

# Improving the Intelligence Community's Leveraging of the Full Science and Technology Ecosystem

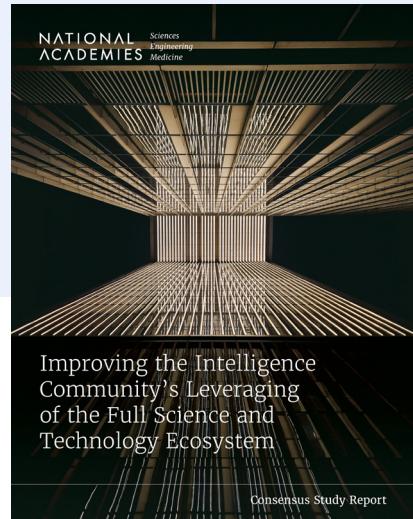
The U.S. Intelligence Community (IC) depends on knowledge of cutting-edge science and technology (S&T) to inform intelligence missions and compete with its adversaries. Advances in technology and its applications are progressing rapidly in areas such as artificial intelligence-based software and the use of big data, advanced computing, microelectronics, and biotechnology, both in the IC and in commercial firms and open environments such as universities and government laboratories. In today's world, it is critical that the IC is aware of, and can innovate and leverage advances from, all fields of S&T to inform and advance core intelligence missions.

The Office of the Director of National Intelligence (ODNI) requested the National Academies of Sciences, Engineering, and Medicine establish an expert committee to explore ways in which the IC might best leverage the S&T ecosystem. This report looks at how the IC can better innovate and leverage S&T knowledge that exists across the broader government, domestic, and global environments.

## IMPROVING AWARENESS

The IC's missions require it to have the broadest possible insights into, and access to, scientific research, technology discovery and development, and engineering wherever in the world that may occur to avert strategic surprise and provide leaders with an advantage over competitors. Advances in S&T improve options for intelligence collection, as well as for the IC's own internal operations, and they can affect the landscape that the IC must monitor.

The IC needs to optimize its ability to learn about and implement advances in the global S&T ecosystem to provide maximal support to national security. As a result, there is a growing risk that the United States may be surprised by its strategic adversaries and may forfeit



opportunities to surprise them at key times. This has highlighted a pressing need for the IC to increase its awareness of advances in S&T to compete with China, Russia, and other adversaries and be positioned to incorporate these capabilities into various missions.

The IC needs a more effective mechanism to gain this knowledge and understanding and to inject it where needed within the IC, both for science and technology intelligence (S&TI) and to facilitate mission support. To have a complete picture of significant global scientific activities, especially those deriving from developments in emerging technologies, one cannot—and should not—rely on intelligence agency sources alone.

#### **STRENGTHENING THE IC CAPABILITIES**

The IC is cognizant of this need and although it is strong in some aspects of S&T, the pace of change in S&T requires that these issues be given a higher priority. It is critical to understand what is happening in the broad S&T community and identify areas that can help solve problems or close gaps within the IC.

The IC needs a clear, high-profile steward of S&T, with authorities and responsibilities that are expansive enough to coordinate, close gaps, and elevate the attention paid to S&T across the IC. To that end, the report recommends **ODNI should clearly designate an individual to strengthen the IC capabilities for leveraging S&T. This individual—a Chief Technology and Innovation Officer (CTIO)—would report to the Director of National Intelligence, serve as Chief S&T Advisor to the Director, and be charged with the responsibilities including:**

- Developing and maintaining healthy sharing and participatory relationships across the IC and between it and many relevant domestic and global S&T entities;
- Identifying S&T trends with special IC relevance and plan balanced programs of open-source and classified collection and analysis to enable their expedited development and utilization;

- Leading efforts to integrate and coordinate S&T awareness and S&TI;
- Converting this heightened strength in S&T to operational advantage more rapidly and agilely;
- And maintaining a diverse, skilled team, selected from within the IC, to be deployed to support the above activities deemed critical to the S&TI mission.

