
change you
can't control.*





Elephant and the Rider (SWITCH)

Logic & Reason



DIRECT THE RIDER

Give clear direction, reduce mental paralysis

MOTIVATE THE ELEPHANT

Find the emotional connection

SHAPE THE PATH

Reduce obstacles, tweak the environment, make the journey go downhill

Emotion





Narrative Thinking 101: 3 Steps to a Compelling Story

SEE IT



Context for Change

FEEL IT



Emotional Dilemma

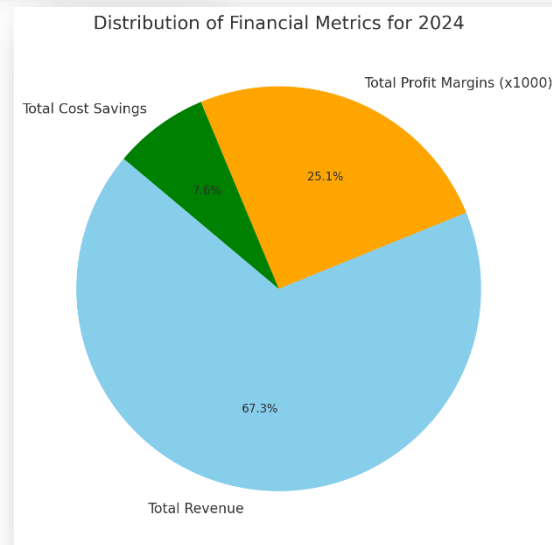
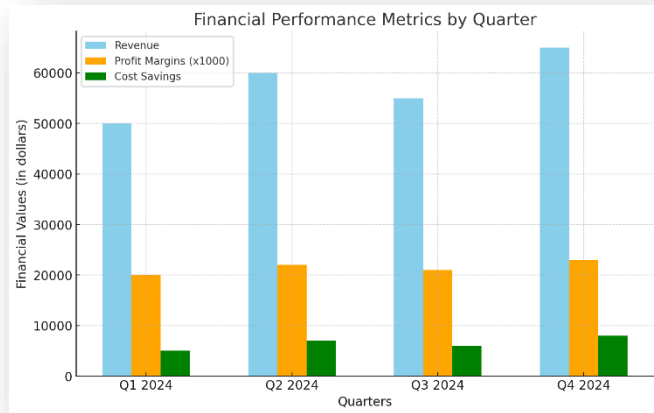
BELIEVE IT



Evidence of Truth



What Evidence Can You Share to Secure a Winning Story?

