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LEGISLATIVE BRANCH APPROPRIATIONS FOR FISCAL YEAR 2022

WEDNESDAY, APRIL 28, 2021

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 2:00 p.m., in room SD–192, Dirksen Senate Office Building, Hon. Jack Reed (Chairman) presiding.

Present: Senators Reed, Murphy, Heinrich, Braun, Shelby, and Rubio.

CONGRESSIONAL BUDGET OFFICE, GOVERNMENT ACCOUNTABILITY OFFICE, AND THE LIBRARIAN OF CONGRESS

OPENING STATEMENT OF SENATOR JACK REED

Senator REED. Good afternoon. The subcommittee will come to order. I'd like to welcome everyone to the second of our fiscal year 2022 budget hearings for the Legislative Branch Appropriations Subcommittee. And I'm joined by my Ranking Member, Senator Braun and Senator Heinrich, and we're delighted to welcome our witnesses. Today, we have with us the Librarian of Congress, Dr. Carla Hayden; the Comptroller General of the US Government Accountability Office, Gene Dodaro; and the Director of the Congressional Budget Office, Dr. Phillip Swagel.

Welcome, and thank you all for joining us here today to testify. The roles that the Library, CBO, and GAO all play are critically important to making sure that Congress can serve the American people well. Your agencies help Congress, supporting us on our basic responsibilities to be informed and educated on behalf of our constituents.

Let me begin by thanking the women and men of your agencies. The past year has been difficult from the COVID–19 pandemic to the January 6 attack on the Capitol. You have had to spend regular appropriations beyond what we provided last year on the CAREs Act on unanticipated IT enhancements, PPE, cleaning, and security course. Because the Senate and the House continue to meet, the already heavy workloads of CRS, GAO, and the CBO have increased to meet congressional requests for reports, analysis, and orders to inform legislative responding to the pandemic.

The Library, for example, has delayed the construction of a needed storage module at Fort Meade so we could use the $40 million to cover Emergency Capitol Campus Security and COVID–19

course. And as I mentioned the support to Congress, I'd like to think the GAO for letting Elizabeth Field come and testify before the Armed Service Committee on Tuesday, another example of your contribution to our efforts.

But as I said, these challenges didn't stop the Library, the CBO, and GAO from delivering for Congress and the American people. CBO has turned out reports. GAO is auditing the trillions of dollars provided by Congress for the Government Live Response to COVID–19 and continues its important oversight role to make sure those funds are spent responsibly.

CRS increased its science and technology, analytical capacity to repair and update more than 1,000 new products on COVID–19 related issues. And the Library ramped up its public outreach, to include a variety of virtual events, webinars, and workshops so that researchers, teachers, parents, and especially our children could still access and learn from its rich and diverse collections.

As our Nation gradually opens and your agencies responsibly resume in-person operations, we owe it to your employees not only to provide the resources they need to do the job, but also to meeting any new demands or innovations identified in the pandemic. I hope we can soon deliver on our promise to make you whole with an emergency supplemental. Meanwhile, I want to know how those unanticipated course have impacted your missions.

Our public libraries serve the common good and are destinations and catalysts for advancement. So, Dr. Hayden, we'll want to hear from you on the progress of the Library's Visitor Experience Project. This is an exciting public/private partnership that will make the Library's treasures more accessible to students, researchers, and visitors to the Nation's Capitol for generations to come. The Library's fiscal year 2022 requests also include critical investments to cover gaps in security and communications that came to light on January 6.

Finally, it continues a common thread across all Library components: IT, modernization, and cyber security. We need to make sure the Library can provide access to its collections in order to better serve the public; but also, able to protect sensitive information from CRS, the Copyright Office, and the Law Library; and guard against cyber criminals using Library assets as a gateway to hack the Congress.

Comptroller General Dodaro, GAO serves as Congress' independent and non-partisan watchdog. We provided $107 million for GAO to conduct oversight of the trillions of dollars provided by the Federal Government beginning more than a year ago for Coronavirus Response and Recovery efforts. You spent roughly a third of that funding on dozens of pandemic-focused engagements already. I'm interested in learning more about GAO's current and future work, evaluating how we can improve decisions in our national response to ongoing pandemic challenges. It's good to know that GAO can and will continue to provide an eye on the ground for us. We owe it to the American people to get recovery funds out the door quickly and ensure that they are spent effectively and efficiently. Your COVID–19 oversight duties are on top of GAO's ongoing efforts to improve Government efficiency and effectiveness, and root out waste, fraud, and abuse.

Director Swagel, Congress relies on CBO to offer expert and nonpartisan analysis to inform budget decisions and economic deliberations essential to the legislative process. CBO's budget request seeks to make CBO's work even more transparent and responsive to Congress. The bills you analyze only grow in complexity and demands for your cost and this estimates have increased. Your budget continues to reflect your priority to get it right and to quickly and effectively inform Congress of your findings. For fiscal year 2022, CBO request adding four new staff to respond more quickly to questions related to your models and during times of high demand, particularly with an eye toward more analysis of infrastructure, energy, and climate change issues.

In this subcommittee, we want to make sure the Library, CBO, and GAO can help keep Congress informed and educated so we can make good decisions on behalf of the American people. We should not skimp on these investments, because in the end, they help us better serve our constituents, yet, we will have to balance the needs of all of the legislative agencies against our resources. That includes supporting your agencies while also making sure other priorities are protected in our bill.

Now, I want to thank you all, again, for coming; and I look forward to our discussion today. Now, let me turn it over to Ranking Member, Braun.

OPENING STATEMENT OF SENATOR MIKE BRAUN

Senator BRAUN. Thank you, Mr. Chairman. Dr. Hayden, Mr. Dodaro, and Dr. Swagel, welcome. Thanks for being here. Each of your agencies plays an important role in supporting the work of Congress.

Dr. Hayden, we spoke earlier this month about the Library of Congress' valuable service; both in support of legislative function and in making the congressional process more transparent for the American people. The Library provides information and expert research on a wide range of topics both to members and staff, and to the public at large, and it delivers an incredible resource as you preserve our national history.

The GAO and the Congressional Budget Office both serve critical roles in ensuring Congress can make informed decisions, particularly with respect to evaluating the budgetary impact of new laws.

I am particularly concerned by Congress' seeming inability to address the slow-moving national debt crisis. In CBO's most recent long-term budget outlook, the agency writes that persistently rising debt as a percentage of the GDP poses significant risks to the Nation's fiscal and economic outlook. CBO further notes that Congress' inability to balance its budget weakens the American economy by crowding out private investment and increasing the risk of a financial crisis. GAO has made similar warnings, writing in its fiscal year 2020 Financial Audit that Congress should consider including fiscal rules and targets, such as debt-to-GDP targets as part of a long-term fiscal plan. I know we've talked about that a lot. I've only been here a little over 2 years; and I know it's been discussed long before that. It seems to be a subject few are interested in. I support this approach, and have introduced bicameral legislation called The MAPP Act, which would attach spending tar-

gets to GDP. Even though the Legislative Branch Appropriations bill is only a small part of Federal spending, our debt crisis threatens every congressional priority.

We must remain diligent to ensure that every taxpayer dollar advances the interests of the Nation. Each day we wait, the economic consequences increase, making the problem harder to solve, pushing it on to our kids and our grandkids; and to run a place like this, and borrow 23 percent of our annual budget, let alone the debt we've added on here recently to me is cause for concern.

Thank you, again, to our witnesses for being here. I look forward to your testimony.

Thank you, Mr. Chairman.

Senator REED. Thank you, Senator Braun. Are any of my other colleagues wishing to make a statement? Thank you. At this time, I'll recognize, beginning with Dr. Hayden, all of our witnesses, to give brief opening statements, approximately 5 minutes. Dr. Hayden, you can begin, and then we'll go to Mr. Dodaro.

STATEMENT OF DR. CARLA HAYDEN, LIBRARIAN OF CONGRESS

Dr. HAYDEN. Thank you, Chairman Reed, Ranking Member Braun, and Members of the subcommittee for this opportunity to testify in support of the Library's fiscal 2022 budget.

And a little over a year ago, we had to close the Library's doors to everyone as the pandemic began. We opened other avenues that allowed us to serve Congress and the American people in new and innovative ways. And thanks to your support and investments in the Library's IT infrastructure, the network was able to handle an 800 percent increase in the remote workforce and essential services, including the CRS and the Copyright Office were able to operate largely as normal. We transformed the Library's public outreach by moving events online. We created new digital programs, and we even reimagined others, developing new audiences for the Library beyond those who couldn't visit us in person. And with congressional support and private philanthropy, we are on schedule to unveil the Visitor Experience in phases, beginning in late calendar 2022.

Worthy of special note during this time is the National Library for the Blind and Print Disabled, NLS, with its network of State and local library circulated more than 20 million copies of braille, audio, and large print items. And I'd like to take this opportunity to recognize NLS director, Karen Kininger, who joined the Library in 2012, and will retire at the end of May. Her priorities were to leverage advancing technology and expand content for all print disabled person. She accomplished these goals and so much more for the NLS.

I'd also like to express my gratitude for your support in the fiscal year 2021 funding bill for high-priority needs, such as cyber security enhancements, state of the art shelving for the Law Library, and enhanced science and technology capacity for CRS. And thank you, as well, for your support for the Library's new preservation strategy and collection storaging modules at Fort Meade as part of the Architect of the Capitol's budget.

I would like to note that the funding from the AOC's budget designated for Storage Module 7 was reprogrammed for the fencing

surrounding the Capitol Campus after January 6; and we would ask that this vital funding be restored to the AOC's budget as part of any Security Supplemental Bill that the committee may consider.

I come before you today to discuss the Library of Congress' fiscal year 2022 appropriations request for approximately 846 million, a 5.5 percent increase over the Library's fiscal year 2021 enacted appropriation. This request includes 24.2 million in mandatory pay and price level increases. The balance of the increase represents critical program investments necessary to fulfill the Library's role, continue modernization efforts, and ensure the safety and security of the Library's collections and work force.

The budget request seeks to replace the Legacy Integrated Library System that was installed in 1999 in preparation for Y2K with a modern Library Collections Access Platform that will be the heart of the Library's collection management, physical and digital, for the next generation.

We're requesting funding to continue to modernize and optimize our financial management and planning by establishing a new Enterprise Planning and Management Program, and the budget seeks to modernize the Library's nearly 20-year-old Integrated Electronic Security System that's used both by the Library and the U.S. Capitol Police for physical security monitoring of Library facilities and collections.

We're asking for funding to replace the Library's End of Life 3G Cellular System that provides connectivity for only about 50 percent of the Library's facilities.

And I'd like to note that these two requests were very important, and continue to be important, for life, safety, and security, and would be good candidates for any Supplemental Security Bills as well.

We also want to have funding to implement the same level of IT security across both the Library's data centers and the cloud-hosting environments. And then, in addition to supporting Library employees with advanced, virtual collaboration tools that were highlighted this year, we are requesting funding to expedite the transition from Microsoft Office to Microsoft 365.

So finally, I'd like to acknowledge our new Register of Copyrights, Shira Perlmutter, and this budget request funds the implementation of the Copyright Alternative and Small Claims Act, or the CASE Act, with the creation of a small claims court.

So, in closing, the Library's 2022 congressional budget continues a sequence of strategically planned modernization efforts across the Library, supports the security of our vast collections, and enhances the safety of our workforce and visitors.

[Statements of Dr. Carla Hayden, Shira Perlmutter, and Mary B. Mazanec follows:]

PREPARED STATEMENT OF HON. DR. CARLA HAYDEN

CHAIRMAN REED, RANKING MEMBER BRAUN, AND MEMBERS OF THE SUBCOMMITTEE:

Thank you for the opportunity to provide testimony in support of the Library's fiscal 2022 budget.

The Library of Congress has built one of the largest collection of human knowledge ever assembled in support of its mission to engage, inspire, and inform Congress and the American people with a universal and enduring source of information

and creativity. We are an authoritative source of knowledge to be used for a purpose. My top priority as Librarian of Congress remains expanded user access to the Library's resources and services. We constantly strive to find ways to share our extraordinary riches more broadly and deeply.

When the pandemic struck a little over a year ago, the Library needed to move rapidly to adopt new approaches to carrying out its mission of serving the Congress and the American people while at the same time ensuring that employees and contractors were able to work in safety. Thanks to congressional support for investments in IT infrastructure over the past several years, the Library's network was able to handle an 800 percent increase in the remote workforce. Essential services including CRS and the United States Copyright Office were able to operate largely as normal. The Library continued to provide public access by creating new programs, reimagining others, and offering them online. The 20th National Book Festival was hosted entirely online. When many schools closed, the Library created teacher webinars, virtual student workshops, and a loc.gov/engage page with information about resources, activities and programs. Planned digital initiatives, such as the LC Collections mobile app and innovator-in-residence projects, moved forward quickly to provide new ways for Congress and the public to engage with the Library. We just launched a new initiative to assemble and preserve a well-balanced collection of archived pandemic-related web content that will fully tell the story of COVID–19 for researchers of tomorrow. In addition, with congressional support and private philanthropy, we remained on schedule to open the Visitor Experience in phases beginning in late calendar 2022. Although planning is ongoing for a phased return to in-person operations and reopening to visitors and onsite researchers as conditions allow, it is clear that the Library needs to ensure that digital innovations can be sustained and even accelerated to meet evolving expectations.

This was certainly a challenging year and I am pleased to report that we continued to make progress in sharing more of the Library's collections, programming, and staff expertise. Today, the Library holds more than 171 million items, including special collections consisting of audio materials, maps, moving images, sheet music and much more. Over 6.8 million preservation actions were performed on the physical collections. The Library responded to 802,676 reference requests from Congress, the public, and other Federal agencies, including direct use of CRS reports. The Copyright Office issued over 443,911 copyright registrations and recorded 7,098 documents containing 233,694 titles. In fiscal 2020, Library web properties experienced the largest volume of traffic in Library history. Those properties (excluding congress.gov and copyright.gov) recorded more than 117 million visits and 647 million page views—increases of 39 percent and 58 percent, respectively. Mobile visits made up 46 percent of those visits, an increase of nine percentage points over the previous fiscal year. And before the mid-March closing to the public, the Library welcomed 565,388 in-person visitors.

The Library also continued direct services to the public with the Veterans History Project and Teaching with Primary Sources, a program that allows teachers in the local districts to create curricula and develop apps using the Library's digitized primary sources.

Of special note is the National Library Service for the Blind and Print Disabled (NLS) and its network of State and local libraries, which circulated more than 20.3 million copies of braille, audio and large print items to patrons. I would like to recognize NLS Director Karen Keninger, who joined the Library in 2012 after serving as director of the Iowa Department for the Blind and as regional librarian for the Iowa Library for the Blind and Physically Handicapped. Ms. Keninger's priorities for NLS at the outset were to leverage advancing technology and expand content for all print-disabled persons. Under her leadership, NLS embraced innovative technology, in just one example, by providing braille digitally with new refreshable braille technology. Working with the communities, Ms. Keninger expanded eligibility for NLS programs and advocated for a name change to highlight service to the print disabled. She made a special commitment to working with veterans' groups. She also developed partnerships with major audiobook producers that doubled the output of new talking books and implemented international partnerships to enable the cross-border exchange of materials. Karen Keninger will retire at the end of May.

I would like to express my sincere gratitude for the outstanding support that this committee and the entire Congress give to the Library. In particular, I appreciate the funding you have provided for our fiscal 2021 requests to meet high-priority needs such as cybersecurity enhancements to protect sensitive information from CRS, the Law Library, the Copyright Office, and other high-value assets. Modernization efforts funded in fiscal 2021 also supported state-of-the art shelving for

Law Library collections in Quad B and enhanced science and technology research capacity in CRS.

I also thank you for your continued support for the collections storage modules at Fort Meade as part of the Architect of the Capitol's budget. Construction is underway for Storage Module 6, the first double-wide unit. Although initial designs for Storage Module 7 are now complete, following the attack on January 6, $30 million from the AOC's budget designated for Storage Module 7 was diverted to pay for the fencing surrounding the campus. We understood the necessity to cover this immediate security need of the campus, and ask that this vital funding for Ft. Meade Storage Module 7 be restored to the AOC's budget as part of any security supplemental spending bill.

I come before you today to discuss the Library's fiscal 2022 appropriations request. The funding request aligns with the strategic goals set forth in the Library's Strategic Plan: expand access, enhance services, optimize resources, and measure impact.

The Library of Congress fiscal 2022 budget request is for approximately $845.982 million, which represents a 5.5 percent increase over the Library's fiscal 2021 enacted appropriation. This request includes $24.28 million in mandatory pay and price level increases. The balance of the increase represents critical program investments necessary to fulfill the Library's role and to continue to modernize our operations and technology, ensure the safety and security of Library collections and our workforce, and adjust to rapidly changing needs.

The budget seeks to modernize the legacy Integrated Library System (ILS) and several related systems that provide access to the Library's collections. The existing ILS is 25-year-old technology that the Library put into place in 1999 in preparation for Y2K. The ILS is at the end of its life, with systems that cannot interface, and is likely to fail within the next few years. The replacement, a modern Library Collections Access Platform (L–CAP), used in major academic libraries, will be the heart of Library collections management, physical and digital, for the next generation. Designed to be closely integrated with a wide range of Library systems, L–CAP will employ the latest technology to manage the acquisition, description and inventory of Library collections and facilitate access for Library employees, Congress and the public. The Library is ready for the L–CAP now because substantial IT infrastructure improvements are in place and we have gained experience with other major IT modernization efforts. We will use continuous integration and continuous delivery development practices to sustain the system to allow L–CAP to meet the Library's evolving needs, including management of exponentially growing digital collections and advancements in technology.

In another move toward modernization, in this case to take the next step in beginning to optimize and modernize financial management and planning in the Financial Services Directorate and across the Library, we are requesting funding to establish a new Enterprise Planning & Management (EPM) program. Financial modernization is an iterative process that must continue to stabilize current accounting activities and at the same time move forward to introduce new capabilities and principles. To meet audit findings concerning cost estimating and cost accounting, this initial EPM funding request will build a base of expertise in the Library in cost management as well as data science and data architecture, and develop processes necessary to optimize cost management practices and lay the foundation necessary for the implementation of more advanced financial planning capabilities and technology. Ultimately, the EPM program will use the Library's financial management and planning data to drive decisionmaking to improve performance in programs, projects, and activities surrounding the Library's investments.

Pandemic operations, as well as heightened physical security threats for U.S. Government agencies, particularly legislative branch agencies, have focused attention on necessary enhancements to ensure the safety and security of the Library's workforce and its collections. The Library is working closely with the U.S. Capitol Police (USCP) and the Architect of the Capitol (AOC) to ensure that safety and security measures are appropriately implemented. The most recent security incident on April 2nd reminded us that we will have to remain more vigilant for the foreseeable future.

The budget request includes a funding request to modernize the Library's nearly 20-year-old Integrated Electronic Security System (IESS), which is used by both the Library and the USCP for physical security monitoring of Library facilities and access from the Library to the broader Capitol Complex. The system is at the center of a complex network of more than 10,000 cameras, motion sensors, electronic door locks, and other controls that regulate access to Library facilities and safeguard staff, visitors, collections, and high-value assets. The outdated analog video camera components lack the high-resolution necessary to fully monitor and investigate pe-

destrian and vehicle traffic in and around our buildings. The request will allow the Library to completely overhaul the security system components with a sustainable life-cycle management program, and modernize the IESS IT network infrastructure, bringing it into compliance with Library IT security standards.

Funding is also requested to allow the Library to replace its outdated and inadequate 3G Cellular Distributed Antenna System. The current 3G system, installed in 2004, covers only about 50 percent of Library facilities. It is at the end of its service life and is incompatible with advanced 5G connectivity. On January 6, USCP and AOC employees reported multiple dropped cellular connections and the inability to initiate calls out of Library facilities, delaying time-critical communications and coordination. The request will allow the Library to implement a modern cellular solution that will ensure connectivity, and by extension, improve safety for the USCP, AOC and Library staff, and congressional and Library visitors.

The budget requests increased funding to allow the Library to implement the same advanced level of IT security across both its on-premises data centers and Cloud hosting environments. This will ensure that Library data, including congressional and copyright information, are secured at all times, leveraging artificial intelligence to identify anomalous and malicious behavior.

Remote work during the pandemic highlighted the need to better support Library employees with work-anywhere-anytime functionality and advanced virtual collaboration tools. The budget requests funding to expedite the transition of the Library from legacy Microsoft Office tools to the Microsoft 365 Government productivity platform for all staff. The request aligns the Library with congressional adoption of Microsoft 365 and ensures a smooth transition away from the Office suite, which Microsoft has announced will no longer be supported after 2025.

Finally, this budget requests the funding required to fully implement the Copyright Alternative in Small-Claims Enforcement (CASE) Act with the creation of a "small claims court" within the Copyright Office. The Copyright Claims Board (CCB) will work to resolve civil copyright claims, counterclaims, and defenses in the CCB as an efficient and inexpensive alternative to using the Federal courts. The request will support the necessary staffing for the CCB and the implementation of an electronic filing and case management system with electronic acceptance of claims filings, fees, and litigation pleadings.

In closing, the 2022 Congressional Budget Justification continues a sequence of strategically planned modernization efforts of all types across the enterprise. The Library's budget request also seeks to support the security of the collections and the safety of our workforce and visitors, and to help the Library meet quickly changing needs. Chairman Reed, Ranking Member Braun, and Members of the subcommittee, thank you again for supporting the Library of Congress and for your consideration of our fiscal 2022 request.

PREPARED STATEMENT OF SHIRA PERLMUTTER, REGISTER OF COPYRIGHTS AND DIRECTOR, U.S. COPYRIGHT OFFICE

CHAIRMAN REED, RANKING MEMBER BRAUN, AND MEMBERS OF THE SUBCOMMITTEE:

Thank you for the opportunity to submit the United States Copyright Office's fiscal 2022 budget request.

As the principal Federal entity charged with administering the Copyright Act, the Copyright Office has many responsibilities, including overseeing the national copyright registration and recordation systems, advising Congress on copyright policy and legislation, working with the Department of Justice and other Federal agencies on copyright litigation, conducting administrative and regulatory activity with respect to statutory copyright licenses, and educating the public about copyright law. We do all of this with a lean staff of less than 450 employees who pursue copyright's Constitutional mission of "promot[ing] the progress of science and useful arts."[1] Since I joined the Copyright Office in late October, I have been privileged to oversee the impressive work performed by the Office's dedicated staff.

SUMMARY OF THIS PAST YEAR

This past year, the Office has achieved many noteworthy successes while addressing significant operational challenges, including those posed by limits on onsite operations as a result of the global pandemic. When the Library shut down the Madison building on March 13, 2020, the Office quickly transitioned most staff to telework. Some of our work, however, involves physical materials (including paper-

[1] U.S. CONST. art. I, § 8, cl. 8.

based recordation documents, paper-based registration claims, and physical copyright deposits). Office staff was unable to process these materials until June 2020, when limited in-office work resumed, as discussed below.

We have accomplished a lot this past year in administering the national registration and recordation systems. In fiscal 2020, the Office registered 443,911 claims to copyright involving millions of works. Ninety-eight percent of registration applications closed were received electronically and 2 percent by mail. Even with the pandemic, we made significant strides in improving processing time: the average overall processing time for examining all copyright claims dropped from 4.0 months in the second half of fiscal 2019 to 2.6 months in the second half of fiscal 2020, representing a 35 percent decrease. The average processing times for fully electronic claims that did not require correspondence (74 percent of all electronic claims) dropped from 3.0 months to 1.6 months, and those that did require correspondence (26 percent) dropped from 6.0 months to 3.6 months. Despite the overall reduction, however, the pandemic did negatively impact processing times for electronic applications that required the submission of physical deposits, as well as paper applications, which make up less than 3 percent of all registration applications the Office receives, as registration staff was not on-site for many months.[2]

With respect to recordation work in fiscal 2020, the Office recorded 7,098 documents, on paper and through the new electronic pilot, containing titles of 233,694 works. The average time from submission to generation of the public record for electronic pilot submissions was within weeks of receipt for most submissions. The average processing time for paper submissions was approximately 11.5 months; this was an increase of 3.5 months from the average fiscal 2019 processing times and again reflects the impact of the pandemic on physical operations.[3] Recordation staff were unable to retrieve submissions from March 2020 until some on-site work resumed in June 2020.

Limited on-site operations also impacted the Office's acquisition of physical materials for Library collections in the third and fourth quarters of fiscal 2020. The Office was able, however, to maintain an effective e-deposit program throughout the fiscal year. E-serial and, in particular, e-book acquisitions made up a significant portion of the Office's contributions to the Library's collections. For fiscal 2020, the value of deposits, $40.03 million, was just shy of the previous year's total. The value of the access that special relief relationships with major e-serial and e-book publishers provided for Library staff and patrons increased from $69.87 million in fiscal 2019 to $75.26 million in fiscal 2020.

The Office was able to continue our longstanding role of providing expert legal and policy advice without interruption. This included promulgating regulations to implement various provisions of the Music Modernization Act (MMA),[4] as well as to update rules to facilitate new practices for group registrations, deposit of electronic books for the Library's collections, and improved administration with respect to recordation of notices of termination. The Office has also commenced regulatory activities to implement the Copyright Alternative in Small-Claims Enforcement Act (CASE Act), as discussed further below. On the policy front, the Office issued a comprehensive study on section 512 of the Copyright Act last May, and continues work on three other studies (unclaimed music royalties, sovereign immunity, and the market impact of termination of certain section 119 licenses), to be completed later in 2021. The Office also continued to provide legal advice and assistance across the government regarding complex and emerging areas of copyright law and policy, including Supreme Court and appellate litigation and work with executive branch agencies on international matters.

