Leveraging AI to Develop and Operate
The World's Best Space-Based ISR Capabilities

GEOINT Symposium
Dr. Chris Scolese
Director, National Reconnaissance Office
May 6, 2026

AS PREPARED FOR DELIVERY

Good morning, and thanks for inviting for me to join you here today, representing the outstanding men and women of the National Reconnaissance Office.

Over the last few years, artificial intelligence has been a consistent thread that has found its way into almost every presentation and hallway conversation.

This comes as no surprise, of course. As one of the most rapidly maturing and disruptive technologies most of us have ever seen – one that is changing roles, processes, speed, and capability even as we speak – AI deserves a leading role at a conference such as this.

From the standpoint of the NRO – and very likely the organizations, agencies, and institutions that you represent – AI's influence can be felt in many ways that make this an especially important moment.

First, we collectively find ourselves at the intersection of *aspiration and realization.* AI is poised to dramatically alter our world in many ways, and at the NRO we are experimenting, prototyping, and applying AI to achieve vital enhancements in space-based ISR.

Second, the collective "we" who are contributing to national security through overhead collection and data synthesis – in academia, business, and government – must work together to make the best use of AI.

Such moments of radical technical change – profound as they may appear – are not new to the NRO. I want to spend some time talking about how we're leveraging our more than six-decade legacy of technological innovation to lead the charge – today – in the application of AI to our mission.

From the beginning of the NRO, nearly 65 years ago, we have been developing and applying leading-edge technologies to solve some of our nation's most pressing intelligence challenges. This is consistent with our mission:

> *"(The NRO is responsible) for research and development (R&D), acquisition, launch, deployment, and operation of overhead reconnaissance systems, and related data-processing facilities, that allow our nation to collect intelligence and information in support of national and DoD missions and other United States Government (USG) needs…."*

The fact that the NRO is responsible for the whole lifecycle of space-based ISR is critical to our success and, I believe, the intelligence advantage that we as a nation possess. It means that we're hearing continuously from the user community about their challenges and needs. Because we are so deeply involved in R&D and development, we're constantly innovating. As a result, we can quickly address our most urgent challenges and deliver needed capability rapidly.

Over the years, this has meant injecting innovative technologies rapidly in space and on the ground to provide new capabilities, greater resiliency, and improved user experiences.

Over the last several years, the NRO has undergone one of its greatest transformations since its creation:

- We have delivered new capabilities that provide more accurate measurements across a greater set of collection modalities.

- We have addressed resiliency through the proliferation and diversification of our systems, both in space and on the ground, making it much harder to significantly disable our systems or to hide malign activities from observation.

- We have responded to the need for faster delivery of capability by adjusting our processes, adding new vendors and partners, establishing multiple in-house innovation cells, and increasing our utilization of commercial capabilities.

- We have tackled the challenge of processing exponentially growing data volumes spanning diverse phenomenologies and temporal scales, through advanced algorithm development – leveraging AI and ML to deliver intelligence products in operationally-required formats with unprecedented speed.

The bottom line: by harnessing AI, ML, and automation, we are delivering data from multiple intelligence disciplines to the point of need at machine speed and global scale.

How did we accomplish this?

- We have added over 200 satellites of diverse sizes and capabilities over the last two years.

- We have established an office to efficiently integrate commercial capabilities that enhance value for our customers, and to seek out cutting-edge technologies to bring into our enterprise.

- We have adapted existing systems to enhance capability and resiliency.

- We have increased investments in technology development, and adopted contract structures to incentivize agile, speedy development – including the utilization of prototypes and space experiments.

- We have opened our architecture and plans – a bit at least – to a broader community by adding unclassified conferences and postings.

- We have expanded engagement with a broader technical community by selectively declassifying architectural concepts and development roadmaps, enabling participation in unclassified conferences and public technical forums.

Our expanded constellation has gone from aspiration to operational and is performing better than expected – improving capability and resilience; achieving greater precision and shorter revisit times; increasing observational persistence; and reaching faster data processing and transmission speeds – with AI and ML already delivering operational value across multiple domains; and poised for expanded integration.

I like to think about the benefits of AI capabilities in several areas:

- speeding the delivery of capabilities
- making systems easier to use
- and ensuring data is easier to understand.

SPEEDING THE DELIVERY OF CAPABILITIES

As I said earlier, the NRO's full lifecycle responsibility allows us to very quickly adjust to user needs. However, the challenge is that our nation's adversaries are also delivering and deploying capabilities at a rapid pace and are continuing to develop sophisticated means to camouflage their capabilities or actions. We must outpace them.