#### **EXPANDING INTERACTIONS AND IMPROVING COORDINATION**

A useful understanding of current, vital progress in many fields must be filled out by continual input from other U.S. agencies, laboratories, federally funded research and development (R&D) centers, research universities, and the private sector. Researchers in these entities also bring knowledge about advances in other countries, which might be challenging for the IC to access directly. The report finds the IC connections with the broader U.S. and global S&T communities are insufficient and recommends **the IC should encourage its technical experts to engage more extensively on a professional level with peers outside the relatively small IC environment.**

The best way to maintain awareness of S&T advances is through the interactions between skilled IC experts and external scientists and engineers who interact broadly with S&T communities. The committee recommends **the IC should position itself to take better advantage of opportunities afforded by interagency S&T committees and other contacts with non-IC agencies that have substantial S&T activities.**

To further expand the IC's access to academic and industrial R&D activities, **the IC should engage in more active partnering with Department of Energy and Department of Defense (DoD) laboratories to take advantage of their extensive infrastructure and capabilities.**

## **LEVERAGING EXPERTISE FROM THE NATIONAL S&T ECOSYSTEM**

Improving awareness of S&T developments hinges in large part on intensive and regular interactions between IC experts and S&T experts in academia and industry.

To institutionalize increased professional interactions between IC S&T experts and the rest of the technical world, the report recommends **IC agencies should consider establishing more rotational positions for leading researchers from academia and the private sector, including start-up and venture capital communities.**

While the IC has programs such as IC Scholarships and IC Centers of Academic Excellence, these efforts could be expanded significantly to further develop a trusted community of external researchers. **The IC should consider emulating some of the DoD's outreach to scientists and engineers in R&D in order to establish trusted collaborations with academia and the private sector.**

The IC should work directly with industry to become part of the technology development process and increase S&T awareness. It **should adopt more forward leaning policies for working with commercial industry to support joint IC-commercial technology developments, such as data sharing.**

## **IMPROVING METHODS FOR COLLECTING AND USING OPEN-SOURCE INFORMATION**

The IC needs the technological tools to collect, manage, and use enormous quantities of S&T data, both from open and classified sources. In today's environment, such data can provide deep insights into other nations' S&T activities and capabilities. Because so many of the advances in S&T take place outside of governmental efforts, open-source intelligence is particularly critical to S&T awareness. The committee recommends that **the IC increase its ability to mine open-source S&T information while remaining consistent with prevailing policies and laws regarding privacy protections. It must enable integrating open-source S&T information with classified intelligence.**

While the IC itself may not be the best place to house such an open-source facility, given legal and policy limitations on its ability to collect domestic information and the fact that its deepest expertise is in the collection of classified rather than open-source information, **the IC should work to establish a center operated external to the IC, focused on open-source S&T information collection.**

## **LEVERAGING EXPERTISE FROM THE INTERNATIONAL S&T ECOSYSTEM**

With the increased commercialization of S&T becoming more international, the IC must have a strong understanding of how global S&T trends might impact operations. The utilization of the best available technologies to keep collection and processing, communications, and analytic processes more effective than those implemented by adversaries is critical to the IC mission.

The U.S. government engages in international S&T cooperation through government-to-government programs and bilateral S&T agreements. The IC could maximize its awareness of and access to international S&T by making better use of knowledge about international S&T activities already available within other federal agencies. The report recommends **the IC should also increase the collection of open-source information on S&T advances and early-stage companies in foreign nations. The CTIO could coordinate these activities and potentially assign and/or post specialists to cover key regions and countries.**

The IC currently partners with allies and foreign intelligence and security services to leverage collective capability, data, expertise, and insights. The IC could increase the benefits it gains from international S&T and **should increase its interactions with Five Eyes, the intelligence partnership among the United States, Canada, the United Kingdom, Australia, and New Zealand and other allies through these four steps:**

- Create a more systemic approach to cooperation, which could include having the CTIO develop a multi-year allied S&T cooperation plan.
- Set aside funding for international cooperative activities.
- Support travel abroad to deepen foreign partnerships and build trusted relationships.

- Develop common talent pools and facilitate commercial cooperation opportunities.

To keep up with these advances, the IC's existing efforts to track and leverage S&T need to be expanded, better coordinated, and given a higher priority. This effort will require increasing the IC awareness of these advances and developing innovative ways to incorporate these capabilities into IC S&T intelligence and missions.

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#### FOR MORE INFORMATION

This Consensus Study Report Highlights was prepared by the National Academies' Intelligence Community Studies Board based on the report *Improving the Intelligence Community's Leveraging of the Full Science and Technology Ecosystem* (2022).

This study was sponsored by the Office of the Director of National Intelligence. Any opinions, findings, conclusions, or recommendations expressed in this publication do not necessarily reflect the views of any organization or agency that provided support for the project.

This Consensus Study Report is available from the National Academies Press (800) 624-6242 | <http://www.nap.edu> | <http://www.nationalacademies.org>

#### Division on Engineering and Physical Sciences



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