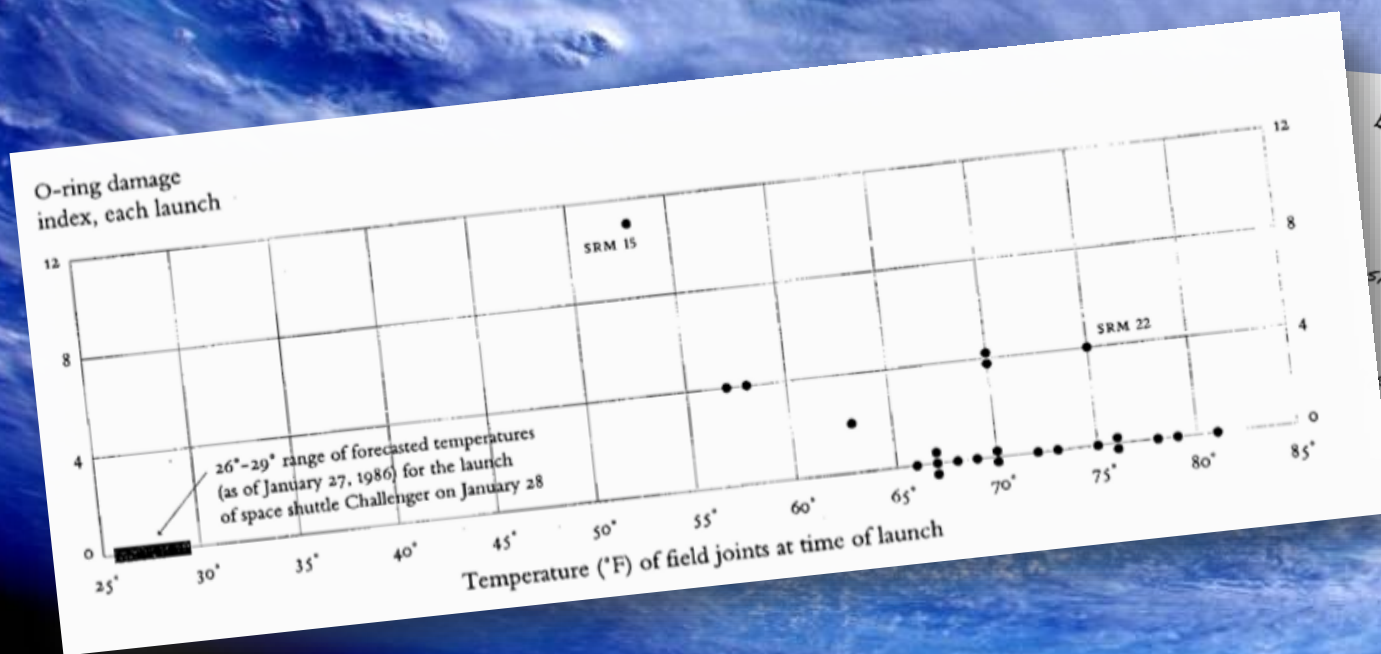


SOURCES OF EVIDENCE

- Performance metrics
- Testimonials
- User research
- Case studies
- Scientific proof
- Pilot projects
- Explainer video
- Communities
- Product demos
- Thought leadership



The NASA O-Ring Failure: The Cost of Ignoring Narrative



Blow By History
 SRM-15 WORST BLOW-BY
 ○ 2 CASE JOINTS (90°), (110°) ARC
 ○ MUCH WORSE VISUALLY THAN SRM-22

SRM 22 BLOW-BY
 ○ 2 CASE JOINTS (30-40°)

SRM-13A, 15, 16A, 18, 23A 24A
 ○ NOZZLE BLOW-BY

MOTOR	MOT	AMB	O-RING	WIND
DM-4	68	36	47	10 MPH
DM-2	76	45	52	10 MPH
QM-3	72.5	40	48	10 MPH
QM-4	76	48	51	10 MPH
SRM-15	52	64	53	10 MPH
SRM-22	77	78	75	10 MPH
SRM-25	55	26	29	10 MPH
			27	25 MPH

Narrative doesn't just tell us what the data is; it tells us why it matters, what actions to take, and potential consequences.

Data without storytelling is like a map without a guide.



Change Is the Only Constant





Clarity: Articulating a Clear Vision

Define Your Vision with Precision

- Craft a concise and compelling vision statement
- Use simple, jargon-free language
- Provide specific examples and scenarios