The Office has engaged in numerous outreach activities to provide accurate and unbiased information on copyright law. We continued to produce events to educate the public and stakeholders about copyright, including specifically to reach music and songwriter communities around the world with information about the MMA. In fiscal 2020, the Office answered some 170,000 public inquiries regarding copyright, helping people understand copyright and the Office's services. We also continued our effective stewardship of the over $1.4 billion in statutory licensing revenues; for the

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[2] Registration processing times are posted on our website at https://copyright.gov/registration/docs/processing-times-faqs.pdf.

[3] Recordation processing times are posted on our website at https://copyright.gov/recordation/. We are currently processing September 2019 basic recordation filings and April 2020 notices of termination. Also due to COVID–19, the Copyright Office mail unit is now processing mail submitted in August 2020.

[4] Orrin G. Hatch—Bob Goodlatte Music Modernization Act, Public Law No. 115–264, 132 Stat. 3676 (2018).

third consecutive year, the Office received an unmodified or "clean" audit opinion of the statutory licensing fiduciary asset financial statements.

Regarding information technology (IT), fiscal 2019 marked the first year Congress appropriated funds specifically for IT modernization (for 5 years, recurring). This allowed the Office and the Library of Congress's Office of the Chief Information Officer (OCIO) to continue making progress on a modernized Office IT system. The Office worked closely with OCIO to provide the business information needed for OCIO to undertake the development work. In fiscal 2020, we met our objectives on three major IT modernization work streams: the April 2020 launch of an electronic recordation pilot; the September 2020 release of an internal version and a December 2020 public version of a new interface for the Copyright Public Records System; and the year-end internal release of a clickable prototype of the planned new registration system. More details on our plans for fiscal 2022 follow below.

To be sure, modernization involves more than just IT; it also involves updates to Office processes, organization, and culture. The Office has made significant progress in business process reengineering efforts—last summer we completed work with a consultant on 66 distinct processes for improvement. We are now reviewing those results and moving forward to identify processes that can benefit from IT support as well as those that can be implemented without it. In addition, the Office continues to work with the Office of Personnel Management (OPM) on organizational issues. After a review of the Office's organization and structural needs for modernization, OPM is now assisting us in devising competency models for two of our most populated occupation series in order to improve succession planning and talent management. Finally, last summer the Office completed work with a consultant on an organizational change initiative, which involves the development of key change management processes and documents, staff training, and strategic coaching on structuring and leading business transformation. The Office is pivoting to apply these skills internally, and we have created a community of practice to spread and better integrate them within our workforce.

Adapting Operations to the Coronavirus (COVID–19)

While fiscal 2020 brought unexpected and unprecedented adversities for the Office, our staff rose to the challenges. The Office implemented a pandemic response plan in March 2020, successfully transitioning 98 percent of the staff to full or partial telework within just a few weeks. More staff gradually returned on-site throughout the summer and fall, in accordance with the Library's plan for restored on-site operations. We currently have about 27 percent of our staff on-site, either full-time or on rotating schedules; the rest are teleworking.

As noted above, the bulk of the Office's operations have been largely unaffected by the transition to telework operations, including all legal and policy work, registration processing of fully electronic claims, and ongoing modernization activities. Although processing of physical materials was suspended for several months after the Madison building was closed in March 2020, the Office issued a new rule that allows us to offer an electronic option for some services that previously required paper submission. We also adjusted practices to receive certain additional applications and submissions via email during pandemic operations.

To further relieve the impact of constraints imposed by the pandemic on users of Office services, the Acting Register had exercised, and I am now exercising, the authority granted by Congress in the 2020 Coronavirus Aid, Relief, and Economic Security Act (CARES Act). So far, we have issued notices that temporarily adjust certain timing provisions and I continue to review conditions to determine whether further extensions are needed. The Office is also monitoring the impact of COVID–19 on our fee receipts. While there has not yet been a significant shortfall, the Office appreciates the Committee's support going forward if funding flexibility is needed to adjust to disruptions in operations or to address increased workloads when normal operations and backlog processing resume.

In sum, the Office is proud to have accomplished so much during this challenging year, and to have continued to serve the country and the copyright system well. Our budget request would enable this important work to continue in fiscal 2022.

FUNDING AND OVERALL FISCAL 2022 BUDGET REQUEST

The recurring financial support for the Office's modernization efforts, initially funded as part of the fiscal 2019 budget, continues for fiscal 2022, and the Office is pleased to provide an update on a number of initiatives that are now fully underway. In addition to ongoing modernization, the Office and the Copyright Royalty Judges (CRJ) are fully engaged in addressing new responsibilities under the MMA. Congress provided an additional $1.6 million in fiscal 2021, primarily for Office and CRJ staffing. To support implementation of the CASE Act, enacted as part of the

fiscal 2021 omnibus appropriations legislation on December 27, 2020, the Office is requesting $3.2 million in additional funding for fiscal 2022 as described further below.

The Copyright Office's overall budget is composed of three separate budgets or program areas:

(1) *Basic Budget,* which funds most of the Office's core operations, including the majority of payroll-related expenses. Historically the basic budget has been composed of a combination of appropriated dollars and authority to spend fee revenue, with fees constituting a majority of this funding (generally in the range of 50 percent to 67 percent);

(2) *Licensing Budget,* which is derived completely from licensing royalty collections otherwise payable to copyright owners and filing fees paid by cable and satellite licensees pursuant to statutory licenses administered by the Office; and

(3) *Copyright Royalty Judges Budget.* Although the CRJ program is not a part of the Office, the Office provides it with budget formulation and execution support on behalf of the Library of Congress.

For fiscal 2022, the Office requests a combined total of $98.0 million in funding and 472 FTEs, of which $45.0 million would be funded through offsetting collections of fees collected in fiscal 2022 and in prior years.

The Office's fiscal 2022 requests are:

—*Basic Budget:* $88.7 million and 439 FTEs. $38.0 million in offsetting fee collections (43 percent) and $50.7 million (57 percent) in appropriated dollars. The request includes mandatory pay-related and price level increases of $1.209 million and a program increase of $3.2 million for staffing, facilities, computer and audiovisual technology, and services to implement the CASE Act. Of this latter amount, $1.0 million is one-time funding for IT system development, audiovisual system acquisition, and facilities expenses, and $2.2 million is permanent funding for staff, operations and maintenance, and services.

—*Licensing Division Budget:* $6.4 million and 26 FTEs, all of which are to be funded via filing and royalty fees. The requested increase includes mandatory pay-related and price level increases of $0.2 million.

—*Copyright Royalty Judges Budget:* $2.9 million and 7 FTEs, with $0.1 million to support mandatory pay-related and price level increases. Of the total, royalties and participation fees offset $0.5 million (for non-personnel-related expenses). The remainder, $2.4 million in appropriated dollars, is to cover the personnel and other related expenses of the judges and their staff.

OUR FOCUS FOR FISCAL 2022 ACTIVITIES

The Copyright Office's fiscal 2022 funding request seeks resources necessary to continue the progress already underway towards accomplishment of the Office's strategic goals, which include focus areas such as providing expert law and policy advice, modernizing information technology, as well as to fulfilling the additional responsibilities entrusted to the Office by Congress as part of the MMA and CASE Act. To advance these goals, the Office is seeking specific funding: (1) implementing the CASE Act by standing up the Copyright Claims Board (CCB); (2) meeting the mandates of the MMA; (3) modernizing the Office's IT systems and applications, including the Office's historical records initiative. Our modernization webpage[5] reflects ongoing work for both IT and non-IT initiatives.

CASE Act

The CASE Act established the new CCB in the Copyright Office to serve as an "alternative forum in which parties may voluntarily seek to resolve certain copyright claims regarding any category of copyrighted work."[6] The Copyright Office is undertaking a number of work streams in support of standing up the CCB over the next several quarters. Last month, the Office published an educational webpage with FAQs about the CCB that will be regularly updated to keep the public informed of its progress. The Library and the Office has publicized job postings to recruit the three Copyright Claims Officers. The Office also has issued a notice of inquiry to solicit public comment regarding all aspects of regulatory implementation. The Office, OCIO, and other Library units are collaborating to identify and ready

[5] *See* https://www.copyright.gov/copyright-modernization/.

[6] Copyright Alternatives in Small Claims Act, 17 U.S.C. § 1502 (2020).

the IT technology, office space, and other needs for the CCB within the statutorily required timeframe.

In support of these activities, the Office's fiscal 2022 budget includes a program increase request of $3.2 million and 8 FTEs. This amount includes $1.0 million in one-time costs for office construction and furniture, audiovisual system acquisition, and development of an online case management system; and $2.2 million in recurring costs for the 8 FTEs ($1.7 for salary, benefits, and related costs and $500 thousand for systems operation and maintenance, printing, and other services).

MMA

The enactment of the MMA assigned new responsibilities to both the Copyright Office and the CRJ. The MMA requires the Register of Copyrights to "engage in public outreach and educational activities" regarding the amendments made to section 115 of title 17, in addition to a number of rulemakings.[7] Specifically, the Register must engage in public education and other outreach activities to inform interested members of the public and songwriters about the process by which a copyright owner may claim ownership of musical works through the mechanical licensing collective (MLC), which will administer a blanket licensing system for digital music providers to make and distribute digital phonorecord deliveries (*e.g.,* permanent downloads, interactive streams). The Office has produced several dozen outreach events over the past year to inform the public about the requirements of the MMA, and in fiscal 2021 the Office requested and Congress provided a program increase that included three additional FTEs to ensure these efforts are fully resourced.

The MMA also assigned additional responsibilities to the CRJ, requiring it to ascertain the reasonableness of the MLC's operating budget and the allocation of contributions to that budget by the various licensees or licensee representative groups.[8] Previously, under section 802(b) of the Copyright Act, the number of support staff authorized to support the CRJ was capped at three. A proviso in the fiscal 2020 Further Consolidated Appropriations Act permanently removed the staffing cap, allowing for the new hires requested in fiscal 2021.[9]

Copyright IT Modernization

The Office has a number of accomplishments to report in the third year of the congressionally-appropriated 5-year funding for modernization. OCIO is working alongside the Office on software development activities, which are progressing across multiple programmatic areas—including registration, recordation, statutory licensing, and access to public records. Building on our agile software foundation, this year the Office implemented the Scaled Agile Framework (SAFe) to improve collaboration across all of our projects and to improve our program-level view of the IT modernization work.

We are pleased to report that we met our target of a spring launch for the public pilot of the new electronic recordation system, which went live on April 27, 2020. The pilot was initially available to a limited number of public users, enabling them to record documents related to copyright ownership that fall under section 205 of title 17. We are now incorporating user feedback from this pilot into iterative improvements, with four point releases behind us. In this continuous development phase, additional functionality and additional waves of users will be added, with this year's focus turning to recordation of notices of termination.

The pilot for the new Copyright Public Records System, an endeavor that will eventually replace the existing Copyright Office Online Public Catalog, also launched this past year. The initial public release in late 2020 has already been supplemented by our first point release incorporating bug fixes and user feedback, and the process of point releases is expected to continue into the coming year.

In addition, moderated user testing has begun on a limited prototype for the copyright registration standard application, from which we will gather public feedback and commence with improvements and a second round of user testing. Iterative development of internal workflows has also begun, and a second development team is expected to join the team working on this functionality over the summer.

User Experience Design for licensing components begun earlier this year, with development against these requirements expected to begin later in the spring.

As part of our historical records project and commitment to the preservation of and access to records, a comprehensive effort is underway to digitize print and

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[7] Orrin G. Hatch—Bob Goodlatte Music Modernization Act, Public Law No. 115–264, § 102(e), 132 Stat. 3676, 3722 (2018).

[8] *Id.* § 102(c).

[9] Further Consolidated Appropriations Act, 2020, Public Law No. 116–94, § 1405, 133 Stat. 2534, 3208 (2019).

microfilm records and make them available online; this includes the card catalog, record books, and the Catalogs of Copyright Entries (CCE). The Office is currently working with the Library's experts in digital collections management to ensure that the digitization of the Office's more than 26,000 physical copyright record books incorporates best practices and the resulting records can be made available for public, online viewing. These record books contain well over 20 million pages of records from between 1870 and 1977, covering works as diverse as books, photographs, musical compositions, sound recordings, motion pictures, and more. A contract for the digitization of these record books has been awarded. Another contract is underway to perfect the metadata and improve access to the more than 40 million registration application and index cards that are already publicly viewable using the Office's Virtual Card Catalog (VCC). The Office also has a contract to create a data-mapping schedule for the historical record collections to use in the development of the Copyright Public Records System. These efforts will enhance the public's user experience by providing more accurate online search capability.

As directed by the Committee, the Office has developed an integrated master schedule (IMS) for IT modernization activities. The Office brought in expert consulting services to assist in developing a program for IMS management that allows for continuous improvement and refinement of the IMS and its estimates. The consultant services were procured in early calendar 2020 as the first task order under the Library's contract for Library-wide performance planning and measurement services. After a slight COVID–19-related delay in the start of these services, the work commenced and was completed in February of this year.

Consolidation of Copyright Office Storage Facilities

The Copyright Office has made great progress in the planned consolidation of copyright materials from several geographically dispersed storage facilities into a single, modern facility. The collaborative warehouse construction project between the Library, the Office, and Architect of the Capitol was completed ahead of schedule, and the Copyright Office moved into the new facility in November 2020. This facility will allow the Office to provide faster location services, better tracking, and improved security of the significant inventory of copyright deposits. The Office is now working to bring copyright materials stored in other locations to Cabin Branch in order to fully consolidate our materials.

MORE FLEXIBLE FEE AUTHORITY

The Copyright Office's operations would benefit significantly from greater flexibility in the use of our fee collections, specifically the authority to use existing fee balances to provide services to the public in the event of a lapse in appropriations. As we have noted before, flexibility in management of fee balances across budget cycles also would provide for more efficient and cost-effective administration of large, non-recurring projects related to modernization and other capital expenditures. To that end, once authorized, the Office anticipates including in a future budget request two changes in appropriations language: (1) to make 20 percent of the balance of fees collected in prior years available each year, in addition to appropriated amounts, for obligation without fiscal year limitation, and (2) to allow the Office to access existing fee balances to continue operations during a lapse in appropriations.

* * *

The Copyright Office appreciates the subcommittee's and Committee's continued support of the Office's efforts to modernize both our technology and services, and of the work involved in the operation of the copyright system overall.

PREPARED STATEMENT OF MARY B. MAZANEC, DIRECTOR, CONGRESSIONAL RESEARCH SERVICE

CHAIRMAN REED, RANKING MEMBER BRAUN, AND MEMBERS OF THE SUBCOMMITTEE,

Thank you for the opportunity to present the fiscal year 2022 budget request for the Congressional Research Service (CRS). At the outset, I would like to express my appreciation for the Committee's support of our fiscal year 2021 request. CRS has already begun efforts to recruit the expertise needed to strengthen CRS's science and technology-related analytical capacity. We also continue to work with the Library's Office of the Chief Information Officer (OCIO) to modernize CRS's IT systems.

Fiscal year 2020 was a year like no other. The emergence and spread of COVID–19 exacted a toll on human life and the national economy that was unprecedented. And yet, despite the enormous disruption caused by the global pandemic, I am pleased to report that CRS continued to successfully carry out its mission to provide Congress with "the highest quality of research, analysis, information, and confidential consultation, to support the exercise of its legislative, representational, and oversight duties." This would not have been possible but-for the resilience and dedication of CRS staff and I would like to thank my colleagues for their hard work in fulfilling this important responsibility.

In addition to outlining CRS's budget requirements for the coming year, my testimony today will highlight a selection of noteworthy support the Service provided to Congress during fiscal year 2020. I will also bring you up to date on developments related to a number of our strategic initiatives.

FISCAL 2022 BUDGET REQUEST AND PRIORITIES

The CRS budget request for fiscal year 2022 is $129.6 million dollars, an increase of 4.1 million dollars (or 3.1 percent) from the amount appropriated for fiscal year 2021. As in previous years, approximately 90 percent of the requested amount would be dedicated to staff pay and benefits. CRS is requesting no additional funding beyond that which is necessary to cover mandatory pay and price level cost increases.

During this time of national crisis, CRS's top priority is to ensure sufficient capacity to continue the delivery of its core services to meet Congress's research and analytical needs. In fiscal year 2022, CRS will continue to bolster analytical capacity, especially in the area of science and technology policy. This additional expertise will better enable CRS to support Congress in areas of increasing complexity and importance. In addition, the Service will continue to work closely with OCIO to meet the next milestones in modernizing its IT infrastructure. Moreover, CRS will build on its efforts to recruit, retain, and develop a diverse, professional workforce, with the skills and expertise necessary to provide Congress with exceptional service.

SERVICE TO CONGRESS

In March of 2020, as news of the impending pandemic grew increasingly dire, CRS worked quickly to execute the CRS pandemic plan to ensure that it would continue to support Congress's needs during any prolonged pandemic event. Within 24 hours, the Service transitioned its entire operation, expanding existing workplace flexibilities to enable staff to work remotely full-time. As a result, CRS was well positioned to provide Congress with timely analysis, information, and consultative support as it considered the plethora of issues presented by this public health crisis. From March through September 2020, CRS prepared and regularly updated over 1000 new products on COVID–19-related issues. To enable expedited access to these products, a COVID–19 resource page was developed on the CRS.gov and Congress.gov websites, organizing CRS prepared material under 26 issue areas, covering topics ranging from the temporary moratorium on evictions provided under the Coronavirus Aid, Relief, and Economic Security (CARES) Act to frequently asked questions regarding testing for COVID–19. Several of these products incorporated custom CRS graphics. In addition, CRS experts responded to over 8200 COVID-related inquiries and conducted over 80 briefings for congressional staff on COVID-related subjects. CRS continues to support Congress as the issues presented by the pandemic evolve.

In addition to COVID–19 related issues, CRS assisted Congress in its consideration of many other policy and legal questions. CRS experts provided extensive research and analytical support as Congress explored the market power of large Internet based companies; environmental justice; Medicare and Medicaid program authorizations; asylum processing at the U.S. border; tax law and policy; veterans issues; and law enforcement reform, among others. The Service worked closely with lawmakers as they considered legislation to reauthorize the Older Americans Act, the Higher Education Act and the Family Violence Prevention and Services Act. In addition, analysts and attorneys advised Members and congressional staff on the legal and procedural questions associated with impeachment proceedings and supported the Senate's consideration of various judicial nominations, including that of a Supreme Court Justice.

The Service supported Congress's examination of various foreign affairs, defense, and trade related matters, such as developments in the Middle East region, the use of delegated trade authorities, the national security implications of foreign investment in U.S. corporations and renegotiation of the North American Free Trade Agreement, and emerging technology in advanced weapons systems. CRS experts also provided guidance on the legislative process, congressional oversight, and the

annual appropriations bills. In addition, CRS continued its offering of seminars and programs for congressional staff, including sessions on the Global Implications and Impacts of the COVID–19 Pandemic; Fiscal Year 2021 Federal Research and Development (R&D) Funding; and the perennially popular Federal Law Update series. Due to the pandemic, many of CRS's programs were presented virtually during the fiscal year, and the Service quickly transitioned its in-person institutes to webinar format.

In total, during fiscal year 2020, CRS experts responded to over 75,000 congressional requests; prepared over 1300 new products; updated over 2500 existing products; and conducted live and virtual seminars that were attended by approximately 8500 congressional staff. As in previous years, the Service provided support to almost every Member and committee office through the provision of its products and services.

STRATEGIC INITIATIVES

CRS remains engaged in accomplishing the goals and objectives identified in its 2019–2023 Directional Plan. The following is a summary of the Service's progress during fiscal year 2020 in advancing some of the key initiatives undertaken to achieve these goals.

Gallup, Inc. Survey and Addressing the Full Range of Congressional Information Needs

In fiscal year 2020, CRS contracted with Gallup, Inc., to conduct a survey of congressional staff designed to gauge the value and utility of various research products and consultative services offered by CRS, as well as to gather information about how such products and services are used by Congress. Gallup contacted over 13,700 congressional staff from early February through mid-March 2020 and received survey responses from over 1300 district, State, and DC-based staff members. CRS continues to evaluate and consider the results as it develops and delivers research products and services to Congress.

IT Modernization/Integrated Research and Information Systems (IRIS)

CRS continues to work with the Library's Office of the Chief Information Officer (OCIO) to modernize its IT infrastructure with the deployment of new tools and software to enhance support to congressional stakeholders. The Integrated Research and Information System (IRIS) initiative is a multi-year effort to update the Service's mission-specific information technology to provide CRS staff with the best resources to create and deliver products and services to Congress. CRS and OCIO are currently implementing several major work streams. These efforts include updating the client relationship management and workforce information management systems, improving the text analysis program to provide greater ease of conducting legislative analysis and comparisons, streamlining the content management system, and enhancing the taxonomy tool for better search results. These improvements are in varying stages of development and implementation.

Congress.gov

In fiscal year 2020, CRS and the Library continued efforts to enhance Congress.gov and improve congressional user support with a number of developments, such as offering weekly alerts of future committee meetings and increasing access to legislative amendments, committee prints, and committee hearing transcripts. CRS also conducted live onsite and webinar training for congressional staff from 54 Senate Member offices and committees, as well as supporting more than 12,000 requests for assistance. In addition to ongoing enhancements, CRS partnered with OCIO and the Law Library to focus on multiple projects to retire legacy backend systems that, once replaced, will improve the functionality of Congress.gov. Other projects accomplished in fiscal year 2020 include modernizing the Member and committee data interchange between the Office of the Secretary of the Senate and the Library; developing tools and data standards for curating legislative data; exploring opportunities for efficient collaboration on bill text analysis; and sustaining and streamlining the CRS Bill Summary analysis, authoring, and publishing processes. CRS and its Library colleagues are appreciative of the ongoing high-performing partnership with Office of the Secretary of the Senate as legislative data workflows, tools, and standards are modernized.

Constitution of the United States of America: Analysis and Interpretation (CONAN) Modernization

Known officially as the "Constitution of the United States of America: Analysis and Interpretation," CONAN serves as the official record of the U.S. Constitution

for Congress. In 2019, CRS collaborated with OCIO and the Law Library to introduce a new website for CONAN: constitution.congress.gov. The new site features hundreds of pages of updated constitutional analysis and content. In fiscal year 2020, CRS legislative attorneys have continued to provide comprehensive analysis of the Supreme Court's jurisprudence as it relates to every provision of the U.S. Constitution, including the implications of recently decided cases. Since the launch of the public website in 2019, CONAN has received over three million unique visitors to the site and its pages have been viewed over seven million times.

Improving Recruitment and Retention of a Diverse and Productive Workforce

CRS continued its efforts to recruit, retain, and professionally develop a highly skilled staff. For example, in fiscal year 2020, the Service provided training on core presentation skills for virtual briefings, as well as encouraged participation learning sessions on diversity and inclusion. In addition, the CRS Diversity and Inclusion Working Group continued to meet throughout fiscal year 2020, and discussed, among other things, outreach strategies for improving the diversity of applicant pools for CRS positions and fostering an inclusive workplace.

CONCLUSION

Mr. Chairman, Ranking Member Braun and Members of the subcommittee, CRS is honored to serve as a trusted and reliable resource for Congress during this difficult period in our Nation's history. The accomplishments outlined above are a testament to CRS's commitment to support Congress with timely, authoritative research, analysis and information, undeterred by the challenges that we now face. On behalf of my colleagues at CRS, I would like to express my appreciation to the Committee for your continued support and for your consideration of our fiscal year 2022 request.

Senator REED. Thank you, Madam Librarian. And now let me recognize Comptroller Dodaro.

STATEMENT OF HON. GENE DODARO, U.S. COMPTROLLER GENERAL, GOVERNMENT ACCOUNTABILITY OFFICE

Mr. DODARO. Thank you, Mr. Chairman. Good afternoon to you Ranking Member Senator Braun, Senator Heinrich. I'm pleased to be able to be here today to discuss GAO's budget request for fiscal year 2022.

First, I want to thank the Committee very much for its support that's enabled us to meet our new responsibilities under the Pandemic Relief Legislation; and also, to continue to have a strong performance across the full spectrum of GAO's responsibilities.

GAO'S FISCAL YEAR 2021 PERFORMANCE

Last year, we were able to have GAO recommendations implemented that resulted in financial benefits to the government for over $77 billion. That's $114 returned for every dollar invested in GAO. We also had over 1,300 other recommendations implemented that improve services to the public, improve public health and security and safety, and also led to a wide range of program and operational improvements across the full breadth of the Federal Government's responsibilities.

GAO'S PANDEMIC RESPONSE

With regard to the Pandemic Relief Legislation, we were charged with looking at the use of all the funds to determine the impact on public health and the economy, and the impact on private and public sector institutions. We were required, which we have done, to provide monthly briefings to a set of congressional committees, and also bi-monthly reports to the Congress and the public, starting in

June 2020. Since then, we've issued six government-wide status reports covering the entire Federal Government.

We've made over 70 recommendations. Last September, for example, we urged the administration to put a vaccine distribution and communication plan in place. We urged that there be a strategy to address gaps in the medical supply chain. We made recommendations for a national testing strategy. A lot of the testing information wasn't complete and consistent. It was hard to target results. Also, we made recommendations to collect better data on the disparate impact of the pandemic on certain segments of our population, including racial minorities and others. We made similar recommendations on the vaccine strategy, to collect information on who's being vaccinated and whether vaccines are reaching the people most vulnerable to COVID–19. So, we've also had a number of recommendations on Program Integrity issues, and transparency and accountability.

