SELECT COMMITTEE ON INTELLIGENCE

UNITED STATES SENATE

Additional Questions for Dr. Christopher Scolese upon his nomination to be Director of the National Reconnaissance Office

Responsibilities of the Director of the National Reconnaissance Office

The National Reconnaissance Office (NRO) was established as a joint Intelligence Community (IC) and Department of Defense (DoD) organization to develop, launch, and operate America's signals, imagery, and communications satellites to enable its IC mission partners to produce intelligence products for Congress, the Executive Branch, and the military.

QUESTION 1: What is your understanding of the unique role of the NRO within the IC?

From my understanding of the publicly available history of the National Reconnaissance Office (NRO), in September 1961, the Central Intelligence Agency (CIA) and Department of Defense (DoD) signed the first NRO Charter that established management arrangements for the National Reconnaissance Program. This consolidated many of America's national space and aerial reconnaissance projects under a covert, highly-compartmented National Reconnaissance Office. In 1992, the U.S. government declassified the "fact of" or existence of the NRO.

As a member of the Intelligence Community (IC) and as an element of the DoD, the NRO is organized and managed as a partnership between the Director of National Intelligence and the Secretary of Defense to meet their overhead intelligence requirements. The NRO mission is to develop, acquire, launch, and operate overhead reconnaissance systems and associated ground command and control, mission management, processing, and communications segments. The NRO maintains close partnerships across the IC and with defense and space-faring organizations, such as the National Security Agency, the CIA, the Defense Intelligence Agency, the National Geospatial-Intelligence Agency, Air Force Space Command, U. S. Strategic Command, and the National Aeronautics and Space Administration.

The NRO supports current operations with existing systems and plays a critical role in providing global situational awareness, including access to high-risk and denied areas. Working closely with its mission partners, the NRO provides policy makers, analysts, and warfighters timely access to high-value, multiple-intelligence fusion content. Using NRO data, NRO mission partners produce intelligence products for the President, Congress, national policy makers, and warfighters.

I certainly appreciate and value the criticality of this mission, and if confirmed, I will work to maintain and further strengthen the NRO's contributions to the IC, the DoD, and other key partners.

QUESTION 2: What is your understanding of the specific responsibilities of the Director of the NRO?

My understanding of the responsibilities of the Director of the National Reconnaissance Office (NRO) is to provide direction, guidance, and supervision over all matters pertaining to the NRO mission to develop, acquire, launch, and operate overhead reconnaissance systems and associated ground command and control, mission management, processing, and communications segments. Accordingly, the Director of the NRO is accountable for the day-to-day management of the NRO and the execution of its mission. To accomplish the NRO mission, the Director is authorized to establish strategic guidance, policy, and procedures for the execution of the NRO mission and the accomplishment of National Security Space responsibilities. Additionally, from my review of Executive Order 12333, as amended, and Department of Defense (DoD) Directive 5105.23, as of 29 October 2015, the Director of the NRO executes other authorities specifically delegated by the Director of National Intelligence (DNI) and Secretary of Defense (SecDef) and is responsible for:

- Managing and operating the NRO, its program activities, and acquisition of NRO systems, which includes developing a capable workforce, and fostering effective teams and partnerships internal to NRO;
- Serving as Principal Advisor to the DNI, SecDef, Chairman of the Joint Chiefs of Staff, DoD Combatant Commanders, and Secretary of the Air Force on overhead reconnaissance;
- Delivering intelligence, surveillance, and reconnaissance capabilities; and information products, services, and tools in coordination with the Functional Managers, as established by the DNI;
- Maintaining close, integral relationships and partnerships with Intelligence Community and DoD mission partners; and U.S. government agencies, departments, and entities with specific responsibility for overhead and space activities in peacetime and wartime; and
- Sharing responsibility for leading and managing the National Security Space community.

QUESTION 3: Have you discussed with Director Coats his specific future expectations of you, and his future expectations of the NRO as a whole? If so, please describe these expectations.

Yes, I spoke to both the Director of National Intelligence (DNI) and the Principal Deputy Director (PDDNI) about their expectations for the next Director of the National Reconnaissance Office (NRO). Their strong emphasis was to ensure continuity of mission, infuse technology (including artificial intelligence), increase the speed of delivery of data to the user community, and modernize the architecture. We also discussed the need to support the NRO Cadre with recruitment and training opportunities.

If confirmed, I look forward to working with the DNI, PDDNI, Secretary of Defense, and the Under Secretary of Defense for Intelligence on these initiatives.

QUESTION 4: Please describe any lessons you have drawn from the experiences of current and former Directors of the NRO.

The most important lessons shared with me were the need to collaborate with the Intelligence Community and Defense organizations so that the process—from requirements generation to implementation of systems—can be done effectively and efficiently. Another lesson is the need to communicate status updates to partner and sponsor organizations to avoid duplication and ensure a common understanding of progress and challenges.

NASA Experience

You have served over thirty years – since 1987 – at NASA and, for the last seven years, as director of NASA's Goddard Space Center.

QUESTION 5: If confirmed, how would you use your "outsider" perspective to the benefit of the NRO?

Throughout my career at the National Aeronautics and Space Administration (NASA), I have been involved in all aspects of space systems development, ground system design, launch operations, facilities management, and personnel management. This experience included involvement in the management and oversight of over 100 space missions in Earth orbit and beyond. These missions

addressed science, operational, and communication requirements and included all classes of satellites, from individual instruments on CubeSats to large missions with integrated constellations. Further, I was responsible for making difficult decisions on requirements, infusing technology effectively, building strong partnerships, and communicating progress on activities. Some specific examples include the redesign of the Earth Observing System and the development of the Earth Observing System Data and Information System. While the preponderance of my career has been outside the Intelligence and Defense communities, if confirmed, I believe my unique experiences at NASA directly correlate to the National Reconnaissance Office (NRO) mission. I will bring innovative approaches to the NRO mission and leverage best practices to enhance the NRO's intelligence collection mission, from satellite design through delivery of data to users.