Alignment: Bridging the Gap

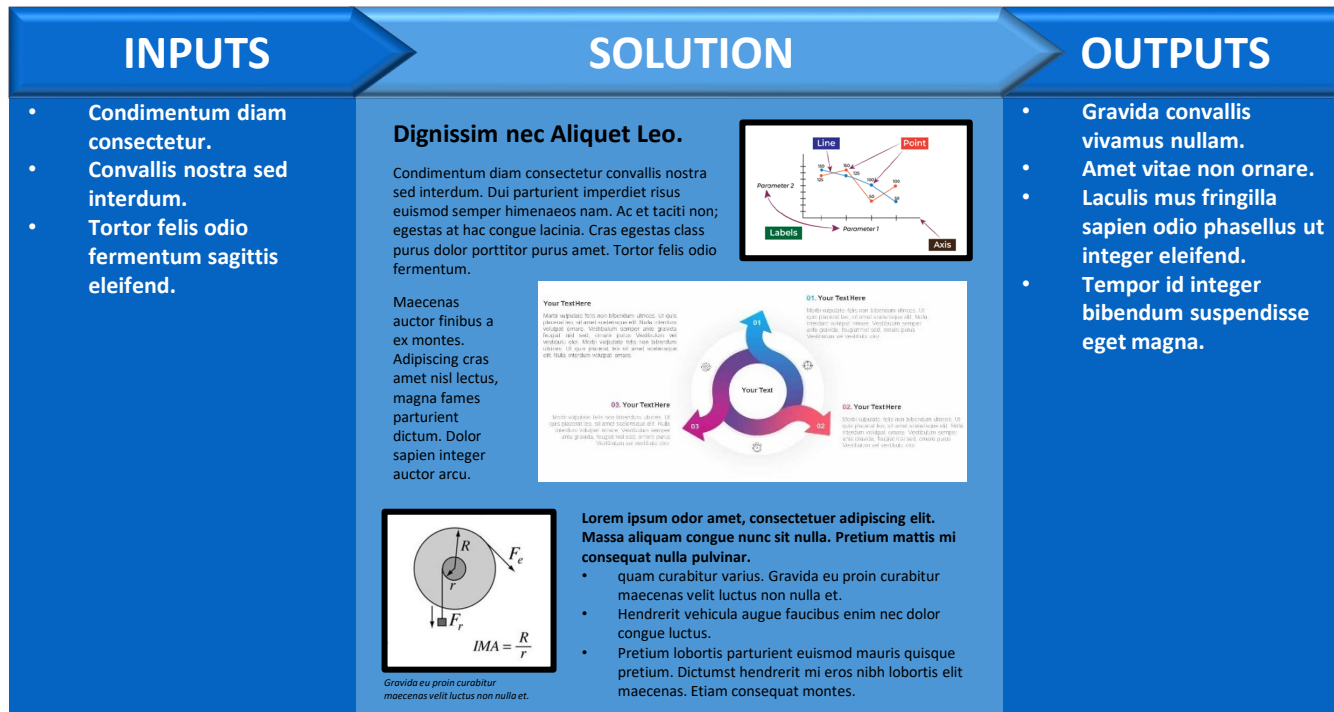
Align Your Vision with Audience Goals

- Identify Common Objectives
- Demonstrate Mutual Benefits
- Engage and Adapt





Bridging the Gap: Connecting Problems with Solutions in Proposal Writing



The Role of Story

- Proposals should do more than present solutions – they should tell a compelling story about the problem and how its addressed
- Engage stakeholders

Key Components

- Persuade by showcasing how the solution addresses critical problems
- Use solid data and feature graphics to build credibility

Digital Transformation Context

- Complex concepts simplified: Frame transformative changes within real-world problems and outcomes



Increase Velocity: Embracing Change

Lead with Decision Making

- Celebrate Small Wins
- Welcome Feedback
- Show Enthusiasm





Making a Difference: How Is DEM&S Writing Their Story?

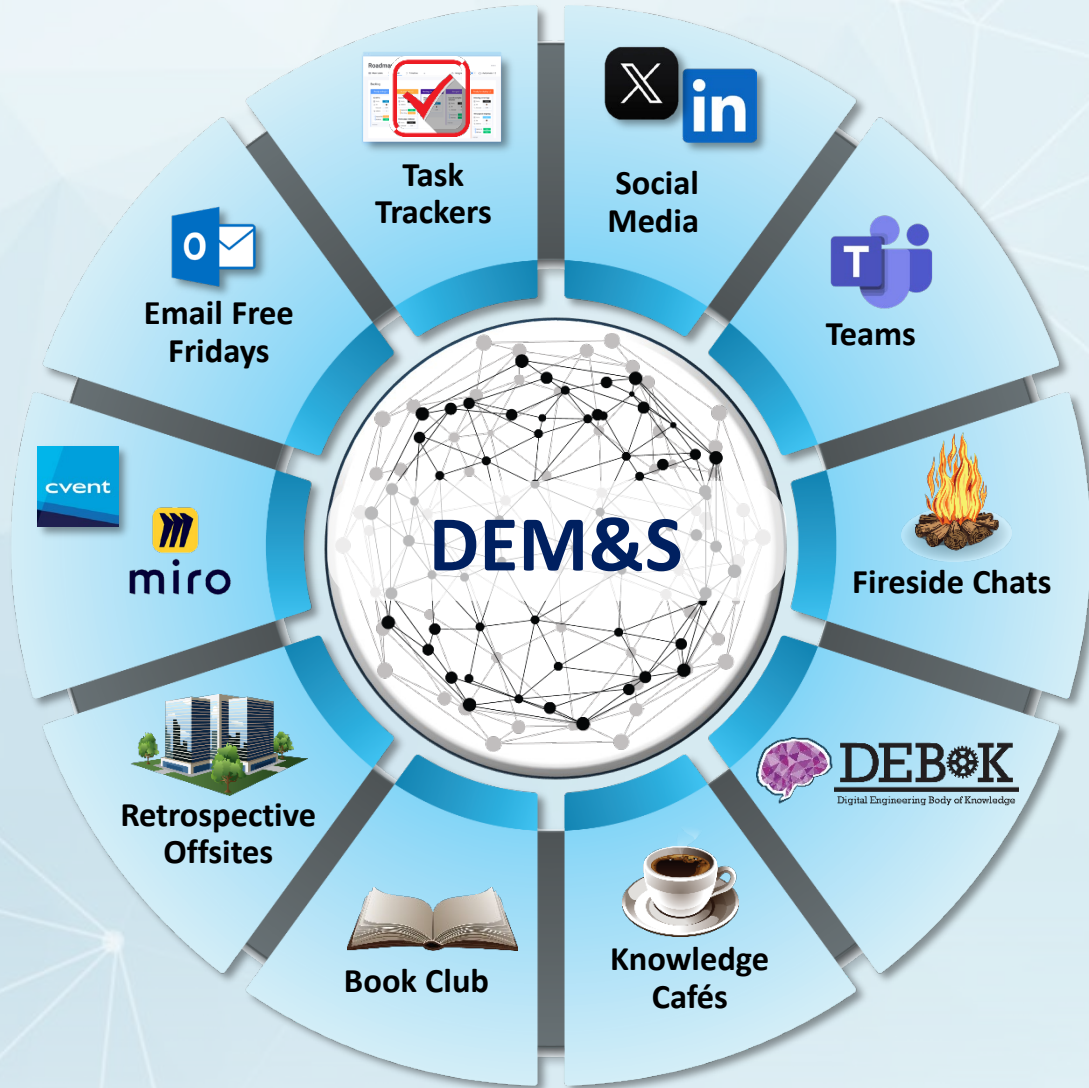
DoD

OUSD(R&E)