As apropos to the emergency, a lot of emphasis was placed on quickly distributing the money, and as a result, there were a lot of trade-off decisions made that resulted in the transparency and accountability goals and expectations that were not met in many cases. There was a lot of fraud in the Unemployment Insurance area, the Paycheck Protection Program, and the Economic Injury Disaster Loan Program. We made recommendations that there be stronger oversight over those programs and activities; and gradually those recommendations are being addressed. But I don't think they were addressed as fast as we would have liked, or the Congress would have expected. So, there is a ways to go.

Most of our 70-some recommendations are still being implemented, and they haven't been fully implemented yet; so, we're going to keep working with the new administration to get them implemented over time.

We've issued a lot of individual, specific reports: for example, one we used our new science and technology team to look at vaccine development and ensure the public that vaccine development goals were being met in a lot of cases.

GAO HIGH RISK LIST

We also updated our high-risk list this year, which we provide to the Congress. We added not only the Emergency Loan Programs under SBA, but also the Federal efforts to prepare for, respond to, and recover from drug misuse. From 2002 to 2019, 800,000 Americans died from an overdose. From May 2019 to May 2020, 80,000 people died. It was the highest annual figure; and that rate just picked up as the pandemic began. There's not strong Federal leadership in this area. It needs better coordination among Federal agencies as well as with the State and local sectors.

SCIENCE, TECHNOLOGY ASSESSMENT, AND ANALYTICS TEAM

We've done a lot of work to build our capacity, including in the science and technology area. I'll be happy to talk more about questions about this going forward.

I appreciate your careful consideration of our request so we can continue this important work for the Congress. Thank you.

[The statement follows:]

United States Government Accountability Office

Testimony

Before the Subcommittee on the Legislative Branch, Committee on Appropriations, U.S. Senate

For Release on Delivery
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FISCAL YEAR 2022 BUDGET REQUEST

U.S. Government Accountability Office

Statement of Gene L. Dodaro
Comptroller General of the United States

GAO@100
A Century of Non-Partisan Fact-Based Work

GAO@100 Highlights

Highlights of GAO-21-510T, a testimony before the Subcommittee on the Legislative Branch, Committee on Appropriations, U.S. Senate

Background

GAO's mission is to support Congress in meeting its constitutional responsibilities and to help improve the performance and ensure the accountability of the federal government for the benefit of the American people. We provide nonpartisan, objective, and reliable information to Congress, federal agencies, and to the public, and recommend improvements across the full breadth and scope of the federal government's responsibilities.

In fiscal year 2020. GAO issued 691 products, and 1,459 new recommendations. Congress used our work extensively to inform its decisions on key fiscal year 2020 and 2021 legislation. Since fiscal year 2000, GAO's work has resulted in over:

- $1.2 trillion dollars in financial benefits; and
- 25,328 program and operational benefits that helped to change laws, improve public services, and promote sound management throughout government.

As GAO recognizes 100 years of non-partisan, fact-based service, we remain committed to providing program and technical expertise to support Congress in overseeing the executive branch; evaluating government programs, operations and spending priorities; and assessing information from outside parties.

View GAO-21-510T. For more information, contact Gene L. Dodaro at (202) 512-5555 or dodarog@gao.gov.

April 2021

FISCAL YEAR 2022 BUDGET REQUEST

U.S. Government Accountability Office

In fiscal year (FY) 2020, GAO's work yielded $77.6 billion in financial benefits, a return of about $114 for every dollar invested in GAO. We also identified 1,332 other benefits that led to improved services to the American people, strengthened public safety, and spurred program and operational improvements across the government. In March 2021, GAO reported on 36 areas designated as high risk due to their vulnerabilities to fraud, waste, abuse, and mismanagement or because they face economy, efficiency, or effectiveness challenges. In FY 2020 GAO's High Risk Series products resulted in 168 reports, 26 testimonies, $54.2 billion in financial benefits, and 606 other benefits.

In this year of GAO's centennial, GAO's FY 2022 budget request seeks to lay the foundation for the next 100 years to help Congress improve the performance of government, ensure transparency, and save taxpayer dollars. GAO's fiscal year (FY) 2022 budget requests $744.3 million in appropriated funds and uses $50.0 million in offsets and supplemental appropriations. These resources will support 3,400 full-time equivalents (FTEs). We will continue our hiring focus on boosting our Science and Technology and appropriations law capacity. GAO will also maintain entry-level and intern positions to address succession planning and to fill other skill gaps. These efforts will help ensure that GAO recruits and retains a talented and diverse workforce to meet the priority needs of the Congress.

In FY 2022, we will continue to support Congressional oversight across the wide array of government programs and operations. In particular, our science and technology (S&T) experts will continue to expand our focus on rapidly evolving (S&T) issues. Hallmarks of GAO's (S&T) work include: (1) conducting technology assessments at the request of the Congress; (2) providing technical assistance to Congress on science and technology matters; (3) continuing the development and use of technical guides to assess major federal acquisitions and technology programs in areas such as technology readiness, cost estimating, and schedule planning; and (4) supporting Congressional oversight of federal science programs.

With our requested funding, GAO will also bolster capacity to review the challenges of complex and growing cyber security developments. In addition, GAO will continue robust analyses of factors behind rising health care costs, including costs associated with the ongoing COVID-19 Pandemic.

Internally, the funding requested will make possible priority investments in our information technology that include the ability to execute transformative plans to protect data and systems. In FY 2022 GAO will continue to implement efforts to increase our flexibility to evolve IT services as our mission needs change, strengthen information security, increase IT agility, and maintain compliance. We will increase speed and scalability to deliver capabilities and services to the agency.

This request will also help address building infrastructure, security requirements, as well as tackle long deferred maintenance, including installing equipment to help protect occupants from dangerous bacteria, viruses, and mold. As reported in our FY 2020 financial statements, GAO's backlog of deferred maintenance on its Headquarters Building had grown to over $82 million as of fiscal year-end.

Chairman Reed, Ranking Member Braun, and Members of the Subcommittee, thank you for the opportunity to discuss our fiscal year (FY) 2022 budget request. I greatly appreciate the subcommittee's support of our efforts to serve the Congress and improve the federal government's performance, accountability, and transparency.

For the past 100 years, the United States Government Accountability Office (GAO) has provided reliable, professional, fact-based, non-partisan information to Congress and the American people on a host of domestic and international challenges and priorities. In this year of GAO's centennial, and with an eye towards laying the foundation for the next 100 years, I am honored to present GAO's fiscal year (FY) 2022 budget request to help Congress improve the performance of government, ensure transparency, and save federal funds.

With this support, GAO has identified over $1 trillion dollars in financial benefits and more than 21,000 program and operational benefits since 2005. Our average return on investment for the past five years is $165 to $1. We also generated, on average, over 1,300 program and operational benefits to produce a more effective and efficient government during the same the period. Congress also responded to GAO's work through dozens of legislative changes to federal programs.

During the global pandemic we recognize the gravity of our responsibilities to provide Congress and the Nation real time auditing and timely reporting on a dynamic situation that impacts everyone. As such, we have issued six bimonthly reports on the pandemic that cover the entire government-wide response to the public health and economic crises. They include 72 recommendations for agency actions and four matters for congressional consideration since June 2020 to enhance the nation's response to ongoing challenges related to the pandemic.

Fiscal Year 2022 Request

To build on this success, for FY 2022, GAO is requesting $744.3 million in appropriated funds, a 12.6 percent increase, and authority to use $38.9 million in offsetting collections. We recognize that this comes at a time when there are increased concerns about the level of federal spending; however, as demonstrated above, GAO has a proven record of delivering a sound return on investment. These past investments in GAO have helped profoundly improve federal government operations and routinely supported Congress in making well-informed decisions. Thus, I am fully confident that this fiscal year's investment will continue to enable us to provide timely support to the Congress and help improve the performance and accountability of the federal government.

The chart below provides a summary by program for the FY 2022 request.

Table 1: FY 2020 – 2022 Summary of Resources by Program (dollars in thousands)

	Fiscal Year 2020 Actual		Fiscal Year 2021 Enacted		Fiscal Year 2022 Request		Net Change Fiscal Year 2021 / 2022	
Program	**FTE**	**Amount**	**FTE**	**Amount**	**FTE**	**Amount**	**FTE**	**Amount**
Human capital	3,178	$551,725	3,180	$579,872	3,400	$635,477	220	$55,605
Engagement support		$6,489		$9,711		$14,765		$5,054
Infrastructure operations		$97,537		$128,456		$141,975		$13,519
Center for Audit Excellence		$1,004		$2,100		$2,100		0
Total budget authority	**3,178**	**$656,755**	**3,180**	**$720,139**	**3,400**	**$794,317**	**220**	**$74,178**
Offsets[a]		($26,764)		($59,000)		($50,000)		$9,000
Appropriation		**$629,991**		**$661,139**		**$744,317**		**$83,178**

Source: GAO. | GAO-21-510T

[a]Includes offsetting receipts and reimbursements from program and financial audits; rental income; training fees, collection of bid protest system user fees; supplemental funds for disaster audits; and for pandemic related audits.

GAO' requested FY 2022 funding level would enable GAO to continue to increase our capabilities to review the opportunities and challenges associated with evolving science and technology issues; complex and growing cyber security developments; and rising health care costs. Specifically

- **Science and Technology**. These resources will allow us to expand our science and technology capabilities in accordance with the 2019 plan provided to Congress to bolster our technology assessments and other science and technology (S&T) assistance to Congress, and help ensure that GAO has the bandwidth and expertise to support audits where this expertise is critical in addressing congressional priorities.
- **CyberSecurity**. GAO will continue to expand our expertise and ability to assess the cybersecurity challenges facing the Nation, including assessments of the implementation of the National Cyber Strategy, government global cyberspace strategies, and government and private sector efforts to address the impact of the SolarWinds intrusion.
- **Health Care Spending**. GAO will continue to examine the sustainability and integrity of the Medicare and Medicaid programs and to oversee VA, DOD, and Indian Health Service health care services. Health care spending now accounts for over 25 percent of

the federal budget and is one of the fastest growing federal expenditures.

The FY 2022 budget also builds upon the planned investments in GAO's Information Technology Modernization efforts. This request prioritizes GAO's multi-year effort to ensure that it has the 21st century tools and technologies needed to support our workforce and achieve our mission, including enhanced cloud data management and storage solutions, and IT security upgrades to combat the ever-growing cybersecurity threats toward U.S. assets.

Further, this request supports significant investments in improving the health and safety environment of our facilities; enhanced building security requirements; and long deferred infrastructure maintenance needs in anticipation of our workforce returning to the workplace. The GAO workforce continues to be our most critical asset and it is imperative that GAO provide a safe and secure workplace.

Finally, I am looking beyond GAO's near-term and immediate needs. I am confident continued investments in GAO, coupled with the stellar talents of our diverse and professional workforce, will strengthen our ability to not only address today's highest priorities, but also provide Congress and the American public with timely insightful analysis on the future challenges facing the country.

Moving forward, GAO will continue to build on bodies of work related to our three broad strategic goals for supporting Congress and the Nation, to (1) address current and emerging challenges to the well-being and financial security of the American people; (2) help the Congress respond to changing security threats and the challenges of global interdependence; and (3) help transform the federal government to address national challenges.

Highlights from FY 2020 Results

GAO's mission is to support the Congress in meeting its constitutional responsibilities, and to help improve the performance and ensure the accountability of the federal government for the benefit of the American people. Our FY 2020 performance results demonstrate GAO's unwavering commitment to our role as the Congress' watchdog.

Financial Benefits

In FY 2020, we documented $77.6 billion in financial benefits for the government – a return of about $114 for every dollar invested in us. Examples of financial benefits we are reporting for this year included those contributing to

- revisions to spending limits for Medicaid demonstration projects ($29.4 billion);
- termination of the Department of Energy's (DOE) Mixed Oxide Fuel Fabrication Facility (MOX) project to dispose of plutonium (about $13.0 billion);
- reductions and rescissions made to DOD's accounts for the development and procurement of weapons (about $2.3 billion);
- changes in DOD's payment policy to cover only FDA-approved drugs for compounded drugs in the TRICARE program ($1 billion); and
- reduced appropriations for certain under-obligated Department of State (State) accounts in FY 2019 ($950 million).

Legislative Impacts

The Congress continues to use GAO's work to inform key legislative decisions, some of which will result in billions in future financial savings. Examples linked directly to GAO's work include

Consolidated Appropriations Act, 2021 (December 2020) and Joint Explanatory Statements included numerous actions based on GAO's work, including the Congress

- providing additional funding to continue the cleanup of the waste site of the radioactive and hazardous materials under the 324 Building at the Hanford site, and directing the implementation of a GAO recommendation for increased surveillance, maintenance, and risk reduction activities associated with legacy waste sites;
- requiring the Social Security Administration, to the extent feasible, to provide Treasury's Do Not Pay Working System access to its full death data for a three-year period, beginning in December 2023, to prevent improper payments;
- repealing a provision of the Middle Class Tax Relief and Job Creation Act of 2012 mandating that the Federal Communications Commission auction the T-Band radio spectrum, allowing law-enforcement, fire officials, and Emergency Medical Services to continue using the T-Band spectrum to operate their radios for day-to-day life saving operations [Don't Break up the T-Band Act (December 2020)]; and
- directing IRS to report on progress toward implementing GAO's recommendations aimed at addressing the numerous deficiencies in the IRS's cyber controls that increased the risk that IRS's network devices and systems could be used by unauthorized individuals to access sensitive taxpayer data.

The Fiscal Year 2021 **National Defense Authorization Act** (January 2021) and Joint Explanatory Statements included numerous actions based on GAO's work, including the Congress

- reviewing unobligated balances and reducing DOD's FY 2021 Operation and Maintenance Accounts;
- establishing the statutory National Cyber Director position in the Executive Office of the President with the authorities GAO identified;
- directing DOD take steps to assess its processes for dealing with contractors with violations of safety, health and fair labor standards; and
- directing DOD to clearly identify the associated goals, risks, and costs of re-designing the Autonomic Logistics Information System (ALIS), which is the information infrastructure used in the joint strike fighter.

The **Setting Every Community Up for Retirement Enhancement Act of 2019** (December 2020). Based on GAO's work, Congress expanded access to retirement plans for millions of long-term, part-time employees who previously were not eligible to save and invest in their employer-based retirement savings plans.

The **Federal Advance Contracts Enhancement (FACE) Act** (December 2020). Based on GAO's work, the Congress directed the Federal Emergency Management Agency (FEMA) to (1) update its advance contracting strategy, (2) issue new guidance to its contracting workforce on the use of advance contracts, (3) promote advance contracts to local and state governments, and (4) improve the use of the agency's program to track major acquisitions.

The **Johnny Isakson and David P. Roe, M.D. Veterans Health Care and Benefits Improvement Act of 2020** (January 2021). Based on GAO's work, Congress required the Department of Veterans Affairs (VA) to develop a plan to address all the GAO-identified high-risk areas; report on progress in implementing open priority recommendations; and to take actions addressing timely access, and monitoring of medical examiners' training.

The **Secure Federal Leases from Espionage and Suspicious Entanglements Act** (December 2020). Based on GAO's work, required the government to identify who owns the office space it leases in order to prevent possible security threats.

The **STOP FGM Act of 2020** (January 2021). Based on GAO's work, the Act required certain federal agencies to report annually on, among other things, their efforts to educate and assist communities and key stakeholders about female genital mutilation.

Other Benefits

Many other benefits resulting from our work lead to program and operational improvements. In FY 2020, we recorded 1,332 of these other benefits.

For example, our work on public safety and security

- Led the Federal Aviation Administration (FAA) to take steps to improve its oversight of small unmanned aircraft systems (UAS or "drones")—to prevent these systems from endangering life and property—through better communication with its law enforcement partners about the information it needs on unsafe UAS operations; and
- Led several federal agencies to take steps to more fully establish key elements of a cybersecurity risk management program and/or conduct an agency-wide assessment of cyber risks to better safeguard their agencies from the growing number of cyber threats. These actions included updating key policies and procedures to ensure that they are identifying, assessing, and responding to cyber risks.

Similarly, our work related to vulnerable populations

- Prompted the FEMA to improve the services it provides to disaster survivors with disabilities by (1) using new registration-intake questions to better identify their needs, (2) establishing related objectives in its 2019-2022 Strategic Plan, and (3) seeking feedback on its new approach to service delivery; and
- Led to agreement by Customs and Border Protection to improve the (1) guidance it uses to process and track family separations at the southwest border, and (2) oversight mechanisms for delivering medical care to those in its custody.

Furthermore, our work in the area of agency operations

- Led to agreement by the National Aeronautics and Space Administration (NASA) to develop a solid business case for its mission to return U.S astronauts to the moon by 2024, and include a comprehensive plan and full cost estimate for this mission; and

- Helped inform a Senate legislative proposal to build on progress made under the Chief Financial Officers Act of 1990 to further improve federal financial management, such as preparing financial management plans and better linking cost to performance.

Building Bodies of Knowledge

Through the products issued this year, we continued to build on bodies of work related to our three broad strategic goals to (1) address current and emerging challenges to the well-being and financial security of the American people, (2) help the Congress respond to changing security threats and the challenges of global interdependence, and (3) help transform the federal government to address national challenges.

Protection of children and students. We reported on the need to (1) update or replace the heating, ventilation, and air conditioning (HVAC) systems in about 36,000 K-12 public schools, which is of heightened importance given COVID-19; and (2) address the physical barriers, such as accessible door hardware and steep ramps, that make it challenging for students, teachers, and others with disabilities to use public schools facilities.

Veterans. We reported on the need for (1) VA to improve how it tracks and analyzes the data on veteran suicides that occur on its campuses, such as medical facilities, to better understand and prevent such suicides; (2) VA to strengthen its oversight of the quality of state veterans homes, which provide skilled nursing and personal care to about half of eligible veterans—especially given COVID-19; (3) VA to take steps to more efficiently and effectively acquire medical and surgical supplies; and (4) the Office of Personnel Management (OPM) and agencies to better leverage data to improve the retention of veterans in federal jobs, which is lower than the retention of similar non-veterans.

Health care. We reported on the need to (1) address infection control deficiencies in nursing homes to help safeguard residents from outbreaks like COVID-19; and (2) determine more precisely the magnitude of antibiotic resistance—which sickens about 2.8 million people annually—and strengthen federal efforts to minimize its effects.

Science and Technology. We reported on (1) COVID-19—Coronaviruses, Social Distancing During Pandemics, COVID-19 Modeling, COVID-19 Testing, COVID-19 Vaccine Development, Herd Immunity, and Contact Tracing Applications; (2) policy options for the use of Artificial Intelligence to deliver health care services; (3) data quality considerations for modeling and analysis of infectious diseases, such as COVID-19; (4) algorithms used in forensic science for federal law enforcement, such as DNA, fingerprints, and facial recognition; and (5) irrigated agriculture technologies, practices, and implications for water

scarcity. In addition, we reported on federal agencies' use of the Internet of Things (IoT) devices. We also expanded our use of Science and Tech Spotlights that distill complex issues into a 2-page summary on topics covering CRISPR gene editing; 5G wireless technologies; and quantum technologies. We have issued over 20 Science and Technology Spotlights since its inception in late 2019 including the most recent, in February, on Vaccine Safety.

COVID-19 Response and Recovery. As required under the CARES Act GAO has conducted ongoing monitoring and oversight of the federal government's $4.5 trillion response to prepare for, respond to, and recover from the COVID-19 pandemic. This has included providing monthly briefings and reporting on a bimonthly basis until March 2021 and on a quarterly basis beginning in July 2021. We are to report on, among other things, the effect of the pandemic on the public health, economy, and public and private institutions.

As of April 12th, 66 of GAO's previous 72 COVID-19 recommendations for agency actions remained unimplemented. These include such critical areas as vaccine distribution and communications plans, medical supply chains, and workplace safety. GAO is pleased that the Consolidated Appropriations Act passed by Congress in December required a number of actions that are consistent with several of our open recommendations and we will monitor the implementation of the Act's requirements. Finally, consistent with the CARES Act, GAO is to continue its oversight of the federal pandemic response under the American Rescue Plan, and GAO will continue to follow up on its past recommendations and make new ones, as warranted.

Disaster Preparedness, Recovery, and Resilience. In FY 2020 alone, we used supplemental disaster audit funding to issue 32 products and made 56 recommendations in four key areas: (1) National preparedness, including the need for FEMA to address national emergency management capabilities based on information known about states' and territories' response and recovery capabilities; (2) FEMA workforce, including its efforts to assess how it deploys its disaster workforce to meet mission needs; (3) Disaster loans, including the need to mitigate and identify risk—such as extended power outages—to disaster loan processing, and, (4) Survivor assistance, such as the need for FEMA to better explain its program information and eligibility decisions to applicants. We also issued a Disaster Resilience Framework to help the federal government promote resilience to natural disasters.

Between November 2017 and March 2021, we issued 66 reports and identified three Matters for Congressional Consideration and 159 recommendations to 16 agencies, including FEMA, the U.S. Department

of Housing and Urban Development (HUD), and SBA. As of the third quarter FY 2021, 23 percent of the recommendations made between FY 2018 and FY 2021 have been implemented. Since implementing our recommendations, FEMA can better (1) identify survivors' disability-related needs; (2) estimate the number of staff needed to administer Public Assistance recovery efforts; and (3) help ensure that its contracting personnel know to reach out to state and local governments to create and use contracts before disasters hit.

While one of our Matters had been fully implemented by year end, we also provided the Congress with technical assistance on draft legislation in five areas: (1) potential reforms to the National Response Framework, (2) possible creation of a national disaster safety board, (3) loans to fund disaster resilience efforts, (4) reforms to federal advance contracts, and (5) permanently authorizing the Community Development Block Grant Disaster Recovery program. As of January 2021, we had 19 disaster-related audits underway.

High-risk areas. In March 2021 we issued the biennial update of our High Risk Report to focus attention on government operations that are vulnerable to fraud, waste, abuse, and mismanagement or need transformation—offering solutions to 36 high-risk problems (See Appendix I). In most areas, progress since our last high risk update has been limited. In five areas the ratings declined, while in seven areas they improved. One area—DOD Support Infrastructure Management—improved to the point of removal from the list. Two new areas—National Efforts to Prevent, Respond to, and Recover from Drug Misuse, and Emergency Loans for Small Businesses—are being added to the list.

Where progress has been made addressing high-risk areas, the results have been substantial. For example, over the past 15 years (FY 2006 through FY 2020) financial benefits totaled nearly $575 billion, or an average of about $38 billion per year. Since our last update in 2019, we have recorded approximately $225 billion in financial benefits. In FY 2020 alone, our high-risk work yielded $54.2 billion in financial benefits, 606 other benefits, 168 reports, and 26 testimonies.

Fragmentation, overlap, and duplication. In 2020, we issued our tenth annual report. It identified 168 new actions in 29 new areas (and 10 existing areas) that could reduce fragmentation, overlap, and duplication, or provide other cost savings and opportunities to enhance revenue across the federal government. From 2011 to 2019, we identified 908 such actions. As of May 2020, the Congress and executive branch agencies had fully addressed 519 of these actions and partially addressed 202, yielding about $429 billion in financial benefits—$393

billion between 2010 and 2019, and $36 billion more projected in the future.

Serving Our Clients

In FY 2020, we received 550 requests for work from 90 percent of the standing committees of the Congress—supporting a broad range of congressional interests. We issued 586 reports and made 1,459 new recommendations. We were asked to testify 59 times before 43 separate committees or subcommittees on topics including COVID-19; disaster preparedness, response, and recovery; 2020 U.S. Census; the Chief Financial Officers Act; and the nation's fiscal health. GAO also delivered five member briefings, and we were asked to submit (1) four Statements for the Record in lieu of testifying; and (2) responses to 27 sets of Questions for the Record, which become part of the official hearing records. GAO executives also participated in seven roundtables sponsored by congressional committees, subcommittees, or working groups. Moreover, GAO's work was cited by Members of the Congress and witnesses in 79 hearings beyond those at which we testified.

The following, are examples of topics GAO addressed in testimony in FY 2020.

Figure 1: Selected GAO Fiscal Year 2020 Testimony Topics



Source: GAO | GAO-21-510T

I continued to meet with the Chairs and Ranking Members of congressional committees to obtain their views on GAO's work, including their priorities, and to discuss opportunities and challenges facing our Nation. In addition, GAO continued to highlight the status of key

recommendations in our annual duplication, fragmentation, and overlap report–citing progress made and the benefits of full implementation.

In FY 2020, agencies implemented 77 percent of our recommendations against a target of 80 percent matching our 2019 performance. I also continued to send letters to the heads of most federal departments, recognizing their progress in implementing our priority recommendations and calling attention to those still requiring action. These letters were also sent to congressional committees of jurisdiction to inform their oversight and published on our website.

Supporting Our People

The hard work and dedication of our diverse and professional multidisciplinary staff positioned GAO to achieve a 93 percent on-time delivery of our products in FY 2020. Our performance also indicates that staff received the support needed to produce high-quality work. We met or exceeded the targets for six of our seven people measures exceeding our targets for, retention rates with and without retirements, staff development, staff utilization, effective leadership by supervisors, and organizational climate. For the people measure of how satisfied GAO employees are with their IT tools, we fell short of our goal of 80 percent by 11 percentage points, at 69 percent. Although we did not meet our goal in this area, we did experience a 13-percentage point satisfaction increase over fiscal year 2019 and continue to seek areas of IT improvement.

FY 2022 Resource Planning and Deployment

In planning our audit work for FY 2022, we are requesting resources that will lay the long-term foundation that allows GAO to continue to provide the Congress with the high quality products it has come to rely on that focus on both the longstanding as well as emerging issues that concern the Nation. A key focus will be increasing our current focus on science and technology areas. In addition we will also bolster resources for identifying government-wide cybersecurity risks and the increasing cyber threat to the nation's critical infrastructure. Another critical audit area this request will support are the challenges associated with growing health care costs.