By leveraging comprehensive acquisition reform tools and deepening collaboration with mission office and industry partners, we've compressed average capability development timelines from five-plus years to approximately three years – delivering operational capabilities faster without sacrificing quality or security. This continuing engagement allows us to clearly understand the mission demands our partners face and adapt our development to better meet those needs.

Today, AI is helping through a number of avenues. Some of the ways we are using AI:

- identifying anomalies in our ground and space operations – detecting expected actions helps protect our assets from cyber intrusions

- assessing design requirements for gaps, closing the loop earlier in the lifecycle to buy-down risk

- speeding up enterprise lifecycle reviews and readiness – from acquisition to launch – by accelerating the conversion of key document-based artifacts to digital models using model-based systems engineering

- accelerating on-orbit checkout by more quickly identifying calibration patterns, reducing time-to-operation after launch, and establishing a repeatable foundation for future missions

- conducting automated test procedure generation from requirements documentation

- managing more efficient risk analysis, identifying critical path vulnerabilities and probabilistic delivery forecasts

- speeding reviews of technical documents and requirements packages, checking for accuracy and consistency

- achieving faster search and retrieval across historical mission documentation, lessons learned, and technical libraries.

I would add that we're also using AI to accelerate and improve contract actions. Besides reducing the burden of paperwork, AI for contract actions is important because it allows us to more quickly deliver new vehicles and technologies so that we can stay ahead of the rapid increase in capabilities and technologies that our adversaries are deploying.

Every application of AI is oriented toward faster delivery of capability, greater accuracy, and the extension of human capabilities.

MAKING THE SYSTEM EASIER TO USE

Over the years, the level of autonomy on our spacecraft and ground systems has, of course, become more sophisticated, increasing the efficiency of our tasking, collections, and data processing. The result is dramatically improved support to our nation's warfighters, intelligence analysts, policymakers, and first responders.

Today, the NRO is building on literally decades of experience in autonomy and machine-driven functions that now serve as an essential foundation of our capabilities.

And as the size of our constellation grows, we will exceed the capacity of what human operators can effectively manage. This demands we build more autonomy into our operations.

Of course, we have used automation to address a variety of needs for years, and now we are expanding our efforts – applying AI/ML capabilities to:

- increase autonomy on the spacecraft, enabling on-board processing and real-time recognition for situational response.

- simplify the tasking process and optimize mission planning across the constellation – making it conversational, rather than complex and manual.

- detect and engage ephemeral objects, allowing us to respond to fleeting opportunities quickly.

- automate anomaly detection, identifying subtle deviations from normal spacecraft behavior that human operators might miss.

- increase the discoverability of data, while making it easily understood by users, even in high-pressure situations.

These and other enhancements strengthen operational responsiveness and data management, but we still need to go further.

We need to get to a point where we use plain language to request information that can be instantly translated into system requests. AI agents leveraging large language models – "LLMs" – offer an unprecedented ability to do this. At the NRO, we are in the process of fielding an agentic AI framework to enable the orchestration of actions across NRO systems, as well as data queries across NRO tools and external sources. We're conducting experimentation to offer architecting- and system- engineering-as-a-service, deploying a user interface that translates plain language queries into system requests to deliver the necessary information at a much faster speed.

Ultimately, we're looking to move faster and more accurately, using AI and natural language processing to model and understand the space architecture from the ground to the satellite and back again. This framework will achieve a couple of essential objectives:

- Automating the synthesis of multiple reporting streams, characterizing observed activity, and using predictive analytics to continuously identify high-interest activities to alert stakeholders.

- Collection agents will help monitor key information gaps and drive dynamic collection against emergent DoW priority requirements.

MAKING THE DATA EASIER TO UNDERSTAND

The NRO has always been a data-driven organization. As early as the 1960s, we were on the leading edge of processing large data sets to address complex, time-sensitive intelligence challenges.

The NRO, like other IC elements, must provide information to a wide range of customers from analysts to interagency and civil communities, from policy makers to warfighters. Today our customers and partners are demanding even more – more data collections, with greater precision; the fusion of varying data streams to offer actionable information; delivered to users wherever they are located, faster than what was possible before.

Here's an early example of how the NRO was finding ways to fuse data more rapidly and automatically. After 9/11, al-Qaida and other terrorist organizations were using deadly – and virtually undetectable – IEDs to inflict mass casualties on U.S. troops. The NRO developed what was called the "Red Dot program," which integrated signals and satellite imagery to identify the probable location of IEDs in near-real-time and with incredible accuracy. Troops were alerted and could avoid affected areas, calling in Explosive Ordnance Demolition teams to remove the IEDs. This saved countless lives.

Today, the need for increased data collection with greater precision and diminished latency has only increased. AI/ML techniques enable searching of massive data volumes, and the delivery

of relevant data to users at much greater speeds – so that more needles can be found within larger haystacks.

The data needed will often be different for an analyst versus a warfighter or first responder, and the timelines of need that are involved may vary substantially. For the analyst, it's about making the process of discovery easier, so they have time to dig into metadata, trace data sources, and investigate anomalies – and we give them the tools to do that efficiently. The warfighter and first responder need actionable data delivered fast – information that tells them exactly what they need to know to immediately address a situation.

These are two vastly different scenarios, and each can be addressed using AI and ML techniques. For analysts, we provide object detection across hundreds of classes that is integrated directly into their workflows, along with generative AI tools that summarize large data volumes so they can generate insights more efficiently. For warfighters, we deliver fused, actionable intelligence in near real-time.

THINGS WE NEED TO THINK ABOUT

AI systems must deliver products that are available, operationally useful, understandable to users, and auditable. For design optimization and tasking algorithms, verification is straightforward – through empirical testing to confirm requirements compliance and expected output delivery. However, while we can validate that AI systems function correctly and produce acceptable results, proving they achieved optimal solutions remains difficult.

The case of data fusion is a good example. In this case, we are asking the system to provide solutions that are not always immediately verifiable and are often based on measurements that are either intentionally or naturally obfuscated.

AI explainability is a major concern for us, and it's still an open area of research. As we continue to operationalize AI, and incorporate AI models into essential NRO functions, we need to be able to look inside the "black box" of AI and verify the prediction and outputs of a model, understanding how the model arrived at its prediction. This is essential for maintaining trust in the NRO's data.

We address this by building trust and transparency into every AI system. That means rigorous testing and validation, continuous monitoring for performance issues, and clear documentation of how each system was developed. We're investing in infrastructure like our Ultra Dense Environment – doubling GPU capacity this fiscal year – to support the development of AI capabilities that our customers can confidently rely upon.

AI AND THE WORKFORCE:

Before I close, a quick word about the people of the NRO in the context of AI deployment.

For nearly 65 years, the NRO's strength has been the outstanding professionals who comprise our workforce, as well as our allies, and other partners. Our team's expertise, spirit of innovation, and laser focus on the mission are a differentiating advantage.

Importantly, our AI transformation does *not* mean we're seeking to replace humans with machines. That doesn't add value to our mission. Rather, one of the key tenets to using AI at the NRO is developing an AI-ready workforce.

Today, AI capabilities aren't just being applied to our satellite systems; they're being integrated across our enterprise in every mission portfolio – precisely to enable our team and partners to do things better and faster.

A major promise of AI is the ability to automate repetitive and tedious tasks, freeing time for humans to focus on more meaningful, creative, and intellectual work – which is also where humans still greatly outclass AI.

In fact, we want *more* humans to join our team – talented, mission-focused professionals who will do the challenging and necessary work that ensures mission success – designing data structures, developing algorithms, training machines, and launching complex satellites and constellations into space.

Skilled individuals can make a difference to the NRO's mission, doing work that is important – both for the country and for the future of technology. We're hiring applicants at multiple grade levels in critical skillsets such as data science, computer science, cyber, systems engineers, contracts, financial management, and security. If you, or anyone you know, are interested in joining the NRO, please visit nro.gov/careers/ for our latest available positions.

I opened my remarks by talking about the NRO's legacy of innovation. I'll close by stressing that the NRO doesn't just need to innovate, we need to innovate faster than our nation's adversaries. We know, for example, that China has committed billions to achieve AI dominance by 2030; and Russia is implementing AI across its intelligence and military operations, in a direct challenge to our comparative technological advantage.

Simply put, the NRO must continue to leverage AI – and *every* emerging technology that we can – to maintain the U.S. space-based intelligence advantage as we protect our satellites; enhance our ability to monitor adversary activity; and provide timely, accurate intelligence to warfighters, analysts, first responders, and decision makers.

We're already seeing AI deliver on the foundation that the NRO has been building for 65 years. *We're better with it*, able to model and understand the space architecture from ground to satellite and back again.

As we look to the future, AI will continue to revolutionize how we provide space-based ISR – ensuring that we can continue to answer the most pressing intelligence challenges that we face in this – and every – era.

# # #