SE&A

DEM&S

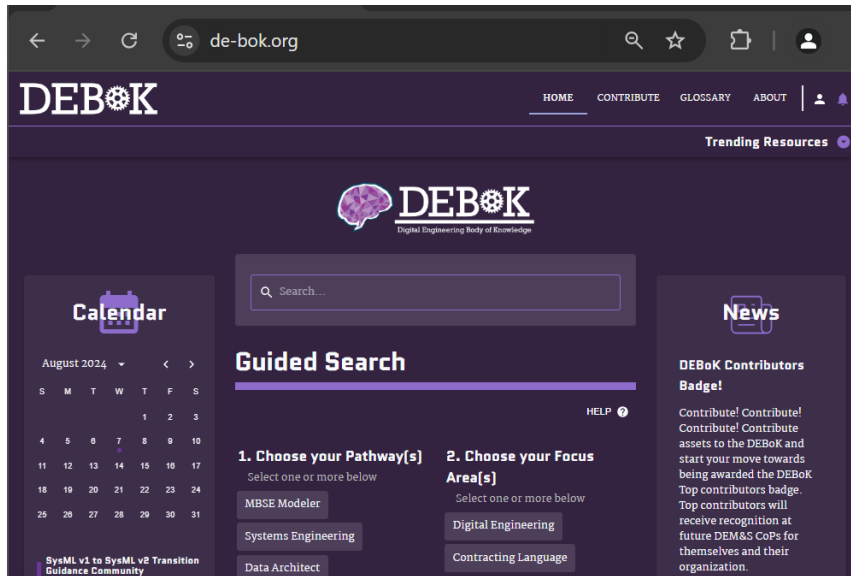
PERSONAL





DEM&S Tools for Your Toolbox

The Digital Engineering Body of Knowledge



- Digital Engineering, Modeling & Simulation Knowledgebase
- Hosts authoritative resources geared toward accelerating capability development
- Collaborative community... *join the conversation!*



DODI 5000.97, “Digital Engineering”



- establishes policy
- assigns responsibilities
- provides procedures for implementing and using digital engineering in the development and sustainment of systems



DoD INSTRUCTION 5000.97 DIGITAL ENGINEERING

Originating Component: Office of the Under Secretary of Defense for Research and Engineering

Effective: December 21, 2023

Releasability: Cleared for public release. Available on the Directives Division Website at <https://www.esd.whs.mil/DD/>.

Incorporates and Cancels: Department of Defense Directive 5000.59, “DoD Modeling and Simulation (M&S) Management,” August 8, 2007, as amended

Approved by: Heidi Shyu, Under Secretary of Defense for Research and Engineering

Purpose: In accordance with the authority in DoD Directive 5137.02, this issuance establishes policy, assigns responsibilities, and provides procedures for implementing and using digital engineering in the development and sustainment of defense systems.



Ways a Compelling Story Can Make a Difference

You want to tell the right story for the future you want to create. When you learn the three basic steps, you can use them to achieve a wide range of desired outcomes. The best leaders are the best storytellers. When you craft a Compelling Story, you can...

- Create a strategic narrative that brings everyone together
- **Get executive buy-in for your vision, strategy, and roadmap**
- Clarify the business case and value of what you do
- **Convey the potential of a disruptive technology**
- Successfully deliver on the promise of transformation
- Create alignment across cross-functional teams
- Legitimize your work and progress in a quarterly business review
- Overcome obstacles and resistance to change
- **Turn data into insights that influence decision-making**
- **Turn your ideas into thought leadership that shapes the conversation**
- Create a sense of belonging that leads to high-performance culture
- Develop the executive presence needed to navigate in uncertain times
- Unite diverse stakeholders around shared common interests
- **Influence even when you don't have the formal authority**



**“Loving ourselves
through the process
of owning our story
is the bravest thing
we will ever do.”**

Brené Brown,

Best-selling Author, Vulnerability
Researcher, *Dare to Lead*



Contact

Office of Systems Engineering and Architecture

osd-sea@mail.mil | Attn: DEM&S

<https://www.cto.mil/sea/>