

Developing and Deploying AI-enabled Systems

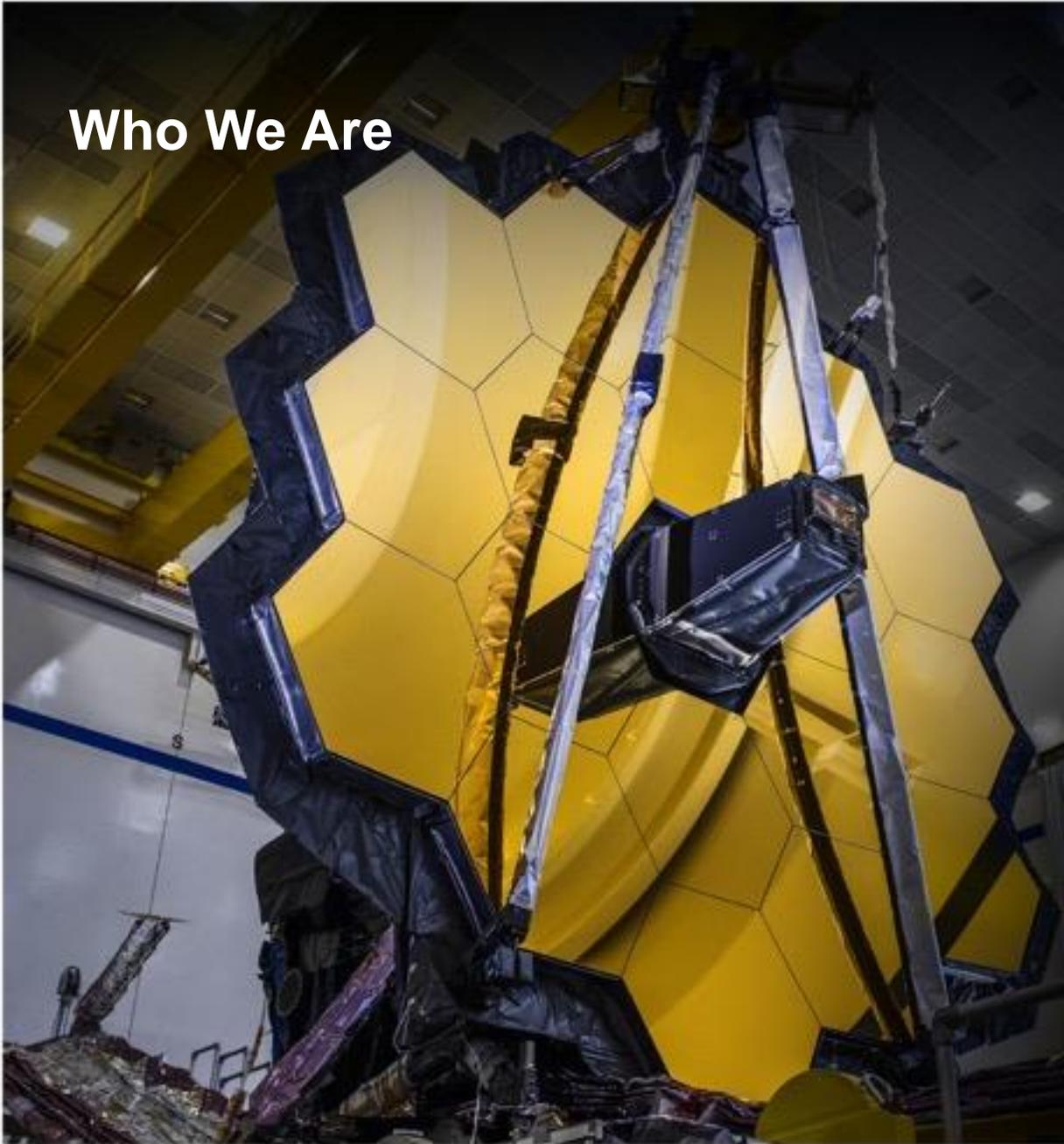
AI-enabled Autonomy for heterogenous uncrewed teaming



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15 April 2025

Who We Are



Northrop Grumman is a leading global aerospace and defense technology company. Our pioneering solutions equip our customers with the capabilities they need to connect and protect the world, and push the boundaries of human exploration across the universe. Driven by a shared purpose to solve our customers' toughest problems, our employees define possible every day.

What We Do

Northrop Grumman is a pioneering company. We design, develop, build and support some of the world's most advanced products, from cutting-edge aircraft and next-generation spacecraft to unrivaled cyber security systems and all-seeing radars.



Space



Aircraft



Advanced Networking



Strategic Missiles



Survivability



Advanced Weapons



Missile Defense



Sensors and EW



Our Business

Northrop Grumman's business sectors offer an extraordinary portfolio of capabilities, technologies, and workforce talent that combine to help our customers around the world meet their most complex challenges across the air, cyber, land, sea and space domains.