In addition to these audit resources, GAO has internal needs to allow our auditors to better serve Congress. These internal investment needs include: accelerating IT modernization and cloud data management and storage solutions, as well as infrastructure enhancements and improvements to address remaining health and safety issues. Another internal high priority is to address the deferred maintenance backlog at GAO's HQ Building, which includes multiple HVAC replacements.

GAO's Science and Technology Program

GAO's newest unit—the Science, Technology Assessment, and Analytics (STAA) team—helps address congressional science and technology needs in a variety of ways, including

- in-depth evaluation and oversight of federal science and technology programs;
- foresight on new and emerging technologies;
- evaluation of the effects and policy implications of science, technology, and innovation on society;
- innovating to support evidence-based policymaking through data analytics;
- exploring emerging technologies and supporting congressional modernization efforts;
- development of policy options that may help policymakers enhance the benefits and mitigate challenges of technologies; and
- proactive and on-demand technical assistance on science, technology, and innovation issues.

GAO's vision for STAA is to provide Congress with critical foresight, oversight, and insight of science and technology issues and harness the power of advanced analytics in order to ensure continued American security, innovation, and competitiveness in a rapidly changing world.

GAO continues to successfully conduct science and technology-related work, providing Members of Congress and their staffs with a variety of products and services. This has included issuing specialized reports known as technology assessments. In 2019, we committed to expanding resources to meet Congressional needs by establishing STAA, a team dedicated solely to S&T. Through our rigorous, fact-based foresight and oversight work, we can help Congress navigate the increasingly complex S&T advances it must oversee, including artificial intelligence (AI), quantum computing, infectious disease modeling, and rapid vaccine development and through our collaboration with the National Academies of Sciences, Engineering, and Medicine.

In 2020, STAA devoted significant resources to address the COVID-19 pandemic. For example, it issued a Science & Tech Spotlight on coronaviruses in early March, providing a high-level overview of what they are and how they are transmitted. It followed this with six additional Spotlights on COVID-19 topics, including social distancing, testing, contact tracing apps, and herd immunity. STAA staff also contributed

significant S&T expertise to the CARES Act reports. Reports on vaccine safety and Operation Warp Speed (OWS) vaccine development and manufacturing were issued in mid-February 2021.

STAA has played an important role in GAO's oversight of the federal response to the COVID-19 pandemic, further building our base of science and technology knowledge. Throughout the pandemic, STAA has provided Congress with technical assistance on COVID-19 on numerous occasions, on topics such as: how well facemask materials filter droplets and aerosols, differences among three prominent COVID-19 models, and the effectiveness of certain filtration systems in reducing respiratory disease transmission on airplanes. STAA also analyzed four COVID-19 vaccine developers' clinical trial protocols and reported in November on information the trials will provide and their limitations. STAA's work related to OWS features a first-of-its-kind digital dashboard to provide up-to-date details on vaccine technology development, manufacturing, and rollout.

Over the past year, STAA has also continued to expand its capacity to meet Congressional needs on other topics. STAA issued technology assessments on capabilities and challenges related to 5G wireless technology and artificial intelligence in health care, among other topics.

- *5G Wireless*. For the 5G wireless technology assessment (with key support from the National Academy of Sciences), GAO reported that new technologies will be needed to reach the full potential of 5G and noted several challenges, including that spectrum demand will likely continue to exceed supply and that 5G will exacerbate existing cybersecurity and privacy concerns.
- *Artificial Intelligence*. STAA partnered with the National Academy of Medicine to deliver a joint technology assessment focused on the use of Artificial Intelligence (AI) tools to augment patient care, the second in a three-part series on AI in health care.[1] GAO assessed both clinical and administrative AI tools and found that they show promise for improving health outcomes, reducing provider burden, and using health resources more efficiently. However, there are several challenges to developing and deploying these tools, including difficulties with obtaining sufficient high-quality data to create effective algorithms; challenges with scaling up and integrating these tools

[1]The first report in this series focused on the potential of Artificial Intelligence to expedite drug development (GAO-20-215SP; December 2019).

across different health care settings, such as rural vs. urban settings; and uncertainty over liability in the event of inaccurate results.

STAA also has additional technology assessments underway on topics including blockchain, AI in medical diagnostics, contact tracing apps, the use of forensic algorithms by law enforcement, quantum computing and communications, detection and remediation of per- and polyfluoroalkyl substances (PFAS) in drinking water, and technologies to provide military navigation capabilities in the absence of GPS. In addition, in FY 2021 STAA plans to begin technology assessments on topics including decarbonization technologies, forensic attribution of chemical weapons, gene editing and engineering, and the environmental and other effects of satellite constellations.

STAA also issued 17 Science & Tech Spotlights in 2020, on a broad range of topics, including nuclear microreactors, CRISPR gene editing, consumer electronics recycling, and deepfakes. Furthermore, STAA conducted numerous S&T-related performance audits on topics such as infectious disease modeling; antibiotic resistance; sexual harassment in science, technology, engineering, and mathematics ("STEM"); how the Patent and Trademark Office assists small businesses and inventors; and policies to address foreign influence in federal research. STAA also issued a new guide on best practices to assess the adoption and use of Agile software development and finalized a guide on using technology readiness assessments in complex technical acquisitions and projects such as the Navy's Columbia Class Nuclear Submarine program.

In addition to addressing numerous Committee or individual Member requests for on-demand technical assistance, we also provided services to Congress more broadly. In October, at the request of the House Committee on Administration, we hosted an S&T policy symposium for the House of Representatives to provide information to Members and staff on a range of topics, such as COVID-19, congressional modernization, and the innovation economy. The Committee included the symposium in the New Member Orientation Training that was provided to all incoming Representatives of the 117th Congress.

Another core area of STAA is the Innovation Lab, which aims to explore, pilot, and deploy new advanced analytic capabilities to enhance audit products. In 2020, the Lab initiated a first-of-its-kind collaborative effort across key agencies to enhance payment integrity. The Lab also implemented GAO's first advanced cloud infrastructure to support leading-edge development of data science prototypes, with the goal of

conducting GAO's work to more effectively support evidence-based policymaking. The Lab is developing a data literacy curriculum to use across the agency to enhance GAO's oversight work overall.

A final area of progress for STAA was further expansion of our network of S&T experts to increase the depth, breadth, and diversity of knowledge available to meet congressional needs. On October 15, 2020, we held our inaugural meeting of the newly established Polaris Council, a group of exceptional science, technology, and policy leaders and experts from many fields, to advise us on emerging S&T issues facing Congress and the nation. In addition, STAA participated in 210 external speaking events in 2020 to further broaden our expert networks.

To accomplish all of these contributions, STAA grew its S&T workforce in accordance with the plan provided to Congress in April 2019. At the beginning of fiscal year 2020, the STAA team included about 70 members, and as of January 2021 it was up to 104 members. These STAA staff have advanced degrees in a wide variety of fields, such as microbiology, quantum mechanics, public health, and chemical engineering.

Our FY 2022 request is based on our plans to continue and build on STAA's current pace of meeting congressional needs, and our plan to further grow STAA's staff. Our goals in doing so are to: 1) increase the number of technology assessments we conduct each year; 2) increase the number of short-to-medium turnaround products; 3) improve access to and absorption of our work through the use of a variety of digital publishing tools, such as online "dashboards;" and 4) pilot and deploy multiple advanced analytics prototypes to greatly enhance congressional oversight and support. For more details about the status of STAA's plans and ongoing efforts, see Appendix II.

Sustaining our Focus on Cybersecurity

Cyber threats can have a serious, or even potentially catastrophic, impact on federal systems, the nation's critical infrastructure, and the privacy and safety of the general public. Since 2010, we have made over 3,300 recommendations to federal agencies aimed at addressing cybersecurity challenges facing the government. More than 750 of the recommendations had not been fully implemented as of December 2020. Until these shortcomings are addressed, federal IT systems and data will be increasingly susceptible to cyber threats. In FY 2020, our work in this area resulted in numerous recommendations to help agencies address cyber threats. For example, we

- recommended ways to better oversee the National Cyber Strategy and highlighted the need to clearly define a central leadership role to coordinate government cybersecurity efforts;
- made 15 recommendations to four agencies to strengthen the cybersecurity of DHS's continuous diagnostics modernization program;[2]
- assessed the progress that FCC made in addressing 136 technical recommendations that we made to improve the agency's cybersecurity posture; and
- examined government-wide IT supply chain risks and made a total of 145 recommendations to 23 agencies, which were directly related to vulnerabilities that led to the SolarWinds intrusion (December 2020).

More recent high-profile and widespread cyberattacks on federal agencies and national infrastructure have further highlighted the urgent need to address the long-standing cybersecurity challenges facing the nation. For example, in December 2020 DHS's Cybersecurity and Infrastructure Security Agency (CISA) reported that an advanced persistent threat actor, likely of Russian origin, inserted a "backdoor" into a genuine version of a network management software product developed by SolarWinds.[3] The malicious actor used this backdoor, among other techniques, to initiate a cyberattack campaign against U.S. government agencies, critical infrastructure entities, and private-sector organizations that use the compromised network management software product. According to CISA, this threat poses a grave risk to the federal agencies and our nation's critical infrastructure, among others.[4]

Congress continues to turn to GAO for insightful analysis and advice to address these cybersecurity challenges. Moreover, it has shown strong

[2]The continuous diagnostics modernization program provides agencies with the tools that identify the hardware and software on their networks and check for vulnerabilities and insecure configurations.

[3]A "backdoor" is a malicious program that can potentially give an intruder remote access to an infected computer.

[4]Critical infrastructure includes systems and assets so vital to the United States that incapacitating or destroying them would have a debilitating effect on national security. These critical infrastructures are grouped by the following 16 industries or "sectors": chemical; commercial facilities; communications; critical manufacturing; dams; defense industrial base; emergency services; energy; financial services; food and agriculture; government facilities; health care and public health; information technology (IT); nuclear reactors, materials, and waste; transportation systems; and water and wastewater systems.

bicameral interest in learning more about the SolarWinds attack. Thus, recruiting top-tier cyber talent to augment our current audit workforce is critical. GAO plans to continue to recruit talent with specialized cybersecurity knowledge, skills, and expertise to augment our Information Technology and Cyber Security Team's capabilities, including within our Center for Enhanced Cybersecurity. This center is responsible for performing technical cybersecurity reviews, including vulnerability assessments and system configuration reviews of complex networks and systems.

Using our cadre of cybersecurity experts, we plan to continue our focus on four major challenges of our cyber High Risk area: (1) establishing a comprehensive cybersecurity strategy and performing effective oversight, (2) ensuring the security of federal information systems, (3) protecting cyber critical infrastructure, and (4) protecting privacy and sensitive data. Over the next 2 years, our planned efforts include assessing the

- federal response to the significant cyber incident, discovered in December 2020 and involving a supply chain compromise of the Solar Winds network management software, that was carried out against federal agencies and critical infrastructure entities;
- federal oversight, coordination, and implementation of the National Cyber Strategy;
- strategy for global cyberspace, such as global cybercrime and cyber diplomacy; and
- federal government's role in strengthening the nation's cybersecurity, including addressing ransomware activity.

Assisting Congress with Health Care Challenges

The COVID-19 pandemic has underscored the importance of effective administration and oversight of the federal government's health care programs and spending. In response to the pandemic, the government launched new programs and directed hundreds of billions of dollars to new and existing health care programs and providers.

In addition to our work on the pandemic, we continued to provide robust and timely analysis of other critical health care issues. In particular, in April 2020, we identified the federal government's efforts to address drug misuse as a high risk issue, noting at the time that this issue required immediate attention and action as the pandemic could further exacerbate the alarming drug misuse trends. In December 2020, CDC issued an alert indicating that provisional data show that drug overdoses have accelerated during the pandemic. We have ongoing work that will

continue to examine the effects of the pandemic on behavioral health, including substance abuse, as well as the federal government's funding for efforts to combat opioid misuse and abuse and the scheduling of fentanyl-related substances.

Last year we also shed light on important FDA oversight issues, including the agency's oversight of federal high-containment laboratories—those that conduct research on hazardous biological agents and operate under specific safety protocols—and overseas drug manufacturing. As of August 2020, nearly 60 percent of the 4,200 establishments that manufactured drugs for the U.S. market were located overseas. More than one-third of the foreign establishments supplying the U.S. market were in China and India. We testified before the Senate Committee on Finance on the challenges that FDA faces in trying to provide effective oversight of these establishments, and we continue this work to explore how these challenges can be addressed.

We have also continued to examine health care spending, which accounts for more than 25 percent of the federal budget. Putting the nation on a sustainable fiscal path requires that we better understand and restrain the growth in health care spending, including spending on prescription drugs. In January 2021, we issued a report that provides a comprehensive look at how drug prices compare across Medicare and VA and the drivers of the observed price differences. We also have forthcoming reports that examine prescription drug prices in the U.S. compared to those in other countries and how direct-to-consumer advertising may affect federal health care spending.

In FY 2021, we will also continue to examine the sustainability and integrity of the Medicare and Medicaid programs, which together accounted for over one trillion dollars in expenditures and an estimated $129 billion in improper payments in FY 2020. In addition to eroding public trust, the scope of improper payments in these programs jeopardizes the government's ability to provide care for those who most need it in the future. We have ongoing work examining how recent federal actions, such as the various telehealth and other flexibilities made available to providers, has affected the sustainability, administration, and integrity of the Medicare and Medicaid programs. In addition, we have ongoing work examining the efficiency of certain Medicare payment policy issues and how market structures, such as private equity ownership of nursing homes, affect the delivery of services.

Finally, we will continue to provide oversight of VA, DOD, and the Indian Health Service (IHS) health care services. For example

- In September 2020, we made recommendations to VA how it could improve the budget estimates for its community care program—through which a growing proportion of veterans are receiving care—to better inform decision-making and planning. Our report in February 2021 also exposed vulnerabilities in the credentialing and privileging processes for VA community care providers that could put veterans at risk, and we made recommendations to address this risk. We plan to continue to review different aspects of the care provided through this program, including the quality, timeliness, and cost-effectiveness.
- In October 2020, we issued a report that found VA's data on on-campus suicides were unreliable and recommended that VA improve this data, noting that such data are key to understanding and addressing this disturbing trend. We have ongoing work that further examines VA suicide prevention efforts as well as work examining DOD's efforts to prevent suicide among service members.
- In November 2020, we recommended that IHS address issues we found with lack of consistent, agency-wide oversight processes that resulted in limited and inconsistent oversight of health care facilities' decisions about the use of funds. We also have work planned or underway examining a range of quality of care issues at IHS, including how it determines current and projected health care needs, and the extent that IHS relies on outside providers for treatment of certain diseases.

Managing Our Internal Operations

In FY 2020, GAO again received an unmodified or "clean" opinion from independent auditors on our financial statements for FY 2020 and our internal control over financial reporting. There was no reportable noncompliance with provisions of applicable laws, regulations, contracts, and grant agreements tested. We demonstrated that all detailed performance and financial information is complete and reliable in order to achieve high standards for accuracy and transparency.

We also continued efforts to support our fourth strategic goal to maximize our value by enabling quality, timely service to the Congress and being a leading practices federal agency. We made progress addressing our three internal management challenges: managing a quality workforce; improving the efficiency of our engagements; and ensuring the confidentiality, integrity, and availability of GAO's information technology

services. With this budget request, we are planning to achieve and maintain 3,400 FTE in FY 2022.

In FY 2021 GAO completed deployment of our platform to edit, fact check and distribute our reports (New Blue). New Blue will streamline the publishing processes to enable efficient and scalable publication of products in a responsive web-based format to accommodate demand for content that is accessible on mobile devices. As such, Congressional staff and users on the go can quickly and easily navigate through our reports. GAO leveraged this platform for all our CARES Act bimonthly reports and will utilize it to republish previously issued products—thus making our key reports more accessible.

GAO's Information Technology Resources

GAO has made great strides in our IT modernization efforts. In fact, the work completed in FY 2019 and FY 2020 positioned the agency well for an immediate and smooth transition to maximum telework during the COVID-19 pandemic. Valuable operations to support auditing, evaluation, and investigative services for the Congress have continued without interruption. However, IT requires continued investment and nurturing to stay current, and even more to stay ahead of the ever-changing and evolving world of technology. I am confident this budget request keeps GAO on the right path.

For FY 2022, GAO is requesting funds to continue implementing efforts identified in our IT modernization plan to increase GAO's flexibility to evolve IT services as GAO mission needs change, strengthen information security, increase IT agility, and maintain compliance. We will increase speed and scalability to deliver capabilities and services to the agency, create a more predictable and consistent ISTS budget, and adhere to the GAO-adopted government Cloud Smart policy in planning for its enterprise IT architecture.

Major FY 2022 planned efforts

- *Cloud Smart Migration Plan*. GAO's Cloud Smart Migration Plan will help reduce our reliance on a physical IT infrastructure; reduce capital investment spending spikes; and increase flexibility to support business requirements more responsively. GAO will begin execution of multi-phased GAO Cloud Smart migration plan. The implementation of the migration plan will enable GAO to progressively move data center capabilities to the cloud such as virtual desktop infrastructure, databases, storage, failover, development / test environments, and other required computing resources.

- *Enterprise Content Management (ECM) Solution*. GAO will acquire and implement a cloud-based modern Enterprise Content Management (ECM) solution that will enable retirement of GAO's legacy document and records management system. The ECM system will also provide support for additional content types (e.g., multimedia), data encryption, workflow automation, enhanced search capabilities, and enable better content reuse.
- *Modern Devices and Hardware*. GAO staff rely on a variety of computer devices (e.g., towers, laptops, zero clients, and associated peripherals) to conduct work whether in-office, remote, or mobile. The vast majority of GAO computers are now several years well beyond their supported normal life cycle which causes problems with system reliability and performance. The FY 2022 request will allow GAO to put new devices into the hands of GAO staff so they have modern, secure, and reliable equipment to conduct GAO business.
- *New Blue enhancements*. GAO's New Blue solution enables digital distribution of audit reports in a mobile friendly web-based format that can be read on-line by any computer or mobile device. Additional funding will allow GAO to enhance New Blue to enable additional GAO product types, support for multi-media, and provide improved capabilities to enforce business rules and quality controls to the content creation process.
- *Enterprise Project Management Tools*. GAO staff execute thousands of projects a year. Additional use of automated tools is needed to improve project management practices. The FY 2022 requested funding level will enable GAO to continue to implement and expand the use of Enterprise Project Management Tools to help GAO staff plan and manage work in a more standardized manner.
- *IT Portfolio Management Solution*. GAO's largest funding category outside of personnel costs are for information technology. The current methods to plan, project, and track IT operations and investment costs are reliant on manual processes and disparate data sources. Requested funding supports investments in an automated portfolio management solution which automates processes and data management associated with IT portfolio management across the IT investment lifecycle.
- *Cybersecurity*. GAO must protect data collected from other agencies. Security threats are dynamic in nature and change quickly. GAO will use funding to enhance security monitoring for both on premise and cloud based assets through implementation of new tools, services, and enhanced processes.

- *Government-wide Shared Solutions*. GAO seeks to continue to add improved automated solutions to support its financial management functions. With the requested funding, GAO will be able to adopt Government Invoicing and integrated Asset Management solutions. The Treasury Department provides software to allow federal agencies to improve the quality and efficiency of intragovernmental billing and collection transactions via its G-invoicing software. This software replaces the current Inter Governmental Billing and Collections (IPAC) process and will be mandated for agencies. In addition GAO seeks to modernize its legacy asset management system with a modern asset management system integrated with the Momentum financial management system.

With these planned improvements we will enhance GAO's work agency-wide. GAO will execute transformative plans to protect data and systems while maximizing the use of cloud computing and minimizing risks associated with customized software. We will continually assess our technical architecture and services to identify opportunities for automating manual processes and reducing duplicative and outdated solutions, as well as leveraging more standard and government-wide shared solutions.

GAO's Facilities, Building, and Security

GAO's building and security services program includes funds to support the management of GAO-owned and leased facilities as well as the safety and security of occupants and visitors.

Budget constraints in recent years have necessitated the deferral of reinvestment in certain elements of our building's infrastructure and have prevented us from maximizing efficiencies. The requested increase will allow GAO to move forward with critical headquarters building initiatives that have been deferred over several years.

In FYs 2021 and 2022, GAO plans to:

- Begin a multi-year project to replace air handlers installed in the 1950s with new units that include HEPA filtration to filter out bacteria and many viruses, and UV light to prevent dangerous mold growth on cooling coils and potentially kill additional viruses. As the headquarters building of two federal agencies (GAO and the Army Corps of Engineers), and as a backup site for Congressional operations if Capitol Hill Buildings are shut down, it is critically important for government continuity of operations that the GAO Building have modern, safe air handling equipment that will protect GAO staff its tenants.

- Begin making critical repairs and/or replacements to end-of-life building systems. As identified in its FY 2020 financial statements, GAO has a growing backlog of deferred, but necessary, maintenance at its headquarters building, which currently totals over $82 million. GAO has begun a multi-year effort to reduce the backlog of maintenance to ensure the reliability and safety of the headquarters building for staff and tenants. In addition to multiple heating and air-conditioning projects, other initiatives include: the fourth floor consolidation; the STAA Innovation Lab; the parking garage structural study and design; and the asset management plan update.
- Continue work to relocate the Chicago field office into a federally-owned space. Work is underway to relocate the Huntsville field office to a permanent location, and the Dallas field office renovation will resume once the site is reopened post-pandemic. We are also working on identifying and planning relocation field sites for Atlanta, Los Angeles, Norfolk, and Seattle.

During FY 2021, GAO will also continue to implement recommendations from the agency-wide security risk assessment that was completed in FY 2018, to include the completion of the electronic security system installations in Seattle, Chicago, and Huntsville as well as continue upgrading the system at the headquarters building. GAO also plans to replace its aging security radio system to better ensure effective operations and compatibility with other agencies.

GAO continues to receive an increasing number of statutory mandates and congressional requests that result in engagements that rely heavily on classified and sensitive information. To that end, in FY 2021 GAO will continue to evaluate and enhance the resources available to staff who are responsible for conducting these audits. GAO will begin the construction of several Secure Video Teleconference (S-VTC) rooms at strategically chosen GAO field offices. These S-VTCs will enhance the ability of field and HQ staff to collaborate securely across multiple GAO locations as well as with other federal agencies.

Legal Work Update

Our Office of the General Counsel (OGC) handled over 2,100 bid protests and issued more than 500 decisions on the merits. With respect to our appropriations law function, in testimony before the House Committee on the Budget, the General Counsel explained how our role in providing information and legal analysis on appropriations law matters ensures respect for the Congress's constitutional power of the purse, and discussed legislative proposals that would help us continue to advance and protect such power. Following this testimony, we continued to

demonstrate how we protect the Congress's constitutional prerogatives by notifying the Congress of four violations of the Anti-deficiency Act for which the agencies failed to make the legally required report. We also issued a number of decisions addressing significant, novel legal issues arising from federal agencies' use of appropriated funds during the partial government shutdown that occurred in FY 2019.

During FY 2019 and FY 2020, OGC increased the number of attorneys assigned to the appropriations law team as encouraged by Congress, and this effort is continuing in FY 2021. The additional funding requested for FY 2022 will allow GAO to further enhance the resources allocated to its important appropriations law functions.

Strategic Planning

As the nation confronts a series of both new and long-standing challenges, GAO's Strategic Plan for Serving the Congress and the Nation – FYs 2018 to 2023 describes our goals and strategies to support the Congress to identify cost savings and other financial opportunities; to make government more accountable, efficient and effective; and ultimately to improve the safety, security, and well-being of the American people. GAO's Strategic Plan provides a comprehensive roadmap for how the agency will support the most important priorities of Congress and the Nation.

This plan reflects the full scope of the federal government's operations, as well as emerging and future trends that may affect government and society. As part of our strategic planning process, we emphasize foresight, continuous environmental scanning, and trend analysis as essential to helping inform our decision-making and long-term planning.

The plan is comprised of three sections: strategic goals and objectives; key efforts; and trends that provide overall context supporting our long-range planning. There are eight trend areas in GAO's 2018 – 2023 plan including

1. Domestic and Global Security: Global conditions affecting U.S. and international security;
2. Fiscal Outlook and the Debt: The federal government's long-term unsustainable fiscal path;
3. Economics and Trade: Global response to challenges posed by divergent economic growth;

4. Jobs and Education: Technological advances and their impact on preparing the workforce of the future;
5. Demographics and Society: Demographic changes and their implications for U.S. society and economy;
6. Science and Technology: Five emerging technologies and scientific advances that could potentially transform society (Genome Editing; Artificial Intelligence and Automation; Quantum Information Science; Brain/Augmented Reality; and Cryptocurrencies and Blockchain);
7. Government and Governance: Increasingly complex governance relationships and practices; and
8. Environment and Sustainability: Balancing competing natural resource and sustainability needs.

The current strategic plan framework (Appendix III) summarizes these global trends affecting government and society, as well as the strategic goals and objectives that guide our work. We plan to issue an updated GAO strategic framework in FY 2022.

Center for Audit Excellence

The Consolidated and Further Continuing Appropriations Act, 2015, enacted in December 2014, authorized GAO to establish a Center for Audit Excellence (CAE) to build institutional auditing capacity and promote good governance by providing training and assistance to federal, state, local and other national audit offices around the world. The Center uses former senior-level GAO executives and auditors on an intermittent basis to provide a wide range of training and technical assistance services to audit organizations and is authorized to charge fees for its services which are used to offset Center operating costs.

In FY 2020, despite the impact of the global pandemic which curtailed travel and in-person training classes for the last half of the year, the Center collected more than $800 thousand in fees and provided technical assistance or training to 11 domestic accountability organizations and audit organizations in six countries. The Center has reached nearly every region of the world—providing custom training courses, mentorship and coaching, institutional capacity building, and needs assessments.

