Ansys

CASE STUDY /

Ansys + Northrop Grumman

"What gets me most excited is MDAO, which is calculating system performance, checking requirements, and performing design trade-offs in a very quantitative fashion. We have a flexible model for evaluating trade studies, performing system optimization, and system verification for phased array antenna systems."

John Hodge
Senior Principal RF Engineer / Northrop Grumman

CASE STUDY

Northrop Grumman Corp. Applies Model-Based Systems Engineering to the Development of Phased Array Antennas to Improve Design Time and Quality

The United States Department of Defense (DoD) distributed a "Digital Engineering Strategy" report in 2018, which stated: "To help ensure continued U.S. technological superiority, the Department is transforming its engineering practices to digital engineering, incorporating technological innovations into an integrated, digital, model-based approach."

To meet this demand, Northrop Grumman has begun implementing an integrated, model-based approach to develop phased array antenna sensor systems. Phased array antenna sensors are essential to all types of wireless communication, radar, and electronic warfare. Due to the wide variety of uses, multifunctionality, and applications of these devices, they have become more complex to design and test.

Challenges

Northrop needed to reevaluate and redevelop the way requirements were communicated to analysis to reduce the document-intensive engineering process. The goal was to:

- Automate and integrate the individual engineering disciplines into one workflow.
- Use an integrated workflow to run a multitude of trade studies to locate the optimal design.
- Connect systems requirements to automated workflows to calculate performance, check requirements, and perform design trade-offs studies.

Ansys Products Used

- ModelCenter

Engineering Solution

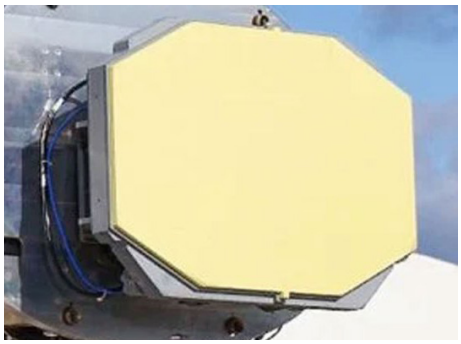
Northrop Grumman needed a solution to improve their engineering workflows that match content physics-based analysis to the systems requirements. The first step was connecting the analysis models from different disciplines to create modular building blocks.

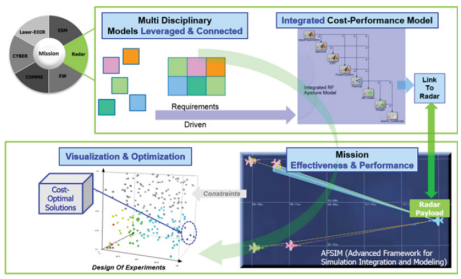
Next, they created a streamlined connection from the systems architecture models (SAM) to engineering analysis. ModelCenter® automated the workflows and connected these workflows to the SysML (SAM) models.

The fully integrated system can calculate performance, check requirements, and perform design trade-offs with ModelCenter. Northrop can run thousands of use cases to develop Pareto Front of cost verse performance using ModelCenter visualization.

Benefits

Northrop Grumman's development of a multidisciplinary phased array antenna model with many interdependencies has improved the antennas' quality, reduced the time for design exploration, and provided adherence to the systems architecture model. Northrop can perform simulation analysis of a single solution in minutes compared to hours previously.



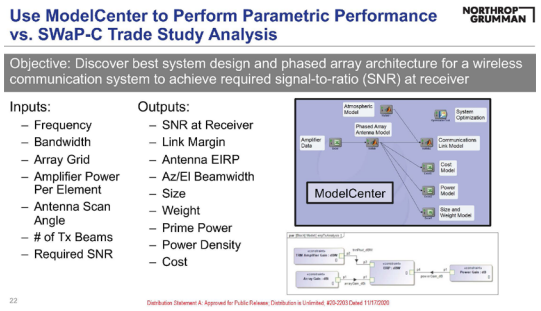


They have eliminated transcription errors through automated connections between models, which has reduced time to run simulations and increased the quality of the final product. The results are:

- Improved technical communication
- Improved design quality
- Increased productivity
- Reduced design and execution risk

Company Description

Northrop Grumman solves the toughest problems in space, aeronautics, defense, and cyberspace to meet the ever evolving needs of our customers worldwide. Our 90,000 employees are Defining Possible every day using science, technology, and engineering to create and deliver advanced systems, products, and services.



ANSYS, Inc.
Southpointe
2600 Ansys Drive
Canonsburg, PA 15317
U.S.A.
724.746.3304
ansysinfo@ansys.com

If you've ever seen a rocket launch, flown on an airplane, driven a car, used a computer, touched a mobile device, crossed a bridge or put on wearable technology, chances are you've used a product where Ansys software played a critical role in its creation. Ansys is the global leader in engineering simulation. We help the world's most innovative companies deliver radically better products to their customers. By offering the best and broadest portfolio of engineering simulation software, we help them solve the most complex design challenges and engineer products limited only by imagination.

Visit www.ansys.com for more information.