Aeronautics Systems



Aeronautics Systems is a premier provider of military aircraft, autonomous systems, aerospace structures and next-generation surveillance, strike and commercial solutions.

Headquarters: Palmdale, Calif.
(Los Angeles area)

Defense Systems



Defense Systems delivers full-spectrum defense capabilities that provide mission-ready, all-domain decisions and effects to a wide variety of national security, military and civil customers.

Headquarters: McLean, Va.
(Washington, D.C. area)

Mission Systems



Mission Systems is a technology leader in open, cyber-secure, software-defined systems for defense and intelligence applications across multiple domains.

Headquarters: Linthicum, Md.
(Baltimore area)

Space Systems



Space Systems is an industry leading provider of end-to-end space and launch systems and capabilities serving national security, civil and commercial customers.

Headquarters: Dulles, Va.
(Washington, D.C. area)

Developing AI Systems as a Product

Mission

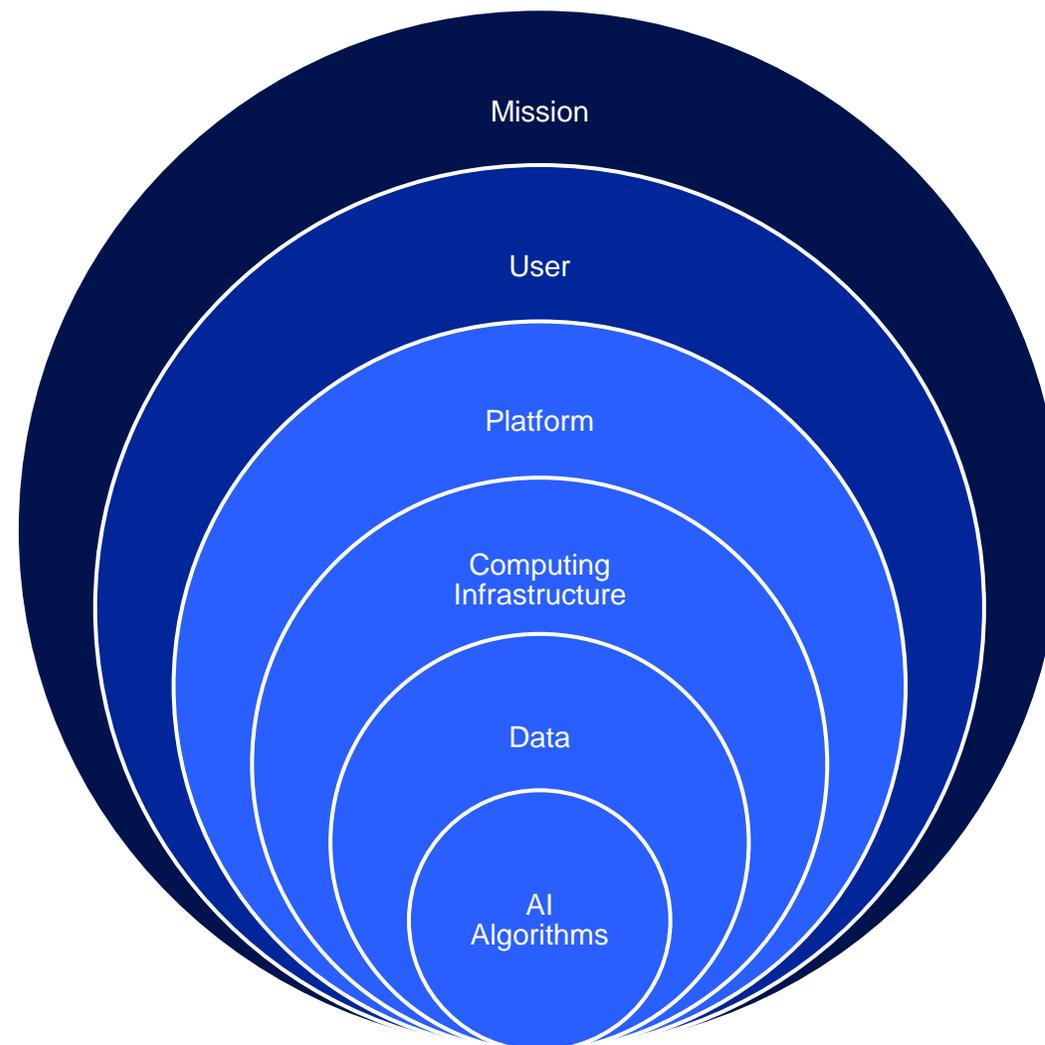
- The product is developed to meet a customer defined need

Value to the Customer

- The product allows mission to be completed with fewer resources

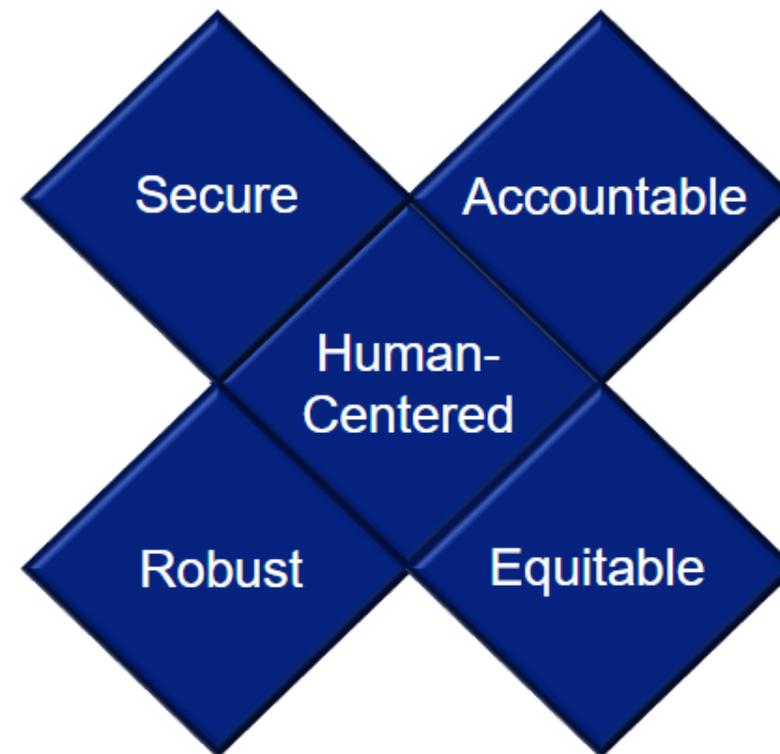
Implementation

- The product needs to be secure, reliable, and trusted



Frameworks for Responsible AI

- Government
 - EU AI Act
 - White House Blueprint for an AI Bill of Rights
 - NIST AI Risk Management Framework
 - DoD Responsible AI Strategy and Implementation Pathway
 - Principles of AI Ethics for the Intelligence Community
- Nonprofit and NGOs
 - Responsible AI Institute
 - World Economic Forum
 - Organisation for Economic Co-operation and Development (OECD)
 - Center for Humane Technology
- Industry
 - Business Roundtable Roadmap for Responsible AI
 - Thousands of individual company frameworks





Collaborative AI-Enabled, Uncrewed Systems

Collaborative uncrewed systems teaming to improve search effectiveness

Improve performance and efficiency of search tasks

Increase operator effectiveness and response



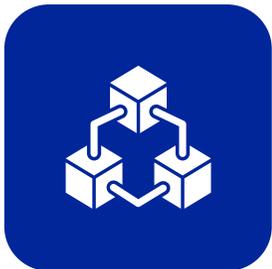
AI enabled collaborative platforms

Helix Overview

Helix offers end-to-end operational solutions for the development, deployment, and command and control of intelligent collaborative uncrewed systems through a single pane of glass.



Helix Components



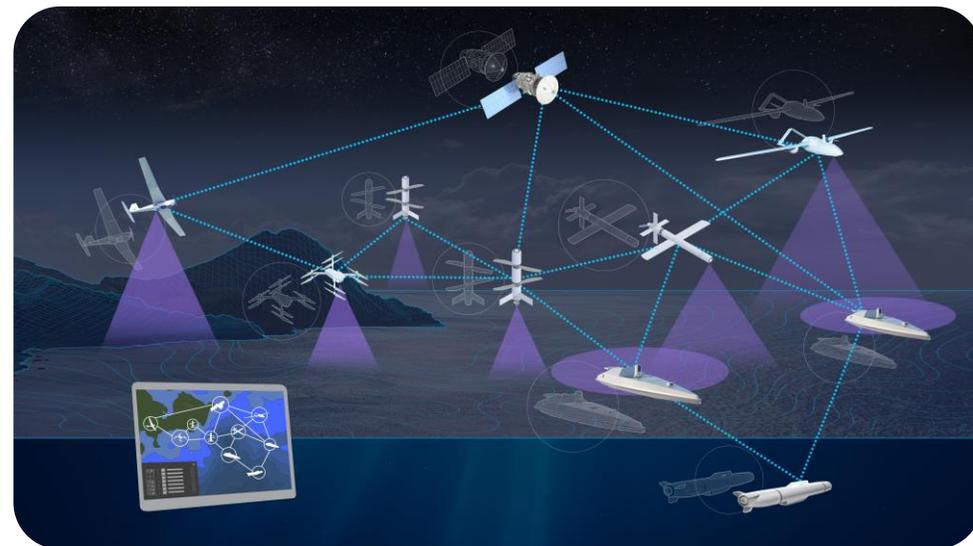
Mission Kits with advanced hardware and software including mission specific autonomy behaviors for mission, platform and payload control to execute the most complex missions.



Mission Digital Twins provide a real-time, photorealistic, high fidelity, physics-based simulation engine for mission training, planning, and rehearsal. Provides live, virtual and constructive (LVC) testing enabling mission scaling through real-time virtual platform integration into live exercises.

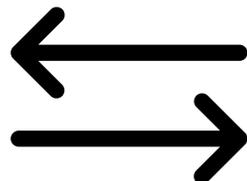
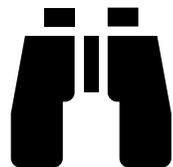


Mission DevOps are designed to rapidly develop, test, and deploy solutions, reducing mission execution risk leveraging a depth of Mission Engineering expertise.

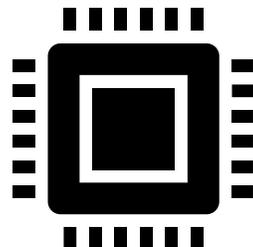


Helix Ecosystem

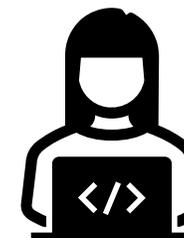
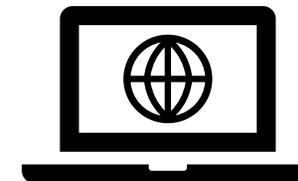
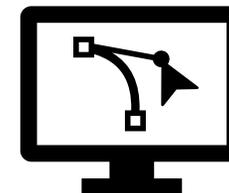
Mission Goals



Autonomous UxS



Enablers



Helix Experimentation Lifecycle



Mission
Deployment



Post-Mission
Feedback



Heterogenous UxV and sensors

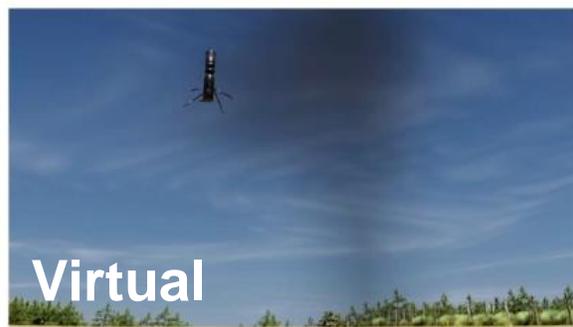
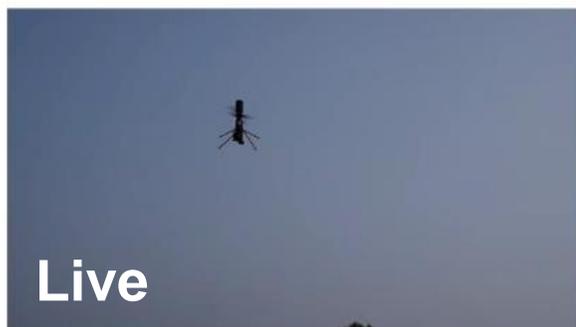
Teaming & Individual Autonomy

Command & Control

Human Centered with
Continuous Feedback

Live, Virtual & Digital Twin

What's different? – High fidelity, physics-based, real-time, scalable, simulation digital twin environment based on *commercial best practices*







End-to-End Operational Uncrewed Systems

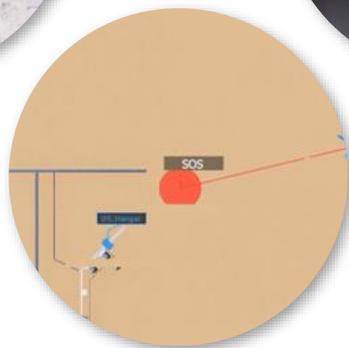
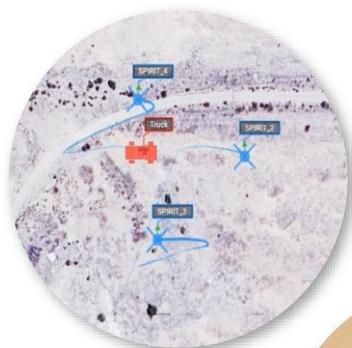
Plan

Rehearse

Train

Analyze

Operationalize





NORTHROP
GRUMMAN

The logo graphic consists of a thick black horizontal line extending from the end of the word "NORTHROP" to the right, and a thick black vertical line extending downwards from the end of the word "GRUMMAN". These two lines meet at a right angle, forming an L-shape that frames the top-right corner of the text.