Moving forward the Center seeks to bolster its operations as demand for its services continues to expand, particularly with international organizations. Building the capacity of National Audit Organizations across the globe helps produce high-quality auditing functions which can improve oversight of U.S. foreign assistance and hold governments

accountable for using public funds efficiently and effectively and deterring and identifying corruption.

Following the onset of the pandemic, the Center began offering virtual training classes in lieu of in-person classes. In FY 2021 and FY 2022, the Center plans to significantly expand the number of virtual training classes. This initiative will enable the Center to offer domestic and international organizations a range of service delivery options during and beyond the pandemic.

Examples of Working with International Organizations

- Currently, with USAID support, the Center is helping to improve the capacity of national audit institutions in five countries including the Philippines, Dominican Republic, Ethiopia, Armenia and Georgia. For example, the Center is helping to enhance the Philippine national audit office's capacity to conduct performance audits via a multi-year $1.5 million agreement. The Center will also be providing training and technical assistance services to audit organizations in Ethiopia and Armenia under multi-year agreements valued at $1.3 million and $1 million, respectively.
- With World Bank support, the Center is helping to conduct a capacity building needs assessment of a national audit organization in Europe.

Examples of Working with Domestic Organizations

- The Center continues to provide high quality training to federal inspectors general as well as multiple state and local audit organizations.
- The Center recently acquired an online registration system and the capability to offer virtual classes for federal, state and local auditors using a software platform.

Concluding Remarks

We value the opportunity to provide Congress and the nation with timely, insightful analysis on the challenges facing the country. Our FY 2022 budget request provides a foundation to ensure that GAO is well-positioned and prepared to address both emerging and long-term priorities of the Congress.

Our request will allow us to continue building our staffing level for critical audit arenas and provide our people with the appropriate resources and support needed to serve the Congress effectively. This funding level will also allow us to continue efforts to promote operational efficiency and

address long-deferred investments and maintenance. Also of great importance, our proposed FY 2022 budget helps us ensure the health and safety of all GAO employees while they work on GAO premises.

As is our standard practice, we will continue to explore opportunities to generate revenue to help offset our costs.

I appreciate, as always, your careful consideration of our budget and your continued support. I look forward to discussing our FY 2022 budget request with you.

Appendix I: GAO's High Risk List as of April 2021

GAO's 2021 High-Risk List
Strengthening the Foundation for Efficiency and Effectiveness
• Strategic Human Capital Management
• Managing Federal Real Property
• Funding the Nation's Surface Transportation System[a]
• Modernizing the U.S. Financial Regulatory System[a]
• Resolving the Federal Role in Housing Finance[a]
• USPS Financial Viability[a]
• Management of Federal Oil and Gas Resources
• Limiting the Federal Government's Fiscal Exposure by Better Managing Climate Change Risks[a]
• Improving the Management of IT Acquisitions and Operations
• Improving Federal Management of Programs That Serve Tribes and Their Members
• Decennial Census
• U.S. Government's Environmental Liability[a]
• Emergency Loans for Small Businesses (***new***)
Transforming DOD Program Management
• DOD Weapon Systems Acquisition
• DOD Financial Management
• DOD Business Systems Modernization
• DOD Approach to Business Transformation
Ensuring Public Safety and Security
• Government-wide Personnel Security Clearance Process[a]
• Ensuring the Cybersecurity of the Nation[a]
• Strengthening Department of Homeland Security Management Functions
• Ensuring the Effective Protection of Technologies Critical to U.S. National Security Interests
• Improving Federal Oversight of Food Safety[a]
• Protecting Public Health through Enhanced Oversight of Medical Products
• Transforming EPA's Process for Assessing and Controlling Toxic Chemicals
• National Efforts to Prevent, Respond to, and Recover from Drug Misuse (***new***)
Managing Federal Contracting More Effectively
• VA Acquisition Management
• DOE's Contract and Project Management for the National Nuclear Security Administration and Office of Environmental Management
• NASA Acquisition Management
• DOD Contract Management
Assessing the Efficiency and Effectiveness of Tax Law Administration
• Enforcement of Tax Laws[a]

Appendix I: GAO's High Risk List as of April 2021

Modernizing and Safeguarding Insurance and Benefit Programs
• Medicare Program & Improper Payments
• Strengthening Medicaid Program Integrity[a]
• Improving and Modernizing Federal Disability Programs
• Pension Benefit Guaranty Corporation Insurance Programs[a]
• National Flood Insurance Program[a]
• Managing Risks and Improving VA Health Care[a]

Source: GAO 21 119SP. | GAO 21 510T

[a]Legislation is likely to be necessary in order to effectively address this area.

Appendix II: GAO's Science, Technology Assessment, and Analytics Team: Progress and Ability to Address Congress' Needs

The United States Government Accountability Office (GAO) established the Science, Technology Assessment, and Analytics (STAA) team in January 2019, as encouraged by Congress.[1] The joint explanatory statement accompanying the Consolidated Appropriations Act, 2021, acknowledged the progress GAO has made since establishing the team and submitting a plan to Congress for expanding the team over time.[2] This report provides an update on GAO's progress in implementing that plan in support of Congress. It also responds to the provision in that statement that GAO provide an analysis of GAO's protocols used by STAA and our abilities to address technology assessment requests from Congress.

Rapid developments in science and technology (S&T) are transforming virtually every sector of society, including medicine, transportation, communication, defense, commerce, and culture. Like all technological change, each of these developments brings opportunities—for economic growth and improved quality of life, for example—and the potential for unintended consequences. The ability of Congress to understand and prepare for such changes will be critical for the United States to remain safe, secure, innovative, and globally competitive. Congress has continued to invest in STAA because of a bipartisan recognition that science, technology, and innovation challenges require increased focus.

GAO provides Members of Congress and their staffs with an array of professional services in the domains of foresight, insight, and oversight to help them carry out their constitutional responsibilities as they relate to the nation's S&T enterprise. Our expertise, research, and analyses help address a number of specific congressional needs, including:

- in-depth evaluation and oversight of federal S&T programs;
- foresight on new and emerging technologies;
- evaluation of the effects and policy implications of science, technology, and innovation on society;
- innovation to support evidence-based policymaking through data analytics;
- exploration of emerging technologies and support for congressional modernization efforts;

[1]H.R. Rep. No. 115-929, at 213 (2018) (Conf. Rep.) (encouraging GAO to reorganize its technology and science function by creating a new, more prominent office within GAO).

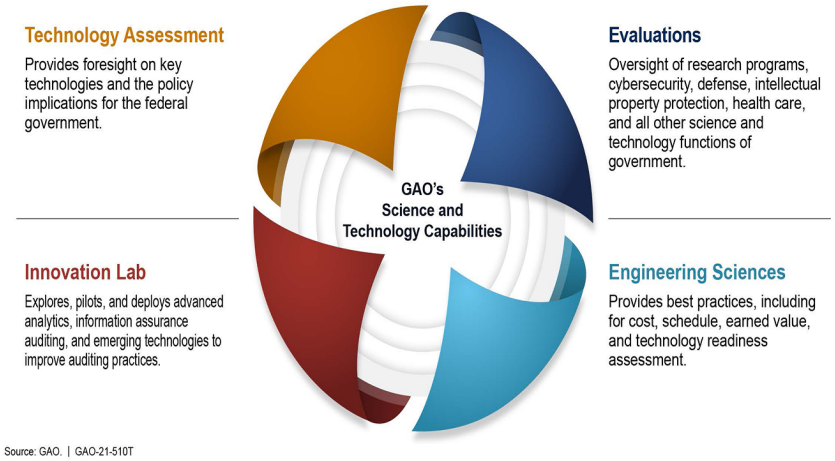
[2]166 Cong. Rec. 8720 (Dec. 21, 2020) (joint explanatory statement).

- development of policy options that may help policymakers enhance the benefits and mitigate the challenges of technologies; and
- proactive and on-demand technical assistance on science, technology, and innovation issues.

GAO continues to successfully conduct S&T-related work, providing Members of Congress and their staffs with a variety of products and services. This includes issuing specialized reports known as technology assessments. By continuing to build our expertise and focus on S&T, we will be even better positioned to help Congress navigate the increasingly complex technologies it must oversee, including rapid vaccine development, artificial intelligence (AI), and quantum computing.

Since the launch of STAA in January 2019, GAO has significantly increased its resources—including staff—to produce a growing volume of accessible, timely, and relevant S&T information, across a broader range of topics. We have organized our S&T activities into four groups, as is shown in figure 1.

Figure 1: Science, Technology Assessment, and Analytics Key Science and Technology Activities



Source: GAO. | GAO-21-510T

Further expanding STAA's capabilities and resources would provide extensive S&T foresight, insight, and oversight to an increasing array of committees and Members at an unprecedented time in our nation's history, as our nation faces both significant challenges and opportunities. Since we issued our plan, the National Academy of Public Administration (NAPA) also issued a report to Congress that recommended that an enhanced STAA become the locus for studies and analyses that are critical for congressional committees to conduct business, including technology assessments and short-to-medium term studies. It included several recommendations regarding GAO's support for Congress. We also provide information on GAO's actions related to those recommendations below.

Variety of Means to Address Congressional Needs

We employ a variety of approaches that can be tailored to meet congressional needs. Examples include technology assessments, Science & Tech Spotlights, technical assistance, performance audits, and outreach. As such, we have been and will continue to be innovative in addressing congressional needs.

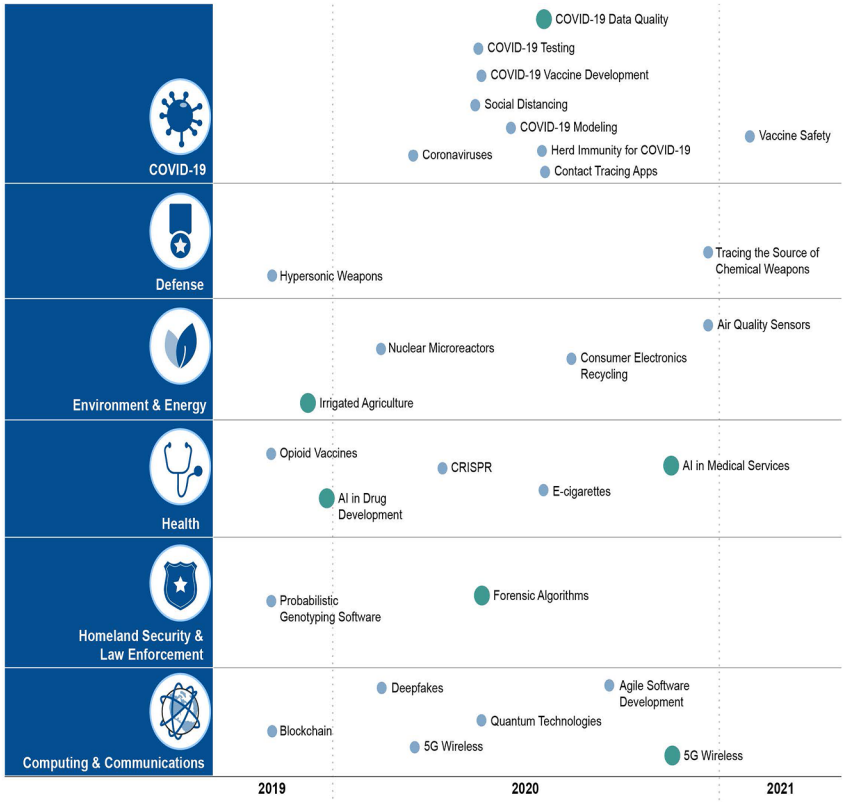
Technology assessments. GAO technology assessments analyze the latest developments in science and technology, draw attention to the implications of technological change, and provide options policymakers could consider to help enhance or mitigate the challenges of a technology. They may highlight potential short-, medium-, and long-term impacts of scientific advancement and/or technological development; elaborate on and communicate the risks and benefits associated with a technology, including early insights into the potential impacts of technology; or highlight the status, viability, and relative maturity of a given technology—especially in the context of a complex acquisition program. Technology assessment timeframes depend on their scope, but some can be completed in several months.

Science & Tech Spotlights. We also provide Congress with information about emerging topics through our Science & Tech Spotlights. Spotlights are two-page overviews or explainers of scientific or technological topics for policymakers and the public. We launched Spotlights in 2019 in direct response to conversations with Members of Congress who expressed interest in short, quick turnaround information on emerging issues. Each Spotlight describes an emerging S&T development, the opportunities and challenges it brings, and the relevant policy context. Spotlights inform Congress of key developments in a timely and efficient manner, generally

before congressional requests for deeper inquiries. It takes about one month to issue a Spotlight.

We have issued technology assessments and Science & Tech Spotlights on a wide variety of topics since we were established in 2019, as is shown in figure 2. (A complete list of our Spotlights is included at the end of this appendix.)

Figure 2: GAO's Issued Technology Assessments and Science & Tech Spotlights Since Establishment of the Science, Technology Assessment, and Analytics Team



Source: GAO. | GAO-21-510T

Technical assistance. We frequently provide technical assistance to individual Members to meet quick-turnaround needs. Technical assistance is a service that GAO provides to any committee or individual

Member of Congress. For example, we provide briefings on our prior work; short-term analyses; technology primers; and support for hearings, including background information and potential questions. We quickly answer many highly technical questions from an array of committees and Members, thanks to our broad mix of expertise. We provided technical assistance to Congress related to COVID-19 on at least 20 occasions from March to December 2020. For example, to answer a question about how textiles perform in face masks, we assembled a team of GAO staff including an experienced clinician, a microbiologist, a biomedical engineer, and a geneticist. Their combined knowledge allowed them to quickly comb the existing scientific literature, evaluate studies, and draw conclusions.

In addition to pandemic-related assistance, we provided technical assistance on several other topics. For example, we provided a detailed analysis of selected technical approaches to how the House of Representatives could carry out its business during the COVID-19 pandemic.

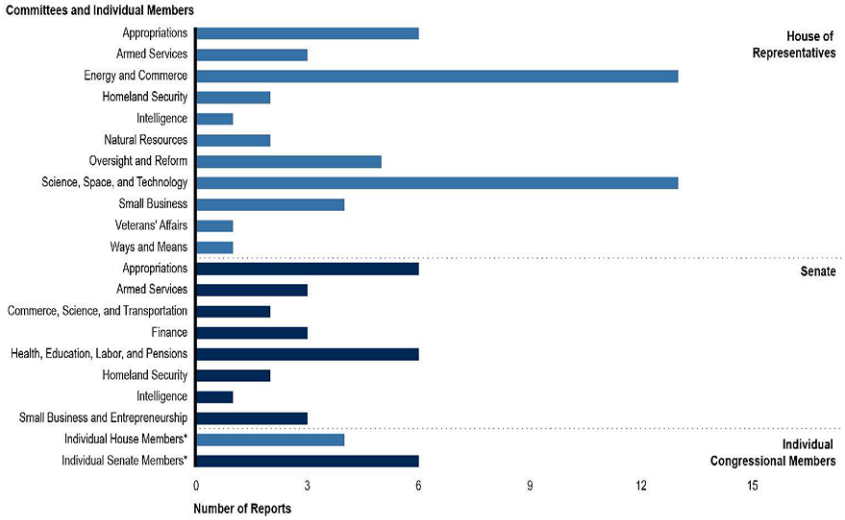
Performance audits. When Congress needs to better understand the operations of S&T focused agencies, programs, or projects, we meet their needs through performance audits. These evaluations can include reviews that assess efforts across numerous agencies or may address just one project at a given agency. Depending on the topic and scope, timeframes can range from six months to over a year.

Outreach. The Comptroller General regularly meets with committee leaders and discusses their interest in GAO's work, including STAA's work. STAA's executives also regularly engage with key committees to understand their oversight and legislative agendas and how GAO can help.

For example, in October 2020, at the request of the House Committee on Administration, we hosted an S&T policy symposium for the House of Representatives to provide information to Members and staff on a range of topics, such as COVID-19, 5G wireless technology, congressional modernization, and the innovation economy. The committee included the symposium in the New Member Orientation Training that was provided to all incoming Representatives of the 117th Congress. We plan to expand such outreach in the future.

We are committed to continuing our support for a wide range of committees and individual members and to expanding how we do so. Figure 3 shows our 2020 client base for reports.

Figure 3: Since Establishment in 2019, GAO's Science, Technology Assessment, and Analytics Team Has Conducted Work for Many Committees and Members of Congress



*Our protocols allow individual members to initiate congressional requests

Source: GAO. | GAO-21-510T

STAA Accomplishments

Since establishing STAA in 2019, we have completed extensive work on a wide range of topics of interest to Congress. We have issued 55 reports on a range of important S&T topics, and we have more than 20 additional studies underway. We also recently issued a Technology Assessment Design Handbook (GAO-21-347G), which offers tools for designing assessments of a technology's effects that make complex issues understandable and useful to policymakers. To develop the handbook, we reviewed numerous GAO technology assessments, Office of Technology Assessment reports, Congressional Research Service reports, and literature regarding technology assessments and analysis of policy options. We held an expert meeting to gather input regarding technology assessment design, solicited comments from external experts, issued an exposure draft to the public for comment, and incorporated comments from those sources as appropriate.

Furthermore, we have expanded STAA's capacity in conducting evidence-based analytics, making recommendations, and delivering on-demand, quick-turnaround reporting. Our expanded issuance of Spotlights, development of some shorter turnaround technology assessments, inclusion of policy options in technology assessments where appropriate, establishment of a working group to develop new types of products, and increased networking to enhance networks with the S&T community all help address NAPA recommendations. We describe our accomplishments below.

COVID-19 Work

The COVID-19 pandemic illustrates the central role of S&T and the benefits of a greater focus on the subject. Even before the full scope of the pandemic emerged, we began to shift some of our resources to address it. For example, we issued a Science & Tech Spotlight on coronaviruses in early March 2020, providing a high-level overview of what they are and how they are transmitted. We followed this with six additional Spotlights on COVID-19 topics, including social distancing, testing, contact tracing apps, and herd immunity. STAA staff also contributed significant S&T expertise to the five CARES Act reports GAO issued between June 2020 and January 2021. These reports focus on efforts across the government to address the pandemic.[3]

STAA has played an important role in GAO's oversight of the federal response to the COVID-19 pandemic. Throughout the pandemic, STAA has provided congressional committees and individual Members with technical assistance—support provided directly to the congressional requester that does not result in a public product—on COVID-19 on numerous occasions. This included topics such as: how well face mask materials filter droplets and aerosols, differences among three prominent COVID-19 models, and the effectiveness of certain filtration systems in reducing respiratory disease transmission on airplanes.

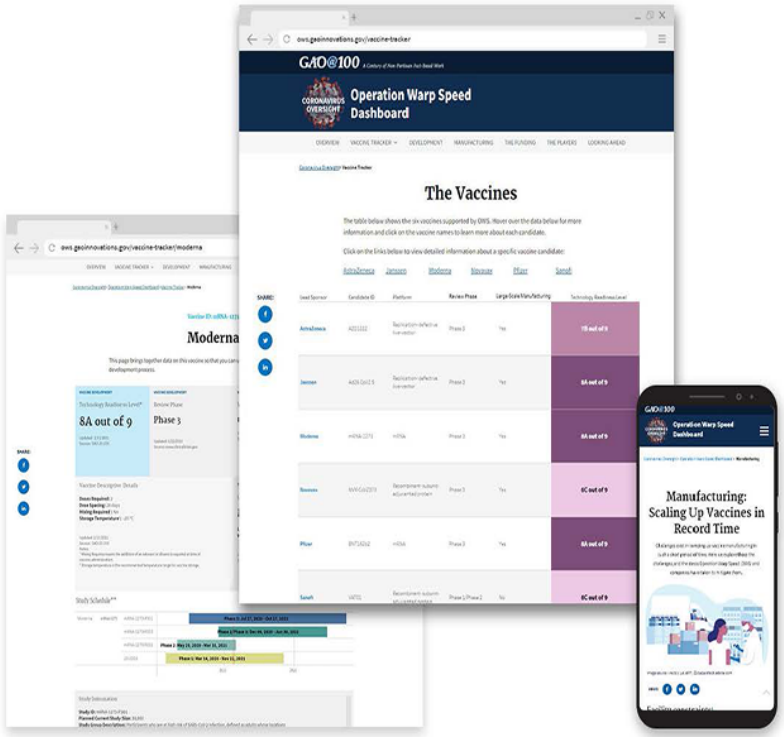
STAA analyzed four COVID-19 vaccine developers' clinical trial protocols and reported in November on information the trials will provide and their limitations. In February, we issued a Spotlight on vaccine safety and released GAO's first-of-its-kind interactive and updated in real-time digital dashboard with a companion full report on Operation Warp Speed (OWS)

[3]As of January 31, 2021, in response to the COVID-19 pandemic, Congress appropriated about $3.1 trillion in emergency assistance for people, businesses, the health care system, and state and local governments. GAO is examining many aspects of the federal response. The CARES Act requires GAO to issue bi-monthly reports on the impact of COVID-19.

vaccine development and manufacturing (see fig. 4).[4] We also briefed Members of the House Select Subcommittee on the Coronavirus Crisis on the oversight dashboard. This included highlighting key interactive features, such as the ability to easily view complex and dynamic information, including the current maturity of the vaccine candidates, the latest clinical trials information for each vaccine, a listing of key OWS leadership, a snapshot of OWS funding obligations, key issues in vaccine manufacturing, and lessons learned from the 2009 pandemic that are relevant to our current situation. These Members indicated their intent to refer back to this dashboard to support real-time oversight of OWS.

[4]See https://ows.gaoinnovations.gov for GAO's dashboard providing key information on Operation Warp Speed COVID-19 vaccine development and manufacturing.

Figure 4: Science, Technology Assessment, and Analytics Dashboard Provides Key Information on Operation Warp Speed Supported COVID-19 Vaccines



Source: GAO. | GAO-21-510T

Our ongoing work includes continued review of vaccine manufacturing and a technology assessment on contact tracing. Table 1 highlights some of our recent COVID-19-related work.

Table 1: Science, Technology Assessment, and Analytics COVID-19-Related Reports

Operation Warp Speed: Accelerated COVID-19 Vaccine Development Status and Efforts to Address Manufacturing Challenges (GAO-21-319)	This technical audit found that Operation Warp Speed (OWS) vaccine developers generally followed traditional vaccine development processes, with some adaptations to meet urgent needs of the pandemic. It also found that agencies have taken steps to mitigate vaccine manufacturing challenges, such as requiring contractors to prioritize supplies for vaccine manufacturing.
COVID-19: Federal Efforts Accelerate Vaccine and Therapeutic Development, but More Transparency Needed on Emergency Use Authorizations (GAO-21-207)	This performance audit examined OWS's efforts to accelerate the development of vaccines and therapeutics for COVID-19. It provided an overview of the six vaccine candidates supported by OWS, including information about the biological mechanisms of the vaccine platforms. We assessed the clinical trial protocols that four OWS vaccine developers released, including details about how they compared with typical clinical trials for vaccines.
Covid-19: Data Quality and Considerations for Modeling and Analysis (GAO-20-635SP)	This technology assessment found that forecasting models can help predict disease trends, such as infection or mortality rates for COVID-19, but that they rely on data collected by different jurisdictions and reported under different standards. This reliance makes it harder to compare data across places and over time. This TA aimed to help decision-makers understand the appropriate uses and limitations of modeling.
Infectious Disease Modeling: Opportunities to Improve Coordination and Ensure Reproducibility (GAO-20-372)	This technical audit reviews federal modeling for selected infectious diseases. Outbreaks of infectious diseases have raised concerns about how federal agencies use modeling to predict a disease's course. Models can help decision makers set disease control policies. If models are unsound, they may not produce the reliable predictions needed to make good decisions. GAO made two recommendations to Health and Human Services (HHS), including developing a way to routinely monitor modeling coordination efforts across multiple agencies. HHS agreed with GAO's recommendations.
Contact Tracing Applications (ongoing)	This technology assessment will describe existing exposure notification application technologies and the extent of deployment of these apps in the United States. It will assess challenges associated with developing, deploying, and using exposure notification apps. In addition, it will also identify policy options that could address the challenges to the development, deployment, and use of exposure notification application technologies.
Vaccine Safety (GAO-21-342SP)	This Spotlight describes the circumstances under which a vaccine is generally considered safe and explains that common side effects that stem from the body's immune reaction, such as swelling at the injection site, fever, and aches, are to be expected. Among other things, it describes the safety evaluation process for vaccines.
Contact Tracing Apps (GAO-20-666SP)	This Spotlight explains what contact tracing is, how the process works, and how applications facilitate it. It includes information about the organizations and technologies involved with contact tracing. It describes opportunities to reach more people through these applications as well as challenges related to areas such as interoperability and adoption.
Herd Immunity for COVID-19 (GAO-20-646SP)	This Spotlight explains that herd immunity is when a large enough portion of a population—typically 70 to 90 percent—develops immunity to a disease. It includes information about how herd immunity develops—through either infection or vaccination. It lays out some of the challenges related to understanding herd immunity for COVID-19, such as limited data on immunity.
COVID-19 Modeling (GAO-20-582SP)	This Spotlight explains the uses and limitations of infectious disease modeling. It discusses different types of models, including mechanistic, susceptible-exposed-infectious-recovered, statistical, and combined models. It points out that each model has a distinct purpose that must be considered when interpreting its results.

COVID-19 Vaccine Development (GAO-20-583SP)	This Spotlight describes the vaccine development process and what the federal government's plans were to develop COVID-19 vaccines. It walks through clinical trials processes. It explains the biological mechanisms of the three vaccine platforms supported by OWS.
COVID-19 Testing (GAO-20-584SP)	This Spotlight explains the different types of tests that were available for COVID-19 testing: molecular, antigen, and serology. It describes how the tests are administered, the technologies involved, and the maturity of the tests. It lays out the benefits and limitations of COVID-19 testing.
Social Distancing During Pandemics (GAO-20-545SP)	This Spotlight explains the science behind social distancing and that it can be used as a tool to reduce disease transmission as vaccines and treatments are developed. It raises policy questions, such as what research is needed to better establish the scientific basis of disease transmission so that effective methods for social distancing can be devised and promulgated.
Coronaviruses (GAO-20-472SP)	Issued on March 3, 2020, this Spotlight provided early information on what coronaviruses are, how they are transmitted, and how they work biologically.

Source: GAO. | GAO 21 510T

Advanced Technologies

We expanded our work on advanced technologies to help Congress navigate the rapid technological changes we are experiencing today. Some of this work reflects the ongoing evolution of our technology assessments to better meet congressional needs. For example:

- We now include policy options in our technology assessments, as appropriate. The policy options are designed to inform decision makers on potential courses of action to help enhance benefits and mitigate challenges associated with advanced technologies.
- **Use of AI in Medicine**. We have been partnering with the National Academy of Medicine (NAM) on a series of joint technology assessments on the use of AI in health care, including reports on AI in drug development, in health care services, and in diagnostics (ongoing). Each report in this three-part series includes a full GAO technology assessment plus a section from NAM. The collaboration also features joint webinars to discuss the results of each report; to date, these webinars have drawn over 600 attendees each.
- **Forensic Algorithms**. To address congressional interest in both quick-turnaround and in-depth work on forensic algorithms, we split planned work into two reports. The first was a quick-turnaround technology assessment that provided an overview of the algorithms in use by federal law enforcement. The second includes a more in-depth analysis of the performance of such algorithms, and is scheduled to issue this spring.

We include examples of recent work on advanced technologies in table 2.

Table 2: Selected Science, Technology Assessment, and Analytics Reports on Advanced Technologies

5G Wireless: Capabilities and Challenges for an Evolving Network (GAO-21-26SP)	This technology assessment reported on fifth-generation (5G) wireless's promise to increase speeds and new applications, like automated cars and smart factories. We found that new technologies will be needed to reach the full potential of 5G and noted several challenges, including that spectrum demand will likely continue to exceed supply and that 5G will exacerbate existing privacy concerns and may introduce new cybersecurity risks. We developed six policy options related to areas such as spectrum-sharing technologies, cybersecurity requirements, and high-band research.
Artificial Intelligence in Health Care: Benefits and Challenges of Technologies to Augment Patient Care (GAO-21-7SP)	This is second technology assessment of the Artificial Intelligence (AI) in Health Care series, which was developed in partnership with the National Academy of Medicine. It assessed clinical and administrative AI tools. We found that the tools show promise for improving health outcomes, reducing provider burden, and using health resources more efficiently. Challenges include obtaining sufficient high-quality data, difficulties scaling up and integrating these tools across different health care settings, and uncertainty over liability in the event of inaccurate results. We developed six policy options related to areas such as collaboration, best practices, and oversight clarity.
Quantum Technologies (GAO-20-527SP)	This Spotlight explains what quantum technologies are, how they work, potential applications, and more. These technologies could revolutionize sensors, computation, and communication. They build on the study of the smallest particles of energy and matter to collect, generate, and process information in ways existing technologies cannot. The Spotlight also poses questions about topics such as workforce needs and national security concerns.
Forensic Technology: Algorithms Used in Federal Law Enforcement (GAO-20-479SP)	This technology assessment examined forensic algorithms, which help forensic experts partially automate the process of assessing whether or not evidence collected in an investigation may have originated from an individual, potentially increasing the speed of investigations and reducing human bias and error. We reviewed three main types of algorithms federal agencies use: face recognition, probabilistic genotyping, and latent print analysis.
Artificial Intelligence in Health Care: Benefits and Challenges of Machine Learning in Drug Development (GAO-20-215SP)	This is the first technology assessment in the AI in Health Care series. We found that machine learning is used throughout the drug development process and could increase its efficiency and effectiveness, decreasing the time and cost required to bring new drugs to market. We identified several challenges that hinder the adoption and impact of machine learning in drug development and developed six policy options to help address them, related to topics such as research, data access, and regulatory certainty.
Irrigated Agriculture: Technologies, Practices, and Implications for Water Scarcity (GAO-20-128SP)	This technology assessment provides an overview of irrigation technologies and on-farm water conservation practices that farmers can use to increase efficient use of water. For example, precision agriculture technologies, such as smartphone decision-support tools and remote control of irrigation equipment can help optimize irrigation scheduling. We also examined factors influencing the adoption of these technologies and implications of their use. We identified policy options related to promotion of more efficient irrigation and use of precision agriculture technologies.
Alternative Positioning, Navigation, and Timing (ongoing)	This technology assessment looks at the Department of Defense's development of alternative navigation technologies that could support DOD missions if GPS is unavailable or unreliable. While GPS will remain a key part of DOD's navigation solution, we describe several alternative technologies that can complement GPS when needed, along with some challenges DOD faces in developing and integrating alternative navigation technologies and six policy options that could address those challenges.

Forensic Algorithms II (ongoing)	This is the second part of the Forensic Algorithms technology assessment series. We are focusing on the algorithms identified in part 1 (above), for their use in criminal investigations. This work examines the metrics used to assess the performance of three key algorithms identified in part 1 (above), the strengths and challenges of these algorithms, and policy options to address such challenges.
Artificial Intelligence in Diagnostics (ongoing)	This is the third in the Artificial Intelligence (AI) in Health Care series of technology assessments. This part, also developed in partnership with the National Academy of Medicine, is examining the use of AI in medical diagnostics. Specifically, we are examining the use and potential of such technologies for diagnosing diseases such as cancer, Alzheimer's, and heart disease. We are also identifying challenges to development and adoption of such technologies, and policy options that could address such challenges
Quantum Information Technologies (ongoing)	This technology assessment is reviewing: potential applications of quantum computing and communications technologies; their maturity; potential benefits and drawbacks from their development and use; and factors that could affect their development and use. We will also develop policy options to address those factors, enhance benefits, and mitigate drawbacks.
Blockchain and Other Digital Ledger Technologies (ongoing)	This technology assessment examines blockchain technology, which can be used to record and track data over distributed synchronous ledgers. Specifically, we are examining the use and potential benefits of such technologies for financial applications such as stablecoins and Decentralized Finance, and in other areas such as supply chain management. We are also identifying challenges to development and adoption of such technologies, and policy options that could mitigate such challenges or enhance the technology's benefits.

Source: GAO. | GAO-21-510T

We also plan to further expand the variety of topics we address. For example, we plan to conduct technology assessments on the following topics to meet congressional demand: decarbonization technologies, forensic attribution of chemical weapons, regenerative medicine/3D bioprinting, AI in environmental modeling, hypersonic weapons, per- and polyfluoroalkyl substances (PFAS), and the environmental and other effects of satellite constellations. We also anticipate developing Spotlights on urban air mobility, gene editing and engineering, DNA and glass for data storage, utility-scale energy storage, innovations in plastics recycling, and the blue economy.

Improving Management of Federal S&T Programs

We continue to issue reports and guidance to federal managers and employees to help S&T-intensive programs operate at their best. One way we do this is through crosscutting work that evaluates the management and coordination of research and development across the federal government. This work addresses issues related to topics such as basic science, innovation, manufacturing, and S&T's role in economic competitiveness. In fiscal year 2020 alone, we made 73 recommendations to federal agencies through this body of work. They aimed to, among other things, improve public access to federally funded research results, address sexual harassment in STEM research, and

improve assistance to small businesses and inventors regarding intellectual property. We include additional examples in table 3 below.

Table 3: Science, Technology Assessment, and Analytics Reports on Science and Technology in the Federal Government

Federal Research Grants: OMB Should Take Steps to Establish the Research Policy Board (GAO-21-232R)	Federal research funding is key for advancing science and innovation. But federal funding comes with administrative requirements—e.g., documentation and reporting—that allow for oversight. Are those requirements getting in the way of research? The Office of Management and Budget could find out. However, it has not done so and authority for the board ends on Sept. 30, 2021. We recommended the Director of OMB establish the Research Policy Board.
Department of Energy: Improved Performance Planning Could Strengthen Technology Transfer (GAO-21-202)	A Department of Energy national laboratory developed a battery that now powers some hybrid and electric cars. But how do new energy technologies get from the lab to the market? Transferring technologies from the DOE to private companies isn't always easy. GAO recommended that DOE assess researchers' needs for commercialization training and develop performance goals. DOE concurred with the recommendations.
Small Business Innovation Research: Three Agencies Made Awards to Businesses Majority-Owned by Investment Companies and Funds (GAO-21-223R)	The Small Business Innovation Research Program seeks to stimulate technological breakthroughs by channeling federal research and development funds to small businesses. Since 2013, small businesses owned by venture capital companies, hedge funds, or private equity firms may participate in some cases. The reasons agencies cited for making the awards included a belief that they would prompt research in areas that have not drawn private investment.
Federal Research: Agencies Need to Enhance Policies to Address Foreign Influence (GAO-21-130)	This review examined federal agencies' conflict of interest policies and disclosure of foreign interest requirements, which aim to protect U.S. investments in scientific research from undue foreign influence. Two of the 5 agencies we reviewed did not have agency-wide financial conflict of interest policies. GAO made nine recommendations to six agencies, including developing written procedures for addressing cases of failure to disclose required information.
Biomedical Research: NIH Should Publicly Report More Information about the Licensing of Its Intellectual Property (GAO-21-52)	Federal research and inventions can contribute to the development of life-saving drugs, vaccines, and medical devices. One way this happens is that the National Institutes of Health licenses its intellectual property to private companies that have the resources to bring products to market. GAO made two recommendations, including that NIH provide more information to the public about the licensing of its intellectual property. HHS concurred with GAO's recommendations.
Small Business Research Programs: Many Agencies' Award Issuances Are Not Timely; Some Practices May Improve Timeliness (GAO-20-693)	Federal agencies awarded almost $3 billion in FY 2019 to small businesses through two programs designed to develop and commercialize technologies—the Small Business Innovation Research and Small Business Technology Transfer programs. In most cases, agencies are to notify applicants within 90 days and issue awards within 180 days. Of the 29 agencies reviewed, half notified most applicants late.
Intellectual Property: Additional Agency Actions Can Improve Assistance to Small Businesses and Inventors (GAO-20-556)	With small businesses creating about two-thirds of U.S. jobs, they need help protecting their intellectual property. The U.S. Patent and Trademark Office and Small Business Administration offer help. However, the Patent Office doesn't evaluate whether its small business programs work as intended. GAO made four recommendations to two agencies, including that USPTO develop an agency-wide approach to evaluate the effectiveness of its efforts to help small businesses and inventors. Both agencies agreed with GAO's recommendations.

Sexual Harassment Policies: Smithsonian Has Procedures for Prevention, but Could Improve Guidance and Monitoring (GAO-20-414R)	The Smithsonian Institution has thousands of employees and supports or funds thousands of academic appointees. We looked at Smithsonian's process for responding to sexual harassment complaints and found, among other things that supervisors lack written guidance on addressing complaints. We made three recommendations, including that the Smithsonian include all of its workforce in organizational climate assessments; they agreed with all of our recommendations.
National Science Foundation: Cost and Schedule Performance of Major Facilities Construction Projects and Progress on Prior GAO Recommendations (GAO-20-268)	The National Science Foundation funds construction of large science and engineering infrastructure projects, like telescopes, that can take years to build and cost hundreds of millions of dollars. Since our March 2019 report, four major NSF construction projects had no increases in their authorized costs or schedules. For example, the Daniel K. Inouye Solar Telescope is on track to be completed within its $344.1 million budget by June 2020.
Antibiotic Resistance: Additional Federal Actions Needed to Better Determine Magnitude and Reduce Impact (GAO-20-341)	Antibiotic-resistant infections can be difficult or impossible to treat. We examined federal challenges to addressing antibiotic resistance: surveillance, diagnostics, new treatments, and antibiotic use. GAO made eight recommendations to strengthen the federal response to combating antibiotic resistance. HHS concurred with seven recommendations.
Sexual Harassment in STEM Research: Agencies Have Taken Actions, but Need Complaint Procedures, Overall Plans, and Better Collaboration (GAO-20-187)	This performance audit evaluated enforcement of Title IX—which prohibits sex discrimination, including sexual harassment—at universities receiving federal financial assistance. GAO made 17 recommendations to the five agencies funding STEM research and DOJ. The agencies agreed with GAO's recommendations and identified actions they plan to take to address them.
Innovative Technologies in Manufacturing: Commerce Has Stopped Efforts to Implement Loan Guarantee Program (GAO-20-326R)	Innovation in products, manufacturing processes, and business models often come from the efforts of small and medium-sized manufacturers. To help them get capital, a federal loan guarantee program was authorized in 2010 and the Department of Commerce was responsible for implementing it through its Economic Development Administration (EDA). However, Congress rescinded funds from EDA in 2017, 2018, and 2019, and EDA applied this to a portion of the loan guarantee program's funds, stopping its implementation.
Federal Research: Additional Actions Needed to Improve Public Access to Research Results (GAO 20-81)	Public access to the results of federally funded research can accelerate scientific breakthroughs. In 2013, certain federal agencies were directed to create plans for increasing access to publications and data they funded—some agencies have not fully implemented their plans. GAO made 37 recommendations to 16 agencies to promote full and effective implementation of agency public access plans. Of the 16 agencies, 15 agreed with GAO's recommendations.
Small Business Research Programs: Many Agencies Took Longer to Issue Small Business Awards than Recommended (GAO-19-620)	Since 1982, federal agencies have given $46 billion to small businesses to help them develop and market new technologies. Businesses apply for these awards, and agencies generally aim to make awards within 180 days after the application deadline. We reviewed 15,453 awards made over 3 years: 76% were made on time. However, the 28 agencies that made the awards varied widely on timeliness—some made 100% on time and some made 0%.
Advanced Manufacturing: Innovation Institutes Have Demonstrated Initial Accomplishments, but Challenges Remain in Measuring Performance and Ensuring Sustainability (GAO-19-409)	The Departments of Commerce, Defense, and Energy have together spent $1 billion to establish 14 institutes that develop advanced manufacturing capabilities. Most of the institutes are operating under an initial 5- to 7-year period of federal financial assistance. These institutes expect possible negative consequences once this initial assistance ends. GAO made five recommendations, including that Commerce work with DOD and DOE to develop performance goals with measurable targets and timeframes. The agencies generally agreed with the criteria development recommendations.

Source: GAO. | GAO-21-510T

We also have many ongoing reviews in these areas. Some of these examine multi- or single-agency programs. For example:

- the National Strategic Computing Initiative, which focuses on high-performance computer development across the federal government;
- the multi-agency Manufacturing USA program, which aims to help bridge the gap between applied research and domestic manufacturing; and
- BioDetection 21, the Department of Homeland Security's acquisition to replace the current biological attack early warning detection system.

We are also conducting work on broader topics, such as the reproducibility and reliability of federally funded scientific research.

In addition, we continued to expand and update our best practice guides, which are authoritative documents for managing and evaluating programs. Our best practices guides lay out proven and effective approaches and decision-making tools for federal managers. We present the best practices as high-level concepts rather than as prescriptive "how to" steps so that they can be used consistently across the entire federal government. To develop the guides, we identified commonly used practices from existing studies, literature, and leading practitioners and created a draft describing leading practices from these sources. Then, we convened a working group of specialists to discuss the practices on a regular basis. The meetings were open to all interested who also had appropriate technical expertise. We shared meeting details with about 1,000 professionals from government organizations, private companies, independent consultant groups, trade industry groups, and academia. We used the information from these discussions, and analyses of any additional literature provided, to inform and update the leading practice draft, resulting in a best practice guide.

Table 4 shows the guides that we have issued or updated since 2019, including cost, technology readiness, and Agile software development best practice guides. In addition, our 2015 Schedule Assessment Guide (GAO-16-89G) continues to be a go-to resource for evaluating schedules in the federal government and other sectors. We also plan to develop a cloud cybersecurity information technology best practices guide.

Table 4: Selected Science, Technology Assessment, and Analytics New and Updated Best Practices Guides

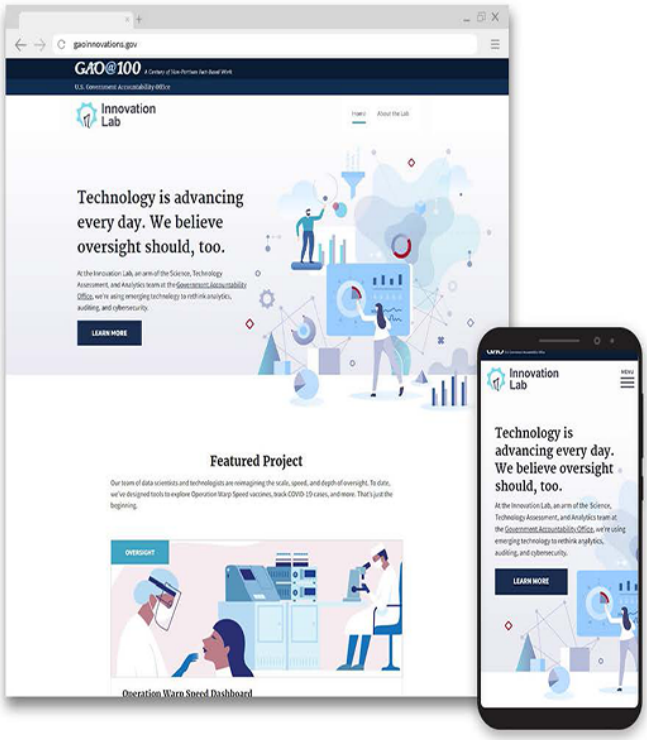
Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Program Costs (GAO-20-195G)	We issued an updated version of our best practices in cost assessment guide in 2020. The guide offers a 12-step process to develop high-quality, reliable program cost estimates applicable across government and industry.
Technology Readiness Assessment Guide: Best Practices for Evaluating the Readiness of Technology for Use in Acquisition Programs and Projects (GAO-20-48G)	We finalized this best practice guide in 2020. It offers a 5-step process to develop high-quality technology readiness assessments for evaluating technology maturity in federal programs. In addition, it provides a framework to better understand technology maturity and for developing plans for technology maturation efforts
Agile Assessment Guide: Best Practices for Agile Adoption and Implementation (GAO-20-590G)	This best practice guide on agile software development provides best practices related to areas such as adoption, requirements development, and metrics.

Source: GAO. | GAO-21-510T

Innovation Lab

The Innovation Lab was established to empower GAO with new capabilities and enhanced capacity to tackle evolving accountability challenges in the Fourth Industrial Revolution through data science and emerging technologies. Made up of data scientists and technologists, the Innovation Lab is working with GAO mission teams and the broader oversight community at the cutting edge of oversight, examining the latest technological advances, every day (see fig. 5).

Figure 5: The Innovation Lab's Website

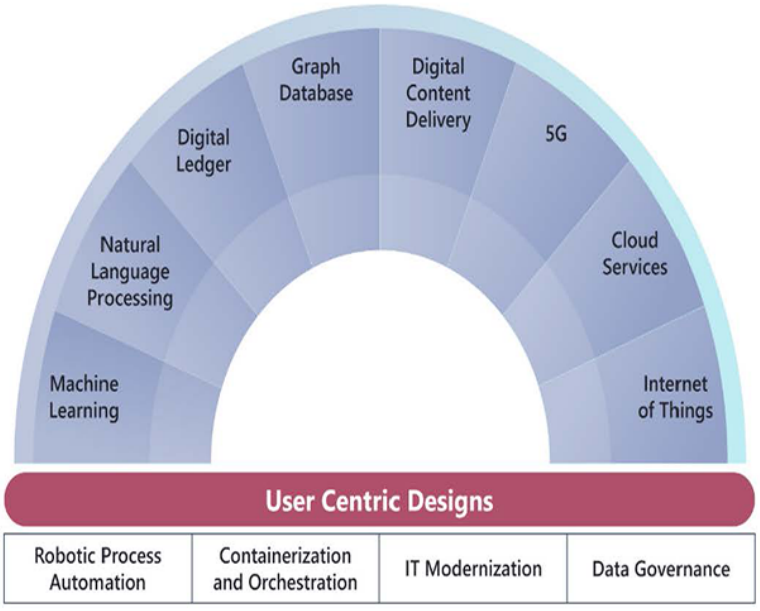


Source: GAO. | GAO-21-510T

In 2020, the Lab initiated a pilot project in collaboration with key financial agencies to use advanced analytics to enhance payment integrity and thus reduce improper payments. Federal agencies estimate that in fiscal year 2020, 98 programs from 21 agencies made approximately $206.4 billion in improper payments. Furthermore, improper payments have been estimated to total almost $1.7 trillion government-wide from fiscal years 2003 through 2019. The Lab also implemented GAO's first advanced cloud infrastructure to support leading-edge development of analytical

tools that GAO can employ to analyze especially large volumes of data to more effectively support evidence-based policymaking. We also plan continued technical experimentation on blockchain, graph databases, robotic process automation, Internet of Things, augmented reality, and complex natural language processing capabilities to enhance support a range of audit and oversight products (see figure 6).

Figure 6: The Innovation Lab's Technical Areas of Focus



Source: GAO. | GAO-21-510T

Building Networks of Experts

We further expanded our network of S&T experts to increase the depth, breadth, and diversity of knowledge we have access to in order to meet congressional needs. In October 2020, STAA hosted the inaugural meeting of the Polaris Council, a group of exceptional science, technology, and policy leaders and experts from many fields, established

to advise us on emerging S&T issues facing Congress. Membership includes top leaders in the S&T community—from nonprofits, academia, and current and former practitioners of legislative technology assessments (listed at the end of this appendix). The Council is now standing up working groups to explore: expanding our product line to meet congressional needs, new methods to conduct our work, and improving communication to help ensure that policymakers and the public are aware of us as a nonpartisan, fact-based, and trusted resource.

To further develop and strengthen our networks of experts, we also participated in 210 external speaking events in 2020. These included events with S&T organizations, such as NAM, universities, scientific societies, federally funded research and development centers, and others. We leverage these networks to inform many aspects of our work, including many of the studies mentioned in this report. For example, we often reach out directly to experts in our networks to interview them about topics we are addressing. In other cases, we draw expertise from scientists, engineers, and physicians through routine engagement with the National Academies of Sciences, Engineering, and Medicine. Since 2001, we have maintained a standing contract that allows National Academies personnel to help GAO identify experts and assist with convening expert meetings for GAO. Many of our products, including technology assessments, benefit from convening such expert meetings, including our recent work on AI in medical services, which is shown in figure 7 below. We also routinely interact with the National Academies' Government-University-Industry Research Roundtable, a convening series that defines and explores critical issues from cross-sectoral perspectives related to horizon scanning and insights into national and global science and technology trends.

Figure 7: Artificial Intelligence in Medical Services Expert Panel



Sources: GAO, Andrey Popov/stock.adobe.com. | GAO-21-510T

Update to STAA's 2019 Plan

Since establishing our team in January 2019 and developing our plan, we have substantially enhanced our ability to provide Congress with thorough and balanced analyses of technological and scientific developments that affect society, the economy, and the environment. We have built significant capacity to produce S&T products and services and more needs to be done. Our fiscal year 2022 budget request is focused in part on continuing to grow the team and implementing the plan we provided to Congress in 2019.

While we have continued to grow in accordance with the plan we provided in 2019, we continue to be committed to achieving the 140 full-time equivalent total staff that we anticipate we will need to meet growing congressional demand. At the beginning of fiscal year 2020, our team included about 70 members, and as of January 2021 we were up to 104 members. We now have staff with doctoral degrees in a wide variety of fields, such as microbiology, quantum mechanics, public health, nuclear physics, environmental chemistry, data analytics, and aerospace engineering, with additional staff holding STEM-related masters degrees. Our staff continue to benefit from collaboration with GAO's broader workforce of subject-area policy analysts, economists, social scientists, methodologists, and attorneys across our 14 other mission teams and staff offices. This access to a well-trained and diverse talent pool brings a powerful and sophisticated perspective to our work as we conduct technology assessments and analyze the policy implications of a range of S&T topics for Members and their staffs.

As we continue to assess anticipated future work and S&T issues that will be of interest to the Congress, we plan to continue hiring to add expertise in areas such as:

- Biological sciences for emerging infectious diseases, epidemiology, synthetic biology, biosafety, and biosecurity work
- Computer/systems/electrical engineering for digital and communications technologies (e.g., 5G wireless, blockchain, quantum cryptography, and artificial intelligence/machine learning systems)
- Applied math, engineering science, and computer science for advanced analytics, data science, and data engineering
- Environmental sciences, such as atmospheric chemistry and environmental engineering

We also have authority to bring in expertise in other ways. For example, through the Intergovernmental Personnel Act, we can bring in personnel such as experts from academia and from S&T organizations, such as National Laboratories or the National Academies, as well as personnel from state and local governments.[5] This authority may be useful in

[5]The Intergovernmental Personnel Act Mobility Program provides for the temporary assignment of personnel between the federal government and state and local governments, colleges and universities, Indian tribal governments, federally funded research and development centers, and other eligible organizations. Assignment agreements can be made for up to two years, and may be intermittent, part-time, or full-time.

meeting project-specific needs, particularly around the latest S&T advances.

We have already accomplished key goals from our 2019 plan, such as creating multiple new product types to better meet Congress's needs and developing additional methods and standards appropriate to technology assessments. Continued growth to the team's target size of 140 full-time employees will help us meet growing congressional demand by:

- Increasing the number of technology assessments we conduct each year
- Increasing the number of short-to-medium turnaround products
- Expanding technical assistance
- Improving access to and absorption of our work through the use of a variety of digital publishing tools, such as online "dashboards"
- Piloting and deploying multiple advanced data analytics prototypes to enhance congressional oversight and support

GAO's Congressional Protocols and STAA's Implementation

Our work directly supports congressional interests, and our congressional protocols are intentionally flexible to help ensure we can meet the needs of the Congress. We conduct all of our work either 1) in direct response to mandates or requests from committees or Members, or 2) under the Comptroller General's authority (CGA) in recognition of broad congressional interest in a topic. STAA has never turned down a request for assistance from the Congress, including from individual Members. We have found that our protocols have given us the flexibility to meet congressional needs in a variety of ways and do not warrant changes at this time. This is also consistent with NAPA's recommendation that we use the same system to prioritize our work as we use for prioritizing performance audits.

Congressional Protocols

We prioritize our work based on our congressional protocols, which GAO designed in consultation with Congress.[6] These protocols help ensure we work constructively with Congress and conduct our work in accordance with congressional priorities to meet the needs of both parties. They also ensure that we are consistent in dealing with all committees and individual members. The protocols provide a sequence of steps, which allows us to efficiently and effectively receive, prioritize, and respond to congressional requests.

[6]GAO, *GAO's Congressional Protocols*, GAO-17-767G (Washington, D.C.: Jul. 17, 2017).

To ensure adherence to GAO's core values, effective management practices, and efficient use of resources, our protocols specify that we will initiate work according to the following priorities:

1) congressional mandates, because they are the broadest expression of congressional interest;

2) senior congressional leader and committee leader requests (chairs and ranking members), both of whom receive the same priority; and

3) individual Member requests.

Although our protocols specify these priorities, to date we have never turned down a request for assistance from the Congress, where we have legal authority.[7] We employ a variety of approaches to ensure that we consistently meet congressional needs. These approaches relate to both how we initiate our work and what type of work we do.

We make appropriate use of CGA, which allows us to undertake work that is not directly tied to requests. CGA can be useful for topics that are of broad interest in Congress, such as longer-range, crosscutting, and transformational issues as well as current and emerging issues that may affect the nation's future. STAA has expanded use of CGA to initiate work to ensure our work is responsive and timely. We have used CGA to initiate a wide variety of work—including for individual Members—such as technology assessments, Science & Tech Spotlights, performance audits, and best practice guides.

[7]There are some situations in which GAO may not accept a request, such as if we do not have statutory authority to address the topic or if any related audit or investigation, including a criminal investigation, is ongoing or imminent by another governmental entity.

Enclosure(s)-2

GAO Science & Tech Spotlights

GAO. *Science & Tech Spotlight: Vaccine Safety*. GAO-21-342SP. Washington, D.C.: February 24, 2021.

GAO. *Science & Tech Spotlight: Tracing the Source of Chemical Weapons.* GAO-21-271SP. Washington, D.C.: December 21, 2020.

GAO. *Science & Tech Spotlight: Air Quality Sensors*. GAO-21-189SP. Washington, D.C.: December 07, 2020.

GAO. *Science & Tech Spotlight: Agile Software Development*. GAO-20-713SP. Washington, D.C.: September 29, 2020.

GAO. *Science & Tech Spotlight: Consumer Electronics Recycling*. GAO-20-712SP. Washington, D.C.: August 31, 2020.

GAO. *Science & Tech Spotlight: Contact Tracing Apps*. GAO-20-666SP. Washington, D.C.: July 28, 2020.

GAO. *Science & Tech Spotlight: Herd Immunity For COVID-19*. GAO-20-646SP. Washington, D.C.: July 7, 2020.

GAO. *Science & Tech Spotlight: E-cigarettes*. GAO-20-610SP. Washington, D.C.: June 30, 2020.

GAO. *Science & Tech Spotlight: COVID-19 Modeling*. GAO-20-582SP. Washington, D.C.: June 4, 2020.

GAO. *Science & Tech Spotlight: Quantum Technologies*. GAO-20-527SP. Washington, D.C.: May 28, 2020.

GAO. *Science & Tech Spotlight: COVID-19 Vaccine Development*. GAO-20-583SP. Washington, D.C.: May 26, 2020.

GAO. *Science & Tech Spotlight: COVID-19 Testing*. GAO-20-584SP. Washington, D.C.: May 20, 2020.

GAO. *Science & Tech Spotlight: Social Distancing During Pandemics*. GAO-20-545SP. Washington, D.C.: May 13, 2020.

GAO. *Science & Tech Spotlight: CRISPR Gene Editing*. GAO-20-478SP. Washington, D.C.: April 7, 2020.

GAO. *Science & Tech Spotlight: 5G Wireless*. GAO-20-412SP. Washington, D.C.: March 27, 2020.

GAO. *Science & Tech Spotlight: Coronaviruses*. GAO-20-472SP. Washington, D.C.: March 3, 2020.

GAO. *Science & Tech Spotlight: Nuclear Microreactors*. GAO-20-380SP. Washington, D.C.: February 26, 2020.

GAO. *Science & Tech Spotlight: Deepfakes*. GAO-20-379SP. Washington, D.C.: February 20, 2020.

GAO. *Science & Tech Spotlight: Hypersonic Weapons*. GAO-19-705SP. Washington, D.C.: September 16, 2019.

GAO. *Science & Tech Spotlight: Blockchain & Distributed Ledger Technologies*. GAO-19-704SP. Washington, D.C.: September 16, 2019.

GAO. *Science & Tech Spotlight: Opioid Vaccines*. GAO-19-706SP. Washington, D.C.: September 16, 2019.

GAO. *Science & Tech Spotlight: Probabilistic Genotyping Software*. GAO-19-707SP. Washington, D.C.: September 16, 2019.

Polaris Council Membership

Jeffrey M. Alexander, Director, Innovation Policy, RTI International

Robert D. Atkinson, President, Information Technology and Innovation Foundation

Mojdeh Bahar, Associate Director for Innovation and Industry Services, National Institute of Standards and Technology

Duane Blackburn, Deputy Director, Center for Data-Driven Policy, MITRE

Marjory Blumenthal, Senior Policy Researcher, RAND Corporation

William B. Bonvillan, Lecturer, Massachusetts Institute of Technology

Dan Chenok, Executive Director, Center for the Business of Government, IBM

Thomas M. Connelly, Executive Director and CEO, American Chemical Society

Robert Cook-Deegan, Professor in the School for the Future of Innovation in Society, and with the Consortium for Science, Policy and Outcomes, Arizona State University

Patricia J. Culligan, Matthew H. McCloskey Dean of the College of Engineering and Professor of Civil Engineering, University of Notre Dame

Gerald Epstein, Distinguished Research Fellow, Center for the Study of Weapons of Mass Destruction, National Defense University

Kaye Husbands Fealing, Dean of the Ivan Allen College of Liberal Arts, Georgia Tech

Kay Firth-Butterfield, Head of Artificial Intelligence and Machine Learning; Member of the Executive Committee, World Economic Forum

Robert M. Friedman, Vice President for Policy and University Relations, J. Craig Venter Institute

Zach Graves, Head of Policy, Lincoln Network

Tom Kalil, Chief Innovation Officer, Schmidt Futures

Marcia K. McNutt, President, National Academy of Sciences

Michael H. Moloney, CEO, American Institute of Physics

Sudip Parikh, Chief Executive Officer and Executive Publisher, Science Journals, American Association for the Advancement of Science

Eric M. Pierce, Senior Science, Leader of Earth Sciences Group, Oak Ridge National Laboratory

Arti Rai, Professor of Law and Faculty Director, Center for Innovation Policy, Duke Law

Daniel Sarewitz, Co-Director, Consortium for Science, Policy & Outcomes Professor of Science and Society, School for the Future of Innovation in Society, Arizona State University

Stephanie S. Shipp, Deputy Director and Professor, Biocomplexity Institute and Initiative, Social and Decision Analytics Division, University of Virginia

Douglas Sicker, Professor of Computer Science and Senior Associate Dean of Computing at the University of Colorado, Denver

Chris Tyler, Director of Research and Policy, Department of Science, Technology, Engineering and Public Policy (STEaPP), University College London (UCL)

Stephen Welby, Executive Director and Chief Operating Officer, IEEE

David E. Winickoff, Senior Policy Analyst and Secretary of the Working Party on Bio-, Nano- and Converging Technology, Organisation for Economic Co-operation and Development

Appendix III: GAO's Strategic Plan Framework



Source: GAO. | GAO-21-510T

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Senator REED. Thank you, Comptroller. Now let me recognize the Director, Dr. Swagel.

STATEMENT OF DR. PHILLIP SWAGEL, DIRECTOR, CONGRESSIONAL BUDGET OFFICE

Dr. SWAGEL. Thank you, Chairman Reed, Ranking Member Braun, and Members of the subcommittee. Thank you for the opportunity to present the CBO's budget request. It's a privilege to lead the Congressional Budget Office, and to work with my hard-working and talented colleagues as we work to serve and support the Congress.

The CBO is requesting an appropriation of $61 million for 2022; and that's an increase of $3.7 million, or 6.4 percent from the amount provided in fiscal year 2021.

The proposed increase would support our goal to be even more responsive to the Congress. Since 2019, since before I was Director, the Congress has increased CBO's budget to bolster our capacity, to make our work more responsive, and more transparent; and we've been working hard to accomplish those objectives. We've been expanding staffing in high-demand areas such as health care. We've been organizing our staff to work on broader, shared portfolios; and we've been doing more to document and to explain our work.

Now, about half of the requested increase for next year would be for added staffing. So, this would cover a full year's salaries and benefits for the seven staff members hired in 2021; and then allow us to hire four more staff members to support our work next year. And those people will focus on the areas of high interest in the Congress. This would be infrastructure, energy, and climate. So, the areas in which we—you know, we know legislation is coming at us.

And like GAO, CBO is also working to improve our capability to analyze the affects of legislation on people in different demographic groups and different income groups.

The remainder of the increase in our budget request would largely cover increases in costs for the existing personnel, and to a lesser extent, IT enhancements as well.

Let me just very briefly highlight CBO's work over the last year and connect that to our budget request. As you can imagine, we've worked intensively over the past year on legislation related to the pandemic. We provided frequent updates of budget projections, of economic projections, and provided technical assistance and cost estimates on COVID Relief Packages, on the annual appropriations, and on other legislation. We've also produced reports on a wide range of issues; expansions of health insurance coverage, a variety of defense-related issues, you know, such as the potential cost of the New START Treaty had been allowed to expire. Student Loans, veteran incomes, immigration, climate, and so on. We had a report on the connection between climate and the budget, the ways in which climate change affects the budget that came out just yesterday, so just an example.

So, looking ahead, the requested funding would allow us to do the following for the Congress:

So, continue to produce the budget and economic projections over the coming decade as usual. We do a long-term budget projections, looking at 30 years. We do some analysis over longer terms; for Social Security, for example, 75 years and beyond.

We produce about 700 formal cost estimates, most of which are for the authorizing committees after Bills are reported.

And we fulfill thousands of requests for technical assistance from committees and from members on the potential budgetary impact of proposals as members are developing legislation. And we produce about 100 score-keeping reports and estimates, including account-level estimates for individual appropriation bills.

And then, we do summary tables as well, showing the status of the discretionary appropriations and running totals on a year-to-date basis.

And then, we do about 70 or so analytic reports and papers each year. These are generally either required by law, such as some of our budget outlooks, or prepared in response to requests from, you know, generally the Chairs or Ranking Members of key committees of jurisdiction.

And then we produce a wide variety of other products.

So, in summary, to achieve our goal to be as responsive as possible, CBO requests an increase of $3.7 million. With your support, we look forward to continuing to provide timely and high-quality analysis to the Congress. Thank you very much.

[The statement follows:]

Congressional Budget Office
Nonpartisan Analysis for the U.S. Congress

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TESTIMONY

CBO's Appropriation Request for Fiscal Year 2022

Phillip L. Swagel
Director

Before the Subcommittee on the Legislative Branch
Committee on Appropriations
United States Senate

APRIL 28 | 2021

Chairman Reed, Ranking Member Braun, and Members of the Subcommittee, thank you for the opportunity to present the Congressional Budget Office's budget request. CBO is asking for appropriations of $61 million for fiscal year 2022. That amount represents an increase of $3.7 million, or 6.4 percent, from the $57.3 million provided to CBO for 2021. Of the total amount, nearly 91 percent would be used for personnel costs.

The proposed budget reflects strong interest from Congressional leadership, committees, and Members in CBO's estimates, analysis, and technical assistance—interest that will strain the agency's resources in many areas. The need to rapidly assess the economic effects of the 2020–2021 coronavirus pandemic and the impact of major pieces of related legislation has added to the normal heavy workload, and significant legislative initiatives prompted by the new Administration will require additional resources. CBO is also working to improve its capability to analyze the effects of legislation on people in different demographic and income groups. The budgetary increase that CBO is requesting would enable the agency to remain responsive to Congressional needs by fully funding the staffing increase that it is undertaking this year and by providing for four new staff members to deliver more analysis of infrastructure, energy, and climate-change issues—areas in which CBO anticipates additional legislative activity.

Reasons for the Requested Increase in Funding

The requested increase would pay for current staffing and for hiring four new staff members in 2022. It would also enable various improvements in information technology (IT).

Personnel Costs

CBO requests an increase of $3.1 million for personnel costs. Of that amount, $1.4 million would cover salaries and benefits to fully fund seven new staff members hired in 2021 and to fund the early replacement of staff members who plan to depart in 2022 (nine full-time-equivalent positions, or FTEs). An additional $0.4 million would fund salaries and benefits for the four new staff members (two FTEs) who would provide the Congress with more analysis of infrastructure, energy, and climate-change issues. (Those employees would be hired partway through the year, so the amount requested is half the cost of employing them for a full year.)

The remainder—$1.3 million—would provide for normal increases in personnel costs. It would fully fund increases in personnel costs that began this fiscal year, as well as provide for performance-based salary increases for current staff in 2022 and an across-the-board increase of 2.6 percent for employees earning less than $100,000. (That group of employees would also be eligible for performance-based increases, whereas employees earning $100,000 or more would be eligible to receive only performance-based increases.) Furthermore, the amount would fund increases in performance bonuses and anticipated increases in leave buyout costs. And it would cover an increase in the cost of federal benefits.

Nonpersonnel Costs

CBO requests an increase of $0.6 million for nonpersonnel costs. That funding would enable such enhancements as improving CBO's ability to assess, detect, and recover from internal and external cyber threats; continuing to improve computing capabilities for many staff by shifting their workstations into cloud-based systems; and enhancing users' ability to conduct remote teleconferences.

CBO's Budget Request and Its Consequences for Staffing and Output

In fiscal year 2022, CBO will continue its mission of providing objective, insightful, clearly presented, and timely budgetary and economic information to the Congress. The $61 million requested would be used mostly for salaries and benefits for personnel.

Funding Request for Personnel Costs and Consequences for Staffing

CBO requests $55.2 million for salary and benefits to support 275 FTEs. That amount represents an increase of $3.1 million, or 5.9 percent, from the $52.1 million provided to CBO for fiscal year 2021.

Of the total requested amount:

- $39.6 million would cover salaries—an increase of $2.6 million, or 7 percent, from the amount provided for 2021.
- $15.6 million would fund benefits—an increase of $0.5 million, or 3.6 percent, from the amount provided for 2021.

Funding Request for Nonpersonnel Costs

CBO requests $5.8 million for costs other than personnel. Those funds would cover current IT operations—such as software and hardware maintenance, software development, communications, and purchases of commercial data and equipment—and would pay for

training, expert consultants, office supplies, travel, interagency agreements, facilities support, printing and editorial support, financial management operations (including auditing the agency's financial statements), subscriptions to library services, and other items. The requested amount is $0.6 million, or 11 percent, larger than the amount provided for 2021.

Consequences for Output

The requested amount of funding would allow CBO to do the following for the Congress:

- Provide roughly 700 formal cost estimates, most of which would include both estimates of federal costs and assessments of the cost of mandates imposed on state, local, and tribal governments or the private sector;
- Fulfill thousands of requests for technical assistance, typically from committees and Members of Congress seeking a clear picture of the potential budgetary impact of proposals and variants of proposals before they introduce or formally consider legislation;
- Produce about 100 scorekeeping reports and estimates, including account-level estimates for individual appropriation acts at all stages of the legislative process, as well as summary tables showing the status of discretionary appropriations (by appropriations subcommittee) and running totals on a year-to-date basis;
- Publish about 70 analytic reports and papers—generally required by law or prepared in response to requests from the Chairs and Ranking Members of key committees—about the outlook for the budget and the economy, major issues affecting that outlook under current law, the budgetary effects of policy proposals that could change the outlook, the details of the federal budget process, and a broad range of related budgetary and economic topics in such areas as health care, defense policy, Social Security, and climate change; and
- Publish blog posts, chart books, interactive tools, presentations, slide decks, testimonies, and questions for the record to bring CBO's work to a wide audience and to increase the transparency of CBO's analysis and methods.

The demands on the agency remain intense and strain its resources in many areas. For example, the workload associated with analyzing appropriation bills and related amendments continues to be heavy. Also, over the past year, CBO devoted extensive resources to analyzing legislation that responded to the pandemic and to sudden changes in the economy. In addition to those extraordinary efforts, CBO devoted resources to producing important reports about the budgetary effects of a single-payer health care system, a variety of defense-related issues, student loans, transparency at CBO, the effects of recapitalizing Fannie Mae and Freddie Mac, veterans' income, and other topics. CBO regularly consults with committees and the Congressional leadership to ensure that its resources are focused on the work that is of highest priority to the Congress. Even with high productivity by a dedicated staff, CBO expects that it will not be able to produce as many estimates and other analyses as committees, leadership, and individual Members request.

Responsiveness

CBO seeks to provide information at the time when it is most useful to the Congress. Depending on its purpose, that information takes a variety of forms, such as cost estimates, background information, and technical assistance. Whenever it is practicable, CBO completes formal cost estimates before legislation comes to a floor vote. In addition, the agency works to provide technical assistance, reports, and other information to policymakers and their staff during earlier stages of the legislative process.

Beginning in fiscal year 2019, the Congress increased CBO's budget in part to allow the agency to implement a plan to strengthen its responsiveness to the Congress. To carry out that plan, CBO has expanded staffing in high-demand areas, such as health care and immigration. It has increased its use of assistant analysts, who can move from one topic to another to support more senior analysts when demand surges for analysis of a particular topic or when additional assistance is needed for a complicated estimate. In addition, CBO is engaging expert consultants in complex areas, such as health policy, economic forecasting, and climate-related research. Finally, the agency is continuing to expand its use of team approaches for large and complicated projects. That approach has been particularly effective in enabling CBO to produce timely analysis of legislation involving health care.

CBO's goal is to increase the number of staff with overlapping skills within and across teams. In some cases, those skills will consist of expertise related to particular topics, such as defense or transportation. In other cases,

they will be more technical, such as the ability to design and improve simulation models. In a similar vein, CBO plans to invest additional resources in bolstering analysts' ability to coordinate work that requires expertise from across the agency. Another of CBO's goals is to dedicate more senior analysts to being responsible for projects that span multiple subject areas.

The budgetary increase that CBO is requesting would allow it to maintain its efforts to be responsive, particularly in three important areas of analysis. In 2021 and 2022, CBO plans to hire additional staff who will increase the agency's expertise and modeling capability in the areas of infrastructure, energy, and climate change—areas in which CBO expects the Congress to show increased interest.

Transparency

CBO works hard to make its analysis transparent and plans to strengthen those efforts, building on the increased emphasis that it has placed on transparency over the past several years. In 2021 and 2022, many of CBO's employees will spend part of their time on efforts to make the agency's analysis transparent.

Testifying and Publishing Answers to Questions

In 2021 and 2022, CBO expects to testify about its baseline projections and other topics as requested by the Congress. That work will involve presenting oral remarks, answering questions at hearings, and presenting written statements, as well as publishing answers to Members' questions for the record. CBO will continue to address issues raised as part of the oversight provided by the budget committees and the Congress generally.

Explaining Analytical Methods

CBO plans to publish reports providing general information to help Members of Congress, their staff, and others better understand its work. For example, a report will explain the important issues surrounding CBO's long-term economic and budget forecasts. And CBO will continue to provide technical information about several methods used to analyze the macroeconomic effects of federal policies. That technical information will include working papers and, in some cases, the computer code used in models.

Releasing Data

In 2021 and 2022, CBO will maintain its practice of publishing extensive sets of data to accompany its major recurring reports, including detailed information about 10-year budget projections, historical budget outcomes, 10-year projections for federal trust funds, revenue projections by category, spending projections by budget account, tax parameters, effective marginal tax rates on labor and capital, and 10-year projections of economic variables, including the economy's potential (or sustainable) output.

The agency will also provide details about its baseline projections for the Pell grant program, student loan programs, Medicare, the military retirement program, the pension benefit guarantee program, the Social Security Disability Insurance program, the Social Security Old-Age and Survivors Insurance program, the trust funds for Social Security, child nutrition programs, child support enforcement and collections, foster care and adoption assistance programs, the Supplemental Nutrition Assistance Program, the Supplemental Security Income program, the Temporary Assistance for Needy Families program, the unemployment compensation program, the Department of Agriculture's mandatory farm programs, federal programs that guarantee mortgages, programs funded by the Highway Trust Fund, benefits for veterans and military personnel stemming from the Post-9/11 GI Bill, and veterans' disability compensation and pension programs.

Other data will provide details about long-term budget projections, projections underlying Social Security estimates, more than a thousand expired or expiring authorizations of appropriations, and dozens of federal credit programs. When CBO analyzes the President's budget request, it will post a set of files providing estimates of the budgetary effects of specific proposals. Throughout 2021 and 2022, the agency will post the data from various reports' charts and tables.

Analyzing the Accuracy of CBO's Estimates

In 2021 and 2022, CBO will continue to release reports analyzing the accuracy of its past projections of outlays, revenues, deficits, and debt. CBO will also reexamine the accuracy of its previous cost estimates in certain cases when the actual outcome of legislation can be determined; in other cases, the agency will explore whether new information sheds light on the original estimates. CBO will release a report on the accuracy of its economic forecasts. And the agency will compare its projections of federal subsidies for health insurance with actual amounts.

Comparing Current Estimates With Previous Ones

In several of its recurring publications—reports about the budget and economic outlook, federal subsidies for health insurance, and the long-term budget outlook—CBO will continue to explain the differences between the current year's projections and those produced in the previous year. In its cost estimates, CBO will continue to identify related legislative provisions for which it has provided estimates in the recent past and explain the extent to which the provisions and estimates at hand are similar or different.

Comparing CBO's Estimates With Those of Other Organizations

CBO will compare its budget projections with the Administration's and its economic projections with those of private forecasters and other government agencies when possible. And in various reports, the agency will include comparisons of its estimates with estimates made by other organizations. In addition, when time does not allow for publication but interest is high, analysts will discuss such comparisons with Congressional staff.

Estimating the Effects of Policy Alternatives

In 2021 and 2022, CBO will release new interactive products to help users understand the effects of potential changes to federal policies. Reports will also illustrate the potential effects of various policy proposals.

Characterizing Uncertainty Surrounding Estimates

CBO will update an interactive workbook showing its estimates of how changes in economic conditions affect the federal budget. The agency's reports about the 10-year outlook for the budget and the economy, the long-term outlook for the budget, and federal subsidies for health insurance will contain substantial discussions of the uncertainty surrounding CBO's projections. In addition, in any cost estimates in which uncertainty is significant, CBO will include a discussion of the topic.

Creating Data Visualizations

In 2021 and 2022, CBO will provide information about its budget and economic projections in slide decks and create infographics about actual outlays and revenues. And the agency will look for opportunities to include graphics to enhance the explanations in some cost estimates.

Conducting Outreach

CBO will continue to communicate every day with Congressional staff and others outside the agency to explain its findings and methods, respond to questions, and obtain feedback. The agency's Director will meet regularly with Members of Congress to do the same. After each set of baseline projections is published, CBO's staff will meet with Congressional staff to discuss the projections and answer questions.

CBO will obtain input from its Panel of Economic Advisers, its Panel of Health Advisers, and other experts. Many reports will benefit from written comments by outside experts on preliminary versions. For some recurring reports produced on compressed timetables, such as the one about CBO's long-term budget projections, the agency will solicit comments on previous publications and selected technical issues to incorporate improvements in future editions.

CBO's staff will give presentations on Capitol Hill—some in collaboration with the Congressional Research Service—on CBO's budget and economic projections and on other topics. Those presentations will allow CBO to explain its work and answer questions. The agency will also give presentations about its findings and about work in progress in a variety of venues to offer explanations and gather feedback. In addition, CBO will use blog posts to summarize and highlight various issues.

This testimony summarizes information in CBO's budget request for fiscal year 2022, which was prepared by Mark Smith, with contributions from Leigh Angres, Joseph E. Evans Jr., Theresa Gullo, Deborah Kilroe, Leo Lex, Benjamin Plotinsky, and Stephanie Ruiz.

Mark Doms, Mark Hadley, Jeffrey Kling, and Robert Sunshine reviewed the testimony. Benjamin Plotinsky was the editor, and Jorge Salazar was the graphics editor. It is available on CBO's website at www.cbo.gov/publication/57087.



Phillip L. Swagel
Director

LIBRARY OF CONGRESS—VISITOR'S EXPERIENCE

Senator REED. Well, thank you very much, Director. And let me first address the question to the Librarian of Congress.

We both mentioned the Visitor Experience. This would be the fourth year of a request for $10 million for a total of $40 million, which would be matched by $20 million from private donations. So that's a public/private partnership; and it would be an extraordinary way to showcase all the Library's true treasures. You mentioned your target date. Can you just give us an update on the status, Madam Librarian?

Dr. HAYDEN. Visitor Experience will greatly expand access to the Library's collections and services, primarily in the iconic Thomas Jefferson Building. The three components are all on schedule. The first component is the Orientation Center, and that should open in December of 2024. First time ever Treasure's Gallery, the second component, on schedule to open in December of 2022. And the Youth Center, on schedule to open in the summer of 2024.

It has been really heartening to work on this project during this past year because there was quite a bit of input from design firms. And the public/private partnership, the $20 million that was part of the private philanthropy effort to match Congress' investment of $40; this year would be the last of the $40 million for the public part.

To date, we have total, in pledges and commitments, firm commitments, of the $20, $12.5 million. And we anticipate and would have loved to have been able to say it exactly today, but within the next 6 months, we will complete the $20 million for the private component. And so, we are very pleased that with the release of last year's funding, there will be a contract for the Treasure's Gallery, audiovisual interactives, and the exhibit fabrication, meaning the exhibits will be made. And, we'll be able to transfer funds to the Architect of the Capitol for staircase and egress construction.

So, the Architect of the Capitol, I want to take this opportunity to say that they have been partners from the very beginning, and been very, very helpful with the entire project. Also, the Capitol Police, in terms of safety issues with the new ways of the public coming in.

And then the funding for this year, the final public funding, would allow the AOC to start construction of the Orientation Gallery and the Welcome area. And so, we're very excited, and we hope to have designs and plans to show this Committee very shortly. We look forward to that.

Senator REED. Thank you, Madam. Comptroller, you indicated that one of the major challenges of the last year for you is at our request, looking at the spending of the Pandemic Programs. There were multiple programs. You've mentioned some suggestions you made, but could you identify some of the key areas that you discovered that needed significant improvements in these programs?

KEY GAO FINDINGS RELATED TO PANDEMIC RESPONSE

Mr. DODARO. Yes. First, in the public health area, we thought there should have been a vaccine communication and distribution plan much earlier in the process that would have set better expec-

tations. We recommended this last September, and it was based upon our experience looking at H1N1 vaccine issues. There was a problem with communication back then that resulted in vaccine hesitancy because the Government didn't deliver on time.

And, sure enough, because there wasn't a plan, there was a difficult start to the COVID–19 vaccine distribution. Fortunately, it's picked up now that supplies are in place, and things are moving. I thought they should have had a vaccine distribution plan in place even before the Emergency Use Authorizations to set expectations and allow the State and local governments to prepare.

The same thing happened with the medical supply chain. The agencies did a lot, and I don't want to detract from that. I think Operation Warp Speed was the biggest success story coming out of this whole endeavor in the vaccine area. Agencies worked hard on the supply chain, but there were still critical gaps, particularly with nitrile gloves, syringes, and other things.

We surveyed hospitals and others, and there was a reluctance to get a plan in place to deal with these gaps as the pandemic unfolded. The government needed a plan for the remaining challenges of the pandemic. We raised this issue again with the initial vaccine distribution plans, because there was a lot of concern about not having enough syringes. As far as the National Testing Strategy, we still don't really have that in place.

GAO also uncovered the painful reality of the fragility of the Nation's public health system and its surveillance capabilities. There really is not a very robust system in place to be able to track what's going on, to be able to target the Federal response, and to be able to monitor progress.

Regarding communicating clearly to the public, there was a lot of confusion about wearing a mask, and when to not wear a mask. There was confusion about who should be tested. What about asymptomatic people? Guidance changed. A lot of Emergency Use Authorizations were granted, but we thought there could have been better explanations of the scientific underpinnings behind those authorizations to give more confidence to the public.

GAO also made many recommendations in the Program Integrity area. For instance, SBA should have done a fraud assessment and a risk analysis upfront. There was too much reliance on self-certification. There should have been some minimum checks in place. But even if they didn't do that initially, I wanted them to quickly have an oversight plan because those loans would be forgiven if they are used properly and they're legitimate. It has not been until relatively recently that SBA has responded to those recommendations. I think they were too slow to act in that regard.

And we have many others in the——

Senator REED. Just a minute. Let me ask a quick question, finally, before I recognize Senator Braun; and I'll, on the second round, get to the Director.

Typically, these types of investigations of this scope take several years. Do you anticipate that you'll have work with respect to these issues going forward for several years and require additional funding?

OUTLOOK FOR FUTURE GAO PANDEMIC WORK

Mr. DODARO. Probably. Yes. Actually, I'd point out we're still auditing the remnants of the TARP Program back from 2008 because the housing part of that is still in place.

We're still auditing the Federal response to the 2017–2018 hurricanes and issues with Puerto Rico and others. This will continue on for a while. We're planning at least for the next 2 years. We've got about 100 audits underway right now. We're going to move the quarterly Government-wide status reports, but we'll issue probably another 80 reports on specific areas of the pandemic.

Of course, there's new programs now under the American Rescue Plan. There's a lot more money going to the State and local level. I want to have a real-time effort to observe what's going on there, because a lot of money is going directly to localities as well as to the States.

I'm anxious to see what Treasury is going to do with their reporting requirements to get some idea upfront where the money is going to go. I talked yesterday to Secretary Yellen and her team. I've been meeting with all of the Cabinet officials and giving them my advice on how to handle these things. That's part of what I normally do, anyway.

Senator REED. Thank you very much, Comptroller. Senator Braun.

Senator BRAUN. Thank you, Mr. Chairman. I've got a question for each witness, and I want to get them in on the first round, so about a minute and a half on the first two.

CBO TRANSPARENCY EFFORTS

Dr. Swagel, over the last few years, there's been money put into your agency for transparency. I think it's so important to be able to be clear about what you're doing. How many individuals have worked specifically on transparency? Just explain briefly what you've been able to accomplish with that extra funding.

Dr. SWAGEL. Okay. No. Absolutely. So, there's a couple of people who are specifically working on transparency: one on data, one in cost estimates, and then there's some others in our management system. And then, across the agency, transparency is now—you know, it's something we're working on across the agency, and it comes up in a variety of ways.

So, with cost estimates, for example, we have much more information on the basis for the cost estimate and the sources of uncertainty for the cost estimate. In our budget projections and our economic projections, again, we have much more information than CBO has done in the past on the uncertainty, you know, both qualitatively and quantitively.

We put data on our website. We put computer programs on our website. You know, with complicated subjects like, you know, our work on drug prices and the innovation effects of changes in drug prices, we've put out working papers to explain the technical basis for what we've done. So, there's some of the ways in which we've tried to answer the call for transparency.

Senator BRAUN. Thank you. Comptroller, we have recently spent in the neighborhood of $4 to $5 trillion last year, particularly de-

voted to COVID issues. And when you look at what's on the table currently, $1.9 trillion I think in the Rescue Act; in the American Jobs Act, $2.5 trillion; and I think $1.5 trillion for the American Family Plan. That is a lot of additional spending. What in total may be $10 to $11 billion or trillion over the span of 2 years? Do you have the ability—I see there is a request for a budget increase. How can you possibly absorb the oversight portion when you've got that much spending dumped into the system?

GAO ABSORBING ADDITIONAL WORK

Mr. DODARO. Yes. We've been coordinating our work with the Inspector Generals. There was additional resources given to the Inspector General community and to the Pandemic Response Accountability Committee, which coordinates them and leverages their responsibilities. We've been doing a risk-based planning effort in GAO, particularly where there are new programs that have no prior history.

We'll need additional resources if additional legislative packages are put in place regarding infrastructure, or other issues down the road. Our budget request was based upon what we knew was on the horizon last year, but a lot of developments have occurred. If we need more resources, I won't be shy about asking for them.

Senator BRAUN. Well, that's good. And what is the capability of the agencies to actually spend this money in a way that would be done in a manner that it's going where it needs to go and is being done efficiently?

GOVERNMENT AGENCY CAPABILITIES TO EFFICIENTLY USE PANDEMIC FUNDING

Mr. DODARO. There are capabilities there, but I think Congress has to be careful. I think SBA, quite frankly, is overwhelmed with their new responsibilities, plus they're getting two additional programs now with shuttered venues and the restaurant programs. And they were unable to pass an audit this past year, an independent financial audit, because they couldn't support the figures for their loan programs and other issues. So now, other agencies are better positioned to be able to do this.

A lot depends on how funding gets distributed, whether it goes through the State and local governments, through contracting, or other means. There are a lot of well-established programs at the State and local level that could handle it without a big effort, if you will, to set up new systems. But it will be a challenge to be able to do it effectively and efficiently. But if properly planned, it can be executed.

Senator BRAUN. I only raise that, and you don't need to comment further on it, but my observation is on any entity, well oiled, with the rigor of maybe the marketplace making you maybe a little more efficient than what this place might be. When you increase anything in categories of 5, 10 percent, or 15 percent, which this is a lot more than that, it stretches and strains any organization to do things efficiently.

LIBRARY OF CONGRESS—MASS DEACIDIFICATION

Last question, Dr. Hayden, I found it interesting that I think a year ago there was actually a request from your office to end funding for mass deacidification, which is a method, I guess, to preserve documents. You said you did not need it. You were given that money anyway. I think there's a company that's been supplying that service for a long time from Pennsylvania. A couple of House Cardinals were interested in seeing it maintained. Ended up, I think it was about $2.5 million instead of $5.5. You again, I think, have said that you do not need it. Do you think you'll be successful this time around when you get the forces of a place like this that ended up basically making you take the money when you didn't want it a year ago? What are your chances this year of having your request honored?

Dr. HAYDEN. I want to thank the subcommittee for supporting the Library and rebalancing the way we care for our physical, and now growingly, our digital collections, and that rebalancing is underway and going very well.

The deacidification process that you correctly said that it had been for a number of years, and it started almost 20 years ago, and most of the materials that require that type of response have been taken care of. And the rebalancing is to give the Library an opportunity to continue to preserve and conserve materials that do not require that method, and to focus on what is increasingly becoming something that the Library and most Libraries are having to plan for; and that's ingesting and storing digital content.

Most of the materials, especially periodicals, and journals, and things are coming in. So, we were able to, in fact, use the contracting authority from the CAREs Act to work with that particular company to make sure that they were able to continue working at different points when there weren't many on-site opportunities for anyone at the Library. And we are using the additional funding to start with the Digital Conservation Program as well as to make sure that we continue to preserve and conserve other materials.

Senator BRAUN. Thank you. And my office will be watching closely to see how that rebalancing act is going on, and that, in fact, that it is rebalanced, and not the same old thing occurring again because lobbyist and House Cardinals may want it to be. Thank you.

Thank you, Mr. Chairman.

Senator REED. Thank you, Senator Braun. Senator Heinrich, please.

Senator HEINRICH. Thank you, Chairman. Mr. Dodaro, approximately 1.6 million people live in border communities referred to as colonias, which are settlements along the U.S. side of the U.S./Mexico border, often characterized by inadequate housing, a lack of basic infrastructure, including water, electricity, and broadband in many cases. And while the GAO mentions colonias in a few reports on rural housing, the last time the GAO reported specifically on colonias was in 1990. I believe these communities deserve more attention than that, and I'll be submitting a request to GAO to provide us with a report, and with recommendations on how to ad-

dress the infrastructure shortfalls. Moving forward, how can we ensure that these communities are accounted for in GAO's reports?

GAO REQUEST PROTOCOL

Mr. DODARO. We do our work in response to three different types of congressional requests, Senator. The first way is through a provision law, a statutory requirement or a mention in conference or committee reports. So that's important.

Second, we respond to requests from Chairs and Ranking Members of Committees of jurisdiction. We're a non-partisan organization. We treat both the same.

That accounts for 95 percent of all of our work. And then I reserve about 5 percent of GAO work to identify areas that I think warrant more attention. The Comptroller General has broad authority to initiate work involving Federal funds or a Federal nexus that is of broad interest. GAO develops a long-range strategic plan for serving the Congress. We're updating the plan right now.

GAO'S RECENT INDIAN TRIBE WORK

We're happy to look at this issue that you mentioned and identified. For example, we've done more work recently on Indian Tribes. In fact, we identified Indian Federal programs that support Indians as a high-risk area a few years ago, both in the education and health care area and in a lack of support for developing their own energy resources.

GAO WILLINGNESS TO LOOK AT U.S./MEXICO BORDER SETTLEMENTS

I'm happy to take a look at this issue, but we have a challenge at our current resource levels responding to all requests from Congress, in particular requests from individual Members. Requests from Chairs and Ranking Members, as I mentioned are our primary means of focusing our work.

LETTER REQUESTING GAO RECOMMENDATIONS ON FEDERAL FIREFIGHTING WORKFORCE

Senator HEINRICH. Thank you. I'll be sure to follow up on that. Yesterday, several of my colleagues sent you a letter asking the GAO to make recommendations additionally on how Federal Land Management agencies can improve the Federal Firefighting Workforce.

Western States are bracing for a historic wildfire season. Unfortunately, that season has already started in New Mexico with the Three Rivers Fire. And the seasons are getting longer on both ends each year.

So, I just want to highlight this letter for you today and hope that GAO will review and report on recommendations to improve hiring and retention for Federal Firefighters. And I would ask unanimous consent to insert a copy of the letter into the record.

Senator REED. Without objection.

[The information follows:]

United States Senate

WASHINGTON, DC 20510

April 27, 2021

The Honorable Gene Dodaro
Comptroller General of the United States
U.S. Government Accountability Office
441 G Street, N.W.
Washington, DC 20548

Dear Mr. Dodaro:

As the Western United States enters yet another dangerous fire season, we write to request that the Government Accountability Office (GAO) conduct an assessment of hiring and retention of federal wildland firefighters at the five federal agencies responsible for wildland fire management - the Forest Service within the Department of Agriculture and the Bureau of Indian Affairs, Bureau of Land Management, Fish and Wildlife Service, and National Park Service within the Department of the Interior. We also ask that GAO make recommendations for how these agencies can improve wildfire prevention and suppression efforts by strengthening the federal firefighting workforce, while ensuring taxpayer dollars are being spent efficiently and effectively across agencies.

Western states are bracing for yet another historic and destructive wildfire season, as worsening drought conditions, long-term underinvestment in forest management, and warmer weather continue to bring about increasingly intense wildfires year after year. Last year, the United States experienced one of the most extreme wildfire seasons on record with 58,950 wildfires burning more than 10 million acres. In California alone, 9,900 wildfires burned a record-setting 4.25 million acres, killing 33 people, and destroying nearly 10,500 homes and structures.

As the fire season becomes more intense, it is also growing longer in duration as a result of climate change. The Forest Service estimates that current fire seasons are lasting 78 days longer than they did in 1970. Wildfires in the West are now a near-constant threat and we can no longer afford to rely on just a seasonal firefighting workforce. Transitioning to a larger, full-time workforce would add immediate capacity to fight wildfires nationwide, allow for greater flexibility in shifting personnel between regions depending on wildfire activity, provide more stable work opportunities and employee benefits, increase employee retention, and reduce agency costs and burdens associated with the seasonal hiring process.

As the wildfire threat worsens, we are concerned that serious problems exist with the availability of federal fire resources to prevent and respond to wildfire emergencies. Given the increasing threat, and the fact that the federal government is responsible for managing substantial areas of land within Western states, it is crucial that federal agencies have the firefighting capacity and resources they need. To that end, we ask that your assessment take the following into consideration:

1. Identify barriers to recruitment and retention of federal firefighters at the wildland fire agencies, including specifically for women firefighters, and suggest possible remedies

that the agencies, the Office of Personnel Management (OPM), and Congress might consider to address each barrier.

2. Assess the seasonal firefighter employment model used by wildland fire agencies, and make recommendations for transitioning to a full-time firefighting workforce.

    a. Please include discussion of potential benefits and challenges of this transition, and outline steps agencies and Congress can take to implement such a change.

    b. As a part of your assessment, please discuss any parts of the model that should be continued or discontinued, estimated costs of the transition to a full-time workforce, and possible funding sources for such a transition.

    c. We ask that you also assess the economic benefits that a full-time firefighting workforce might offer through potential cost savings and efficiencies, as well as the impact of added capacity for prevention activities, given the large and increasing costs of wildfire damage.

3. Review the current range of Forest Service and Department of the Interior occupational series that incorporate wildland firefighting, and assess whether OPM should create a new, separate job series and pay scale for federal wildland firefighters to ensure their pay is commensurate with state firefighting agencies and reflects their training requirements and the hazardous conditions they must endure. As part of this review, please describe each of the current occupational series and pay grades that include federal wildland firefighting responsibilities, and identify specific issues that the agencies and OPM would need to consider if a new job series and pay scale were to be established.

Thank you for your attention to this important matter.

Sincerely,

Dianne Feinstein
United States Senator

Kyrsten Sinema
United States Senator
Chair, Subcommittee on
Government Operations and
Border Management



Jeffrey A. Merkley
United States Senator



Steve Daines
United States Senator



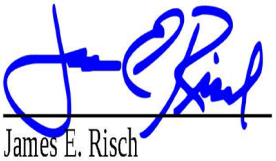
Alex Padilla
United States Senator



Mike Crapo
United States Senator



Patty Murray
United States Senator



James E. Risch
United States Senator



Michael F. Bennet
United States Senator

LIBRARY OF CONGRESS—SURPLUS BOOKS PROGRAM

Senator HEINRICH. Dr. Hayden, recently a very ambitious and dedicated group of interns in my office led policy workshops with local university students. And each of those groups focused on issues that were important to the community that they were in. One group proposed an expansion of the Federal definition of the word "Library" to include mobile libraries and even community centers with rooms that are devoted to housing library materials. First, I wanted to just take a moment to recognize the work that these interns did and that all of the students that actually participated in those policy workshops did, but second, I wanted to ask you, do you have thoughts on how can Congress work with the Library of Congress to get more materials out to rural communities, to expand the reach, in particular, of your Surplus Books Program?

Dr. HAYDEN. Thank you for that, because the Surplus Books Program is a very effective way to provide brand new books and materials that are selected by congressional offices to send to, in particular, libraries, schools, and other entities that provide literacy services in cases of emergencies, especially hurricanes. And we've been doing that for a number of hurricanes, and fires, and things like that, when the collections in a local community are either destroyed or they're not available.

And so, being able—and we've been working with congressional offices to make sure, even during this time, that we make it easier for staff members to work with communities and specify what types of books, what types of materials they could use. And we see that, as a program, we've been able to talk about that during virtual Town Halls this past year with members. And we mentioned the Surplus Books Program.

And just, if I may, libraries in general consider their mobile services as extensions, and that's part of it. So, thank you for mentioning that.

CBO PROJECTIONS CONSIDERING DEMOGRAPHIC MAKEUP

Senator HEINRICH. Thank you for your focus on that. Dr. Swagel, in your testimony, you mentioned that CBO is working to improve its capability to analyze the effects of proposed legislation on people in different demographic and income groups.

New Mexico's population is currently 49 percent Hispanic, 11 percent Native American. Ensuring that CBO projections are considering demographic makeup is incredibly important to States like mine. Can you expand on your efforts to analyze the effects on people in different demographic and income groups?

Dr. SWAGEL. Yes, Senator. You know, we realize it's a crucial topic for our analysis. We do some. So, we have long-standing work on income distribution and looking at the progressivity of the tax system that doesn't get broken down by racial or ethnic group. And so, we've been working hard on the data to be able to address that. And some of the challenge is that the data sources don't always include the racial or ethnic information we need. Our healthcare work, for example, relies heavily on data from the IRS. And that doesn't have race or ethnicity. So, we've been working to—essentially infer that, you know, to do our best in statistical ways to fig-

ure out how to analyze policies by different racial groups in addition to ethnic groups.

We do a lot of work on immigration as well. The effect of immigration legislation, the role, and the contributions of immigrants to our society and our economy, so we do some of it, but we're working to do more.

Senator HEINRICH. Thank you. Thank you, Mr. Chair.

CBO POLICY ON EXAMINING PREVIOUS ANALYSES

Senator REED. Thank you, Senator Heinrich. Dr. Swagel, as you pointed out in your testimony, CBO aspires to, and must maintain a non-partisan, independent, and reliable record on the Hill. One way to sort of validate or check that is go back and look at your work. Do you have, as a policy, returning to previous analyses, examining those, see if they're off and why they're off, and with a feedback process of improving your analysis? Is that something you do regularly?

Dr. SWAGEL. It is. It's something we do both on our economic projections and in our fiscal projections of spending and revenue. We do it some on our cost estimates. There it's harder, it seems, to figure out why a cost estimate is right or wrong, but we try to do that as well.

Senator REED. And when you—are those lessons shared externally as well as internally within CBO?

Dr. SWAGEL. Yes. They are. So, we do an annual—two annual reports: one on the economic side; one on the fiscal side. And then we engage with outsiders with—we have two panels of outside advisors. And then every report, we go out and ask outside experts to review reports and then engage with them afterward.

CBO CYBERSECURITY AND COORDINATION WITH OTHER AGENCIES

Senator REED. Thank you. And I have got a question for the whole panel. I'll start with Dr. Swagel, to be fair. And no surprise, cyber security is the issue de jure and will be, I think, for the rest of our lives, but how would you rate—two questions, starting with Dr. Swagel: How would you rate your cybersecurity in CBO today? And also, how is your relate or rate, rather—your coordination with other congressional agencies?

Dr. SWAGEL. Okay. So, I think we're doing pretty well. And obviously, you know, I say that with some trepidation since none of us know what we don't know.

Senator REED. Right.

Dr. SWAGEL. You know we have put a lot of effort into our cyber security, starting with the move to the cloud. So, you know, across the agency, our email servers have been long in the cloud, so we were instance protected from some of the, you know, the recent hacks based there. And other things. We have tax data that we work with the IRS and the Joint Committee on Taxation to make sure that that's secure as well. So, I think we're in good shape. You know, I say that cautiously.

On coordination, so I'll highlight just very briefly two avenues of coordination: One is what I just hinted at with the IRS and JCT. You know, they have authority over particular data, and we work closely with them to secure it. There is also coordination across the

Legislative Branch agencies. There is several councils that our Chief Information Officer participates in to share best practices, to share threats. And there's one across the government that we participate in to share, essentially, again information and best practices.

Senator REED. Thank you. Comptroller Dodaro.

GAO'S CYBER SECURITY FOCUS

Mr. DODARO. This has been an issue of mine for a long time. GAO first designated cyber security as a high-risk area across the entire Federal Government in 1997. That was the first time we ever said anything was government high risk. I added critical infrastructure protection in 2003: electricity grid, financial markets, telecommunications, et cetera. So, this has always been on my mind, and we manage GAO accordingly.

We've had outside experts come in and take a look at our system. I think we're in pretty good shape, as good as anybody could be. I mean you're not going to be at zero risk, but we've been very fortunate. It's always a top priority for us.

Part of our budget request will be to continue to update GAO's cyber security capacity. We have to keep working on it. Threats evolve and change. I still don't believe the Federal Government's operating at a pace commensurate with the evolving grave threats.

This issue will get more complicated with artificial intelligence, quantum computing, et cetera. And that's what we have our new Science and Technology Group focused on too, looking at this in the future aspects of this issue.

We also have a responsibility to look at cyber and electronic threats to the Congress, and to report to a number of committees, so we do that. From time to time, we're brought in to look at Congress' own operations with regard to cyber security to provide technical advice. We've got a great group of experts in cyber security.

GAO is doing more and more work on this area. It's intertwined, as you say, with almost everything. People want to know about it. And we participate, as Phil mentioned, with the Legislative Branch Councils. GAO's Chief Information Officer and our Chief Information Security Officer participate in those events. We've looked at this issue in the past, at the Library, Copyright Office, and the Office of Congressional Workplace Relations, and have made some recommendations there.

And I would add that the Library has been, particularly under Carla's leadership, very responsive to our recommendations.

Senator REED. But you will take this on as an important—as you said, you have 5 percent of sort of the responsibility—ability to assign. This will be at the top of your list, I presume?

Mr. DODARO. Absolutely. But I don't have to anymore. I used to. We built a computer lab facility in the 1990s to demonstrate to agencies how easy it was to hack their systems. At the time nobody seemed concerned. Nobody was paying attention to it. I said, "Well, that's a problem." You could see this coming as we were becoming more and more reliant on computer networks. Nobody was building in computer security upfront in those days, and we're still not doing it. For example, we just did work, not that long ago, at the Defense Department showing they weren't focused enough on de-

veloping new weapons systems with cyber security protections. This is also an issue with satellites and a wide range of other issues. It's not just information systems.

We're moving to an air traffic control system that's going to be satellite based, not radar based, which was a pretty self-contained system. So, there is increased risk there.

The Internet of things also introduces risk. Anything that touches the Internet has the potential to become a problem.

Senator REED. Thank you——

Mr. DODARO. You're welcome.

LIBRARY OF CONGRESS—CYBERSECURITY

Senator REED [continuing]. Very much. And Madam Librarian——

Dr. HAYDEN. Yes. And IT——

Senator REED [continuing]. Your comments?

Dr. HAYDEN. Yes. And IT security is very serious at the Library, not just for our data, but also our interactions with other legislative branch agencies; and we have two divisions: The Congressional Research Service, and the Copyright, where we are very concerned, and need to make sure that our cyber security is more than sufficient.

And we have implemented all of the GAO recommendations under IT security; and we are adhering to the NIST Security Standards. We are part—and I'd like to say we're a very active part of the Legislative Branch Cyber Security Working Group. And we work closely, too, with the Senate Sergeant of Arms and all of the other technology offices as well.

So, we definitely know that that is a major part of what we have to be concerned about as we modernize and work on our IT structures.

CLOSING STATEMENT—CHAIRMAN REED

Senator REED. Thank you very much. Senator Braun, