

## **GSAW 2023 Tutorial J:**

### Digital Engineering Overview

#### **Overview:**

##### Course Description

This short course provides an overview of Digital Engineering (DE), to include what it is, how it's used, and what benefits it is expected to provide to Aerospace and the broader space enterprise.

We start this course with a brief discussion of what *model-based systems engineering* (MBSE) is and how it forms an important foundation of DE. However, we also explore what makes DE so different from MBSE, and why DE has the potential to fundamentally change the nature of almost every aspect of our jobs and the future of the industry.

We'll dive into core DE concepts like *authoritative source of truth, data-centricity, digital ecosystems, digital twins, and digital threads*. We'll also address why these concepts are so game-changing, along with current examples and ongoing challenges related to DE implementation.

##### Course Objectives

1. Be able to identify and describe core components of model-based systems engineering and how it differs from traditional systems engineering
2. Be able to identify and describe core components of digital engineering
3. Be able to explain the relationship between MBSE and DE, including both common and differentiating features
4. Be able to list key benefits of MBSE and DE
5. Be able to explain key DE terminology and concepts, and how they relate
6. Be able to cite specific examples of MBSE and DE
7. Be able to list multiple challenges associated with digital transformation
8. Be able to locate additional learning and reference resources as desired

**Instructor:** Erin Ryan, The Aerospace Corporation

#### **Biography:**

**Dr. Erin Ryan** is a Senior Project Leader with the Aerospace Corporation, currently helping lead digital transformation activities across Aerospace as well as supporting Aerospace customers with their own transformations. Prior to joining Aerospace, Dr. Ryan spent 26 years in the Air Force, most of that time involved with space capabilities, from architecture to acquisition to operations. He has a bachelor's degree in Electrical Engineering from the University of Washington, a master's in National Security from New Mexico State University, and a doctorate in Systems Engineering from the Air Force Institute of Technology.

#### **Description of Intended Students and Prerequisites:**

Intended audience is those who wish to learn more about the basics of digital engineering. Students should have a basic familiarity with systems engineering as well as modeling and simulation, but this isn't required.

#### **What can Attendees Expect to Learn:**

Attendees will gain a better understanding of digital engineering, to include what it is, how it's used, how it relates to model-based systems engineering, and what benefits and challenges pertain to the national space enterprise. Attendees will also learn about core DE concepts like authoritative source of truth, data-centricity, digital ecosystems, digital twins, and digital threads.