The NASA and NRO missions are in many ways different, yet they are also similar. At a fundamental level, we share some of the same industrial base partners, launch systems, and at times, personnel. NASA missions are designed to address a specific set of requirements based upon prior scientific discoveries. Throughout my career, including in my current position as the Director of the Goddard Space Flight Center, I have sought to apply state-of-the-art technologies, combined with capabilities from industry, academia, and industrial partners, to ensure the most efficient use of resources to meet the NASA mission. Similarly, the NRO is responsive to intelligence requirements, and the fundamental principles of space system design and acquisition from my experience at NASA would also apply.

If confirmed, I believe that all of these experiences will benefit the NRO and will provide different perspectives and approaches to accomplishing the mission.

QUESTION 6: If confirmed, how would you seek to overcome challenges presented by your lack of IC experience?

I have deep expertise in developing and acquiring space systems at the National Aeronautics and Space Administration (NASA) that is directly relevant to the National Reconnaissance Office (NRO) mission, and I have served as an advisor on NRO programs. Similar to the mission of the NRO to support intelligence requirements, NASA and the Goddard Space Flight Center (GSFC) are charged with developing space and ground systems that are responsive to the user communities' requirements. To this end, GSFC and NRO use the same

components, vendors, and in some cases, systems, to accomplish their respective missions. NASA, GSFC, and the NRO often participate in common activities, such as the Space Collaboration Council, the Joint Missions Assurance Council, the Space Quality Improvement Council, and the Mission Assurance Improvement Workshop, all of which are intended to improve our performance and assure communication among the agencies and industry about common concerns and best practices.

Further, we work together in areas of critical importance, such as setting common standards for launch vehicles and looking at future capabilities. One example of this is the recent "Science and Technology Partnership Open Forum: Information Exchange for Market Analysis of Commercial In-Space Assembly Activities." The purpose of such joint forums is to coordinate efforts, especially in the areas of cutting edge technology, to achieve common goals more efficiently than could be accomplished by one organization alone. Often these activities result in community standards or new capabilities that improve reliability and resiliency.

QUESTION 7: As head of Goddard, you are responsible for many of NASA's major acquisition programs, to include the James Webb Space Telescope. In the most recent spending bill, Congress criticized NASA for "mismanagement, complete lack of careful oversight, and overall poor basic workmanship" on the James Webb Space Telescope. This project, whose costs have increased from $1 billion to nearly $9 billion, will be nearly a decade late when it finally launches in 2021.

Given NASA Goddard's struggle to keep the James Webb Space Telescope on schedule and on budget, what assurances can you provide to us that you have the management expertise to prevent similar cost and schedule overruns with NRO-managed acquisitions?

First, allow me to provide some context on the James Webb Space Telescope (JWST) mission. JWST represents a once-in-a-generation mission designed to accomplish complex scientific objectives that have been elusive for over three decades. At JWST's outset, the National Aeronautics and Space Administration (NASA) readily acknowledged that it was necessary to invent 10 new technologies to meet the demanding performance specifications necessary to accomplish the requirements. As an example, JWST must operate at temperatures of -387.7 degrees Fahrenheit (or 40 Kelvin), use a 6.5-meter diameter segmented

mirror, and be located more than 1 million miles from Earth. By comparison, JWST is expected to perform more than 100 times better than the Hubble.

While serving as the NASA Associate Administrator in 2009, I initiated a wide-scale review to address the technical, funding, and contractual items that were complicating several NASA missions. This review was called the "Explanation of Change," and it evaluated several past missions to determine the causes of issues and reviewed lessons learned from the Government Accountability Office and the NASA Inspector General reports, as well as past studies of space system development. Nine factors were identified as part of this review. Because JWST was initiated before this study was completed, it adopted the relevant aspects of these guidelines during its replan in the 2010-2011 timeframe. As a result, from 2011 until 2017, the JWST program performed within cost and schedule; the recent program challenges are primarily related to unanticipated manufacturing issues. These guidelines were applied to other Goddard Space Flight Center programs at their initiation and have been adopted as a best practice. As a result, nine of the last 12 missions developed by Goddard were delivered at, or below, the agreed to cost target. These guidelines are still in use today and have been adopted by other space acquisition organizations.

If confirmed, I will bring my experience in mission development, evaluation, and replanning to the National Reconnaissance Office (NRO) and will seek to apply these acquisition best practices and lessons learned to NRO acquisitions. Additionally, if confirmed, I will provide programmatic updates to Executive and Legislative Branch oversight committees as needed to ensure an informed dialogue and to allow for timely programmatic adjustments, before cost and schedule are impacted.

QUESTION 8: What lessons have you learned from your experiences managing Goddard's acquisition of the James Webb Space Telescope that you could apply to the NRO?

I learned many invaluable lessons from my time on the James Webb Space Telescope project, among the most notable, and likely to be applicable to the National Reconnaissance Office mission, include:

- Increase investments in research and development for new technologies to achieve a reasonable maturity level before establishing as a "program of record";
- Solidify and document requirements;

- Conduct a Joint Confidence Level-based estimate prior to approving the program and ensure the estimate accounts for development risks;
- Establish the program budget commensurate with cost and schedule risk and secure the proper funding profile; and
- Hold independent program reviews at critical milestones.

QUESTION 9: Goddard recently proposed changes to the Wide Field Infrared Survey Telescope (WFIRST) mission intended to reduce the spacecraft's projected cost and address issues about the technical maturity and risk of some elements. If confirmed, how would you apply lessons learned from your experience with the WFIRST mission to the NRO?

The most valuable lesson I learned from my experience with the Wide Field Infrared Survey Telescope (WFIRST) mission was the importance of clear and stable requirements. The WFIRST program adopted the guidelines that I developed as Chief Engineer that have allowed recent missions to perform at, or better than, expectations in terms of cost and schedule. The most important guidelines are to ensure that the requirements are clear and stable, risks to development are understood, and budgets are consistent with the requirements. The WFIRST program correctly identified that the budget profile and the technical requirements were not in alignment. To address this, I facilitated a review of the goals of the mission, which is still ongoing. If confirmed, I will bring this critical look at all aspects of program development to the National Reconnaissance Office (NRO) to determine if and when adjustments need to be made to ensure the NRO meets the needs of the user community.

QUESTION 10: A few months ago, NASA launched a number of CubeSats on a Rocket Lab rocket designed specifically for small payloads. Likewise, NRO has begun to embrace small satellites and is looking at small launch solutions. If confirmed, what would you do to help NRO continue along this path?

CubeSats, small, and medium satellites can provide a range of benefits, from quickly testing and space-qualifying technologies, to meeting or enhancing mission requirements. I also think that a mix of small, medium, and large satellites provides an increased capability to best meet the mission, allows for greater innovation, optimizes the architecture, and achieves resiliency. If confirmed, I would ensure that the National Reconnaissance Office (NRO) is weighing all architecture options against mission needs, recognizing that at times, requirements

may best be met using hybrid architectures comprised of both larger and smaller satellites.

From my experience at the National Aeronautics and Space Administration (NASA), mission requirements and physics largely drive the size of a satellite, telescope, or constellations of satellites. At Goddard I championed the use of CubeSats and small satellites. I supported the development of miniaturized instruments for use on CubeSats, identified missions best suited for small satellites, and modified policies to address the unique aspects of small satellites and CubeSats. The ability to manifest CubeSats and small satellites on a variety of launch platforms, along with their lower cost compared to larger satellites, has afforded the opportunity to more quickly space qualify technologies, train scientists and engineers, and allow for constellations of satellites. More recently, the combination of miniaturized instruments with CubeSats and the greater variety of launch platforms has demonstrated the ability to accomplish significant scientific goals.

Additionally, at the NASA Goddard Wallops Flight Facility, NASA personnel work closely with National Science Foundation-sponsored researchers to develop, manifest, and track nanosats and CubeSats for educational and outreach activities. These activities accomplish science goals while demonstrating new technologies and training the next generation of scientists and engineers. Further, NASA continues to work with the NRO on small satellite launches from Wallops.

QUESTION 11: NASA has many programs with new graduates and new ideas. This same pipeline has evaded the NRO for decades. How will you encourage a new generation of talent to embrace the NRO?

From my experience at the National Aeronautics and Space Administration (NASA), talent recruitment and workforce development are fundamental to the success of any organization. It is critical for a highly technical space agency to recruit and retain science, technology, engineering, arts, and math (STEAM) expertise. During my tenure at Goddard, I actively partnered with professional societies, high schools, colleges, and universities to educate students on the NASA mission and encourage students to pursue STEAM fields with an eye towards NASA and Goddard as ideal places to utilize their talent. I also encouraged Goddard personnel to visit schools and talk with students and faculty, championed partnerships with professional societies, and provided rewarding opportunities for interns. All of these activities, across all fields — from administration to science

PhDs — have resulted in a highly motivated and innovative workforce at NASA Goddard. Because of my dedication to inspiring and educating the next generation of explorers, I have worked to develop relationships with minority and underrepresented institutions. I have developed a strong recruitment program at Goddard that draws from an extremely diverse population and significantly leads NASA in minority intern recruitment. These efforts have ensured a healthy Center pipeline of students engaged in multi-year programs leading to potential employment. As a result of my leadership focus on personnel engagement, the Goddard Space Flight Center has been rated as one of the best NASA workplaces for the last two years, according to the annual Best Places to Work in the Federal Government rankings. In addition, NASA has been ranked the best place to work in the federal government for the last seven years.

If confirmed, workforce management will be a priority for me as the National Reconnaissance Office (NRO) Director. As I learn more about NRO's talent recruitment and workforce development initiatives, I will seek to incorporate best practices from my NASA experience at the NRO.

QUESTION 12: At NASA, you have been a proponent of inserting cutting-edge commercial technology into programs. Although it is improving, the NRO has, at times, been slow to adapt to ongoing changes and potential applications of commercial space and related technologies.

Please describe some successes you have had at NASA in adopting commercial solutions.

I have a strong record of using commercially available components and systems, and if confirmed, I will continue to encourage their use, where appropriate. I believe it's the responsibility of any government agency to buy commercially available products and services when they meet the requirements and are available.

At the National Aeronautics and Space Administration (NASA), we have seen that spacecraft buses for many applications are commercially available and can perform with little to no modification to meet mission requirements. As a result, at Goddard, we implemented the Rapid Spacecraft Development Office to acquire fixed-price commercially available spacecraft buses. This allowed NASA to focus on the unique areas that required significant technology development to meet the mission's requirements. The results have been successful, from the first

mission that supported the Earth Observation System—QuikScat—to the most recent science mission—the Fermi astrophysics observatory—in terms of both mission performance and cost. In addition, this philosophy has helped missions for the National Oceanic and Atmospheric Administration (NOAA) that serve the operational community. For instance, the Suomi National Polar-Orbiting Partnership mission used a commercially available bus to rapidly address and prevent a gap in weather observations. NOAA and the U.S. Geologic Survey now rely on commercially available buses for operational weather and land imaging satellites.

NASA also worked with commercial providers for data on weather and land imaging to provide or enhance data sets. An example is the Sea-Viewing Wide Field-of-View Sensor (SeaWiFS) project that employed a data-buy arrangement where a commercially developed system acquired measurements of the ocean for commercial and scientific customers at a lower cost than if either party developed the system alone.

QUESTION 13: Do you see a path forward at NRO to inject some new technologies and adapt more toward commercial solutions?

Yes. To provide innovative overhead systems, the National Reconnaissance Office (NRO) must constantly work to inject new technologies into programs and leverage the latest technologies into space and ground systems to stay ahead of our adversaries in terms of capability and resiliency.

Based on my experience at the National Aeronautics and Space Administration (NASA), this is best accomplished by developing a technology pipeline, maintaining awareness of other organizations' developments, and adapting the architecture(s) to be flexible to allow for rapid technology insertion. Commercial or other partner capabilities can enhance or replace existing systems. Common data standards and interfaces can increase industry participation to more efficiently meet mission requirements.

NRO Missions and Capabilities

QUESTION 14: The NRO's primary mission is to procure, build, and deliver world-class satellites. If confirmed, how would you prioritize NRO's missions and capabilities?

If confirmed, my priorities for the National Reconnaissance Office (NRO) would be focused on meeting the requirements of Intelligence Community and Department of Defense customers.

Based on my one-on-one meetings with Senators from this committee, as well as drawing on the conversations with both the Director of National Intelligence and Under Secretary of Defense for Intelligence, I would seek to increase the speed at which data is delivered to users, increase the ability to insert new technology, and upgrade systems, while maintaining the high degree of reliability and data integrity expected of NRO systems.

QUESTION 15: If confirmed, what steps will you take to improve the information-sharing, integration, coordination, and collaboration between NRO and the other IC agencies, in particular the National Geospatial-Intelligence Agency (NGA) and DoD?

Throughout my 32-year career at the National Aeronautics and Space Administration, I've partnered with, and worked across, a diverse community of agencies, scientists, engineers, and analysts, with a disparate set of requirements. This experience has instilled in me a strong belief in the value of building and sustaining partnerships with customers and communicating regularly on the status and future direction of programs. I have managed multifaceted partnerships with agencies including the National Oceanic and Atmospheric Administration, the U.S. Geologic Survey, the Department of Defense, the National Reconnaissance Office (NRO), and international organizations to meet shared requirements and priorities. Consequently, I place a priority on listening to partners' needs throughout the conception, development, and operation of a system(s) and communicating progress so that adjustments can be made to ensure operational performance satisfies user needs within technical, cost, and schedule constraints.

If confirmed, I look forward to receiving in-depth briefings on the NRO's current relationships with Intelligence, Defense, and other partners, and look

forward to building strong, cooperative relationships to ensure the NRO continues to provide critical intelligence to support policymakers, analysts and warfighters.

QUESTION 16: If confirmed, how will you ensure that the tasking of NRO resources and personnel to support DoD does not negatively impact its ability to support other mission partners and to fulfill NRO's core missions and capabilities?

The National Reconnaissance Office (NRO) has a responsibility to serve the needs of users across the Intelligence Community (IC) and the Department of Defense (DoD), and since the NRO was established in 1961, it has been supporting various users and mission priorities across both communities. I have demonstrated experience at the National Aeronautics and Space Administration (NASA) supporting diverse customer sets across varied missions that is not unlike the diverse set of customers supported by the NRO. If confirmed, my NASA experience will enable me to work effectively with IC and DoD customers. It will be a priority for me to ensure that NRO continues to fulfill and deliver its core missions and capabilities.

QUESTION 17: If confirmed, how would you partner with private industry to accomplish NRO's missions?

From my experience at the National Aeronautics and Space Administration (NASA), I know a strong partnership with private industry is necessary to accomplish the mission. Mission development is a team effort between government and private industry, and all team members are critical to success.

Private industry typically has the personnel, tools, and facilities to conduct large scale developments and the ability to manufacture multiple copies of systems very effectively. Further, as commercial demand for products increases, the private sector can offer solutions that augment or replace existing systems, thus allowing the government to enhance capability or focus on new capabilities. Also, in many cases, private industry can infuse technology or implement processes at a more rapid rate.

From my NASA perspective, and from what I understand is the National Reconnaissance Office's perspective as well, the government has a broader and longer-term perspective than private industry. The government has the advantage of historical perspective based on long-term knowledge of system capabilities and evolution, of observing the performance and capabilities of multiple suppliers, and

of knowing what capabilities may be needed in the future. Also, the government can often invest in very early stage technologies through universities and government labs that have long-term potential to enhance capabilities for both government needs and commercial applications.

This creates an opportunity for teamwork between government and industry where industry can build the systems, provide commercial alternatives, and infuse technologies, while the government can focus on mission performance, continuity of operations, and maturing very new technologies that may not have a commercially viable payoff at this time, but could significantly improve the mission.

I believe that neither the government nor the commercial sector alone can maintain the level of performance needed to keep the U.S. competitive in space, given the ambitions of our adversaries, so partnership with private industry is not only beneficial, but necessary.

QUESTION 18: In familiarizing yourself with NRO's existing vision and architectures, what are your thoughts about what you have seen in the organization, in light of the massive shifts in the threat and the continued vibrant growth in the commercial sector in the U.S. and globally?

Based on my experience at the National Aeronautics and Space Administration (NASA), I recognize that there is a significant and growing threat to our space and ground systems. From what I have seen so far, the National Reconnaissance Office, like NASA, takes these threats very seriously and is making systems more resilient through design and operation, and by relying on multiple types of systems to assure the continuity of data.

If confirmed, I look forward to receiving more detailed briefings on this matter.

QUESTION 19: Please describe your views on NRO's role with regard to enabling artificial intelligence (AI) and machine learning.

It is very clear that artificial intelligence (AI) is rapidly becoming more capable, and as we move to more diversified and proliferated sources of information, we will need to leverage AI to accomplish the mission. If confirmed,

I would seek to work with industry and academia to maximize their potential to support the incorporation of AI technologies into the National Reconnaissance Office (NRO) mission, in areas such as ground architecture and tipping and cueing across the constellation.

Based on my experience at the National Aeronautics and Space Administration (NASA), AI, if implemented successfully, is a multiplier that enables assessment of large volumes of data not easily done by humans, speeds the delivery of information to the end user, and can help increase system robustness. Leveraging AI is critical to maximizing collection platforms to solve complex intelligence problems. If confirmed, I look forward to partnering across the Intelligence Community and Department of Defense to develop and apply AI technology to the NRO mission.

QUESTION 20: There have been concept of operations (CONOPS) discussions suggesting that NRO may not save all mission data from future collection platforms. Given the downward trend in the costs of commercial storage capacity and the important role of having massive quantities of data supporting AI algorithms, what are your views on deleting data that may not seem to have mission value?

It is critical to save mission data to enable discovery and to train artificial intelligence (AI) algorithms. It is my experience that although storage costs are trending down, the growth of data tends to offset this trend. My experience at the National Aeronautics and Space Administration (NASA) has shown me that it is critical to maintain a combination of data and algorithms that enables a trade between data storage and processing capability to manage costs.

It is my understanding that the National Reconnaissance Office (NRO) is also evolving its ground systems to support a data-centric architecture, which I believe will enable effective data management strategies, such as tiered data storage, minimized duplication of records, and facilitated data sharing across the Intelligence Community and Department of Defense.

If confirmed, I will work with NRO mission partners to develop data retention strategies that provide the best intelligence determination opportunities.

QUESTION 21: In recent years, there have been orders of magnitude growth in tipping and cueing between overhead satellites. Both NGA and NRO separately employ teams of specialized personnel to develop mission-based models to enable collection orchestration. How would you work to ensure an integrated approach to maximize the value of these low density, high demand personnel?

From my understanding, the National Reconnaissance Office (NRO) is focused on developing models, in coordination with the National Security Agency (NSA) and the National Geospatial-Intelligence Agency (NGA), to enable automation across its overhead collection architecture to include geospatial and signals intelligence. Also, Intelligence Community (IC) elements, such as NSA and NGA, need to develop analytic models to analyze data from multiple sources, including data from NRO systems, and identify trends and intelligence gaps. If confirmed, I would work with IC partners, such as NSA and NGA, to ensure NRO-developed mission models are leveraged across the IC to maximize their value.

QUESTION 22: Current NRO Director Betty Sapp has said that although NRO is still innovative and agile, the agency does not have the "same level of risk tolerance or the processes that support a lot of going fast" that it once did. Do you agree, and if so, if confirmed, what would you do to bring the risk-taking and "going fast" culture back to NRO in a way that would also preserve appropriate oversight and accountability?

The National Reconnaissance Office (NRO), under Ms. Sapp and her predecessors, has had a successful and admirable record that, if confirmed, I hope to continue. However, having been involved in government acquisition for a very long time, it is clear to me that we need to explore new ways to streamline our processes to increase the speed of development and improve performance, without compromising the mission or increasing cost risk.

We have a responsibility to infuse the latest technology into our programs to stay ahead of our adversaries and to ensure that we are providing the needed data quickly and efficiently. However, this requires that we all understand and accept the risks. This is not always easy to accomplish and can only be accepted if the systems allow for the flexibility to distribute risk so that no one system or data product is vulnerable to catastrophic loss. New launch capabilities, commercial capabilities, and acquisition approaches all lend themselves to providing the tools to allow a "going fast" culture with reasonable risk.

Over the last 20 years, I have held positions in which I was responsible for program oversight and for reporting progress to Congress and other organizations. I have found that regular reporting ensures oversight is fully and currently informed on the status of programs and acceptable levels of risk to support a "going fast" culture. Only by engaging with oversight can we assure Congress that we are managing risk while meeting mission requirements. Therefore, I believe that communicating with Congress on a regular and continuing basis enables us to increase the pace at which we address the threats we face in space, prevent acts of aggression, and remain consistent with American laws and values while managing risk.

QUESTION 23: One of NRO's top priorities is mission resiliency and survivability – not just the survivability of the spacecraft, but also of communications lines and of processing facilities. If confirmed, would you view mission resiliency and survivability as a top priority?

Yes, if confirmed, I would view mission resiliency and survivability as a top priority.

The National Aeronautics and Space Administration (NASA) operates or develops critical systems for communicating with our astronauts, collecting and distributing data from our satellites, and providing critical data about our weather and resources. Many of these systems are developed or operated by Goddard. As a result, I have worked closely with other agencies to ensure the safety of these systems and to provide resiliency where and when possible. I have directed changes to our space and ground systems—existing and future—to reduce susceptibility to attack and provide protection for our spacecraft.

QUESTION 24: NRO needs not only to acquire space systems but also to ensure that the intelligence collected in space can quickly get to a user – whether an analyst, policymaker, or military user at the tactical edge. The boundary between space and ground blurs more and more, as we seek to perform more processing onboard spacecraft. How do you see the relationship between NRO and NGA adapting to meet these conditions?

From my experience at the National Aeronautics and Space Administration (NASA), working with the National Oceanic and Atmospheric Administration, the National Reconnaissance Office (NRO) needs data to be delivered to the user as

soon as possible. At NASA, we have implemented and experimented with direct downlink and direct broadcast to the user in the field. By "data," I mean direct measurements from the sensor that yields imagery or physical products. As ground processing capabilities have improved, data and information access has also improved, and we expect this trend to continue. Finally, from my NASA experience, it has become clear that data from multiple platforms is necessary to produce the products needed by the user, so that any solution requires a combination of space and ground assets.

As the NRO evolves its capabilities to meet new threats—such as support to Department of Defense (DoD) multi-domain operations to defeat near-peer adversaries in contested environments—I believe the NRO will need to work with its Intelligence Community (IC) and DoD mission partners to augment existing processes with new operational concepts and architectures.

If confirmed, I would work to further enhance the relationship between the NRO and its IC and DoD partners to include the National Geospatial-Intelligence Agency. In a world where the lines between space and ground are blurring, it is even more critical to collaborate among agencies to ensure timely data delivery to users.

QUESTION 25: As it relates to the procurement of commercial imagery data, NRO and NGA Directors agreed in 2017 to transfer the Enhanced View contract to NRO. Going forward, NRO will procure pixels, and NGA is responsible for developing or procuring value-added algorithms and data services. What are your views about this division of labor, and what are your views about the importance of procuring commercial remote sensing data such as Enhanced View?

Based on my experience working with the U.S. Geologic Survey (USGS) on Landsat, I believe that this is a logical and effective division of responsibilities. For Landsat, the National Aeronautics and Space Administration (NASA) develops the sensor and satellite, and provides that data to USGS to develop and procure value-added algorithms and data services.

QUESTION 26: Now that commercial industry processes satellite data in the cloud, NGA is requesting that NRO deliver unprocessed pixels directly to the Commercial Cloud Services (C2S) cloud for processing and dissemination. If confirmed, would you embrace commercial best practices, such as this?

Yes. I agree that C2S represents an opportunity that should be pursued, and I think that government organizations like the National Aeronautics and Space Administration (NASA) and the National Reconnaissance Office (NRO) should employ commercial best practices when they do not compromise the mission.

QUESTION 27: NRO is focusing on traditional spacecraft as well as new "small" space entrants. Less expensive commercial launch options have democratized access to space.

a. If confirmed, how would you plan to leverage commercial launch and use less expensive launch options to allow for more risk and more rapid replenishment of satellites?

I believe it's the responsibility of any government agency to buy commercially available products and services when they meet the requirements and are available.

There is a growing number of commercially available launch providers, both small and large, and if confirmed, I have every intention of leveraging the commercially available options to launch National Reconnaissance Office (NRO) payloads when that is the right solution for the mission.

Fortunately, I have been involved with the NRO and Department of Defense in the utilization of both new and smaller entrants into the launch vehicle market, as both a joint user of the service and as a provider of range support at the National Aeronautics and Space Administration Goddard Wallops Flight facility.

b. What are your views about the need for "on demand" launch and "on the shelf" satellites to potentially re-establish capacity in a wartime scenario?

I am supportive of both capabilities and, if confirmed, look forward to being briefed on the National Reconnaissance Office's plans for

implementing these capabilities. In my role at the National Aeronautics and Space Administration, I have experienced the benefits of off-the-shelf components and how they can accelerate mission delivery.

c. If confirmed, how would you plan to balance spending and missions for both of these dimensions of the space architecture?

If confirmed, I look forward to being briefed on current plans for implementing "on demand" launch and "on-the-shelf" capabilities for the variety of missions the National Reconnaissance Office conducts.

d. Do you believe that smaller satellites can begin to take on portions of missions that today's larger, more expensive satellites provide?

Yes, smaller satellites have a role in the future and can enhance the architecture or offload the mission requirements for larger satellites, taking into account the relevant physics of the user requirement. A mix of large and small satellites will provide complementary capabilities that address the full range of user requirements, while also enhancing resiliency.

e. What roles do you see small satellites playing in architecture?

I see great potential for small satellites in the future architecture of the National Reconnaissance Office (NRO). The National Aeronautics and Space Administration and Goddard Space Flight Center have used small satellites for missions ranging from education and technology demonstrations to science mission enabling. Satellite size is determined by a variety of factors that must be balanced, so I anticipate a diverse architecture employing all scales of spacecraft, with a growing reliance on small satellites as sensors are miniaturized, launch costs decrease, launch opportunities increase, and constellations become feasible. If confirmed, I look forward to understanding which NRO requirements can be satisfied with smaller satellite constellations.

QUESTION 28: Currently, large aerospace prime contractors dominate the contract landscape. This reliance on classic primes limits the flow of new ideas into the NRO acquisition cycle. If confirmed, what are your plans to allow "new" space entrants easier access to NRO contract vehicles?

As the variety of launch capabilities has increased, it has become easier to develop a full range of payloads, from small to large, which expands the design options for space systems. This includes a full range of system sizes, from small satellites, to large systems, to constellations of satellites, based on mission requirements. As the design options increase, so do opportunities for new entrants with new ideas, capabilities, and systems. At the National Aeronautics and Space Administration, we have explored multiple ways to do this by using "off-the-shelf," commercially available spacecraft and by purchasing commercial services. If confirmed, I will seek to best adapt these concepts to the National Reconnaissance Office mission.

QUESTION 29: What are your views concerning NRO's capabilities, and what is your assessment of the steps that have been taken to date to improve those capabilities?

I have been involved in the review of some of the National Reconnaissance Office's (NRO's) systems and in community sponsored events involving the industrial base and research opportunities. As a result, I am impressed with what I have seen and believe that NRO is working to improve its capabilities.

QUESTION 30: If confirmed, what additional steps would you pursue to improve intelligence collection and what benchmarks would you use to judge the success of future collection efforts by NRO?

As part of the confirmation process, I have had office calls with several members of this committee. Several themes emerged from these office calls, including the need to increase the speed of data delivery to the user community; the need to increase the pace of technology infusion; and the need to increase the use of commercially available systems to enhance or replace existing systems, all while ensuring the continuity of critical data available from National Reconnaissance Office (NRO) systems. Further, it has been emphasized, and it is critical, that we maintain a highly capable workforce that can achieve the NRO mission and that recruitment will be critical to bring in new thoughts and future leaders.

QUESTION 31: The Office of Director of National Intelligence IC IT Enterprise (IC ITE) C2S cloud provides the IC with an opportunity to enhance mission capabilities as well as offloading commodity capabilities, such as elastic compute/processing. What are your views on the role of the cloud as it relates to NRO capabilities?

I believe that cloud services offer an opportunity to reduce the cost of processing, enhance data distribution, and provide a more secure environment if implemented properly. C2S allows users to obtain computing resources more efficiently and only pay for the resources that are used. These resources can increase and decrease as demand changes, especially important in any dynamic environment.

QUESTION 32: The commercial cloud soon will deliver new capabilities such as "ground station as a service" that receives directly downlinked data globally and will make processed data accessible within seconds. If confirmed, would you be willing to embrace disruptive technologies such as this?

If confirmed, I will not shy away from investigating disruptive technologies if they enable the National Reconnaissance Office to better accomplish its mission.

Space Force

On February 19, 2019, President Trump signed Space Policy Directive-4 (SPD-4), directing the Secretary of Defense to craft a legislative proposal to establish a Space Force as a sixth military department of the Armed Forces within the U.S. Air Force. The proposal also excludes NRO or other non-military space organizations.

QUESTION 33: What are you views of the Space Force?

I support Space Policy Directive-4. Space provides a global strategic advantage to the United States, and increasingly our adversaries are seeking to deny that advantage. The Executive Branch proposal to establish a U.S. Space Force will ensure the United States has an organization dedicated to the unique warfighting requirements for enhanced defense against an increasingly contested space domain.

QUESTION 34: If confirmed, would you support moving NRO from its current position within the IC to the Space Force?

No. The Administration's proposal does not include the National Reconnaissance Office (NRO) in the Space Force. One of the guiding principles in the standup of the Space Force is to minimize risk to mission. The NRO is on the cusp of delivering key capabilities that will bring more data to support both the Intelligence Community (IC) and our warfighters. As directed in SPD-4, the IC and Department of Defense will be developing mechanisms to deepen space collaboration and integration efforts to increase effectiveness in space operations.

QUESTION 35: If confirmed, would you support combining NRO and the Department of Defense's new Space Development Agency (SDA)? If not, how would you as NRO director plan to collaborate and coordinate with the SDA?

No. At this time, the newly established Space Development Agency (SDA) is in the process of standing up. From my understanding of recent guidance from the Acting Secretary of Defense, there will be opportunities for cooperation that benefit both the National Reconnaissance Office and SDA. If confirmed, I look forward to working with the SDA and other agencies to identify areas of cooperation in the space systems development domain.

QUESTION 36: If confirmed, what do you see as some of the significant challenges to harmonizing and aligning how the NRO and the Space Force could work together and take advantage of their respective capabilities?

A U.S. Space Force will help ensure that the United States has an organization dedicated to the unique warfighting requirements to defend against an increasingly contested space domain. If confirmed, under my leadership, I expect the National Reconnaissance Office (NRO) to work with the Space Force just as it has worked with the U.S. Air Force in fulfilling the Air Force's responsibility to organize, train, and equip military forces for the joint force and to assess opportunities for advancing our shared mission interests. The NRO will be a participant in the Space Policy Directive-4 directed study to identify mechanisms to increase unity of effort between the Intelligence Community and Department of Defense.

QUESTION 37: If confirmed, how would you support the 180-day study required by SPD-4 that will detail progress and plans to create and enhance mechanisms for collaboration across the DoD and IC?

If confirmed, I will seek to provide input into the 180-day study to ensure the National Reconnaissance Office (NRO) mission continues to support Intelligence Community and Department of Defense (DoD) requirements. I believe it is important to build upon the strong foundation of cooperation between the NRO and DoD space elements in areas such as acquisition, planning, and operations that exists today.

Congressional Intelligence Committees

QUESTION 38: What is your understanding of the Director of NRO's obligations to keep congressional intelligence committees fully and currently informed?

If confirmed as the Director of the National Reconnaissance Office, I assure you that I will continue to abide by the responsibility to provide timely and accurate information to Congress.

QUESTION 39: Please assess, based on your observations and understanding of the relationship between NRO and Congress, how well NRO is working with Congress and, specifically, with the congressional intelligence committees.

a. What information should NRO share with Congress?

Over the last 20 years, I have held positions in which I was responsible for program oversight, and I routinely briefed and testified before Congress. I believe that communicating with Congress on a regular and continuing basis enables us to further our collective ability to meet national intelligence needs, ensure resiliency and robustness, and remain consistent with American laws and values. If confirmed, transparency with congressional oversight must and will be a priority for me as I fulfill my duties as Director of the National Reconnaissance Office.

b. What, if any, information should NRO withhold from the congressional intelligence committees? Why?

Given my understanding of the National Reconnaissance Office and its mission, I am not aware of any information that should be withheld from the congressional intelligence committees. If confirmed, I will keep the committees fully and currently informed.

QUESTION 40: Please describe your view of NRO's obligation to respond to requests for information from Members of Congress.

Oversight is critical to the successful operation of any government organization, to include the National Reconnaissance Office (NRO), and I believe oversight committees are our partners in accomplishing the mission. If confirmed as Director of the NRO, I would have the responsibility to keep committees fully and currently informed, and I would direct all NRO entities to promptly support requests for information.

QUESTION 41: Does NRO have a responsibility to correct the record, if it identifies occasions where inaccurate information has been provided to the congressional intelligence committees?

Yes.

National Security Threats and Challenges

QUESTION 42: What, in your view, are the current principal threats to national security that are most relevant to NRO?

I have experience in this area, based upon the National Aeronautics and Space Administration (NASA) Space Asset Protection Program that routinely informs us of threats and mitigations. No space asset in Earth orbit is immune from at least the attempt to deny control. Space threats are increasing, and we must be vigilant to protect against them to the best of our ability.

If confirmed, I plan to pursue strong partnerships across the Intelligence Community and Department of Defense to assess space threats. I look forward to

receiving more information on this topic to better understand the depth and breadth of adversary space systems that are intended to counter the National Reconnaissance Office's current and future capabilities.

QUESTION 43: In your opinion, how has NRO performed in adjusting its policies, resource allocations, planning, training, and programs to address these threats?

My experience with National Reconnaissance Office (NRO) personnel and programs has been very positive in the areas of policy, resource allocation, and planning regarding threats. If confirmed, I intend to gain more insight on how NRO plans to align its resources to address potential threats.

NRO Management and Personnel

QUESTION 44: NRO's workforce includes NRO cadre as well as other IC personnel and personnel from the military and private industry. NRO's missions require highly-skilled engineers, scientists, communications specialists, and acquisition managers.

a. What are your views of the current NRO culture and workforce?

Based on my experience working with elements of the National Reconnaissance Office, I am confident that there is a highly motivated, competent, innovative workforce with whom I will be glad to serve, if confirmed.

b. What are your goals for NRO's culture and workforce, if confirmed?

From my experience at the National Aeronautics and Space Administration, creating and maintaining an open and diverse work environment is essential. This means people are valued, have exciting work, are supported, have promising career paths, and know they can bring up issues or concerns whenever they arise. Further, since the National Reconnaissance Office cadre is still relatively new, if confirmed, I will focus on enhancing recruiting activities and developing an intern program to allow motivated college students to participate in an exciting mission.

c. If confirmed, what are the steps you plan to take to achieve these goals?

If confirmed, I fully expect that outreach and recruitment will be a significant focus of my work at the National Reconnaissance Office (NRO), and I am willing to make myself available for public events that would serve NRO's recruitment efforts. I understand the continuous challenge of attracting and retaining highly qualified employees to solve our national security challenges.

QUESTION 45: If confirmed, you would be the first political appointee to run NRO. Yet the Director of NRO must achieve independence and distance from political considerations to serve the nation with objective and dispassionate intelligence collection.

a. In what ways can the Director of NRO achieve sufficient independence?

The National Reconnaissance Office (NRO) mission is highly technical; accordingly, programmatic decisions must be based on technical merit, and acquisitions must proceed consistent with U.S. law and regulations.

If confirmed, I will ensure that the NRO satisfies its mission based on technical and legal requirements.

b. If confirmed, how will you maintain this independence?

Throughout my career, including as a Naval Officer and at the National Aeronautics and Space Administration (NASA), I have found it imperative to do what is right to protect people and hardware and to maximize the possibility of success. As such, I have, at times, disagreed with senior leaders. One example is when I dissented on the decision to launch the Shuttle mission, STS-121, to the International Space Station when I was the NASA Chief Engineer. The NASA engineering and safety community, in the wake of the Columbia accident and unexpected foam release on STS 114, recommended that potential foam problems on STS 121 and future missions could be further mitigated with minor improvements. However, the Chief of Safety and I disagreed with the

rationale and risk assessment developed by the program to launch without the fixes. To be clear, the risk we were concerned about was not launch, or risk to the crew, but the potential for loss of the vehicle. We were the only two people on a 25-member panel who recommended delaying the launch. From this experience and others like it, I have demonstrated an ability to maintain independence, and if confirmed, I will defend National Reconnaissance Office equities.

c. What is your view of the Director's responsibility to inform senior Administration policy officials or their spokespersons when the available intelligence either does not support or contradicts public statements they may have made?

The Director must inform the leadership of the correct information promptly.

QUESTION 46: How would you resolve a situation in which the assessments of NRO personnel are at odds with the policy aspirations of the administration?

If confirmed as the Director of the National Reconnaissance Office (NRO), it will be my responsibility to accurately convey the assessment of the NRO and to resolve to the best of my ability any differences of position.

QUESTION 47: What is your view of the principles that should guide NRO in its use of contractors, rather than full-time government employees, to fulfill intelligence-related functions?

a. Are there functions within NRO that are particularly suited for the use of contractors?

It is my understanding that the National Reconnaissance Office (NRO) has a history of partnering with industry to meet its mission requirements. Like the National Aeronautics and Space Administration (NASA), it is my understanding that the NRO leverages industry to manufacture and develop space assets, provide IT capabilities, develop ground systems, and operate and maintain systems.

Further, it is my understanding that the NRO relies on the use of specialized capabilities of contractors through System Engineering and Technical (SETA) services.

b. Are there some functions that should never be conducted by contractors, or for which use of contractors should be discouraged or require specific Director approval?

Based on my experience at the National Aeronautics and Space Administration, there are inherently governmental functions that should never be performed by contractors. As an example, contractors should not perform program manager or contracting officer functions.

c. What consideration should NRO give to the cost of contractors versus government employees?

Based on my experience at the National Aeronautics and Space Administration, the cost of contractor services must be closely monitored and justified. If confirmed, I look forward to receiving briefings on the National Reconnaissance Office's hiring practices, functions performed by contractors, and the ratio of government employees to contractors.

d. What does NRO need in order to achieve an appropriate balance between government civilians, military personnel, and contractors?

I am aware that in 2015 this Committee supported the National Reconnaissance Office's (NRO's) request to establish a cadre workforce. If confirmed, I look forward to receiving briefings on NRO's hiring practices and the workforce breakdown across cadre, military, and contractor positions.

QUESTION 48: If confirmed, what will you do to ensure that there are equal professional opportunities for all members of NRO workforce?

Diversity is a force multiplier that greatly enhances an organization's ability to accomplish its mission. I certainly found this to be true at the National Aeronautics and Space Administration (NASA). Creating an open environment of

trust is key to working with all levels of the workforce to understand opportunities and challenges that exists within employee career paths. One example that both encouraged diversity and helped foster careers in science, technology, engineering, and math (STEM) was my participation in, and support of, the creation of an annual national STEM workshop, "Sustaining Women in STEM." This event brought together leaders from Federal agencies, private industry, and academia to develop solutions to create work environments that sustain women in STEM careers. As a direct result of my leadership focus on inclusion and diversity, Goddard has been rated as one of the best NASA center at which to work for the last two years.

If confirmed, I want the National Reconnaissance Office (NRO) to be an employer of choice, drawing science, technology, engineering, arts, and math talent from across academia, industry, military, and government; and to be inclusive of all ages, ranks, races, religions, sexual orientations, and identities. If confirmed, I look forward to working with the NRO's Office of Human Resources to become fully informed of the processes in place to ensure fair hiring practices, diversity recruitment, and career development opportunities.

Disclosures of Classified Information

QUESTION 49: If confirmed, how will you ensure that the precautions that NRO takes to protect classified information are maintained and improved, if necessary?

Safeguarding our classified information and capabilities is a fundamental requirement for success. If confirmed, I look forward to receiving briefings on the current protective measures in place at the National Reconnaissance Office and exploring new capabilities to further enhance security.

QUESTION 50: If confirmed, how would you manage, and what priority would you give to addressing, the following issues:

a. The vulnerability of NRO systems to harm or espionage by trusted insiders;

If confirmed, I look forward to working within the National Reconnaissance Office to make sure that we are hiring the best people and putting systems in place to secure our network and our environment.

b. The vulnerability of NRO systems to outside penetration.

The second part of the equation is hardening our systems against intrusion, and if confirmed, I look forward to working with the National Reconnaissance Office to learn more about the protective measures in place now. I can also pledge to dedicate sufficient time and resources to maintain and improve the protections currently in place.

QUESTION 51: How do you think that individuals who mishandle, intentionally or unintentionally, classified information should be dealt with? Would you draw distinctions based on intent?

I take these issues very seriously. If confirmed, to the extent that there is an intentional or malicious effort to mishandle classified information, I would anticipate referral to the Department of Justice for review and potential criminal prosecution; in the case of unintentional mishandling of classified information, the matter would be referred to National Reconnaissance Office security for review and appropriate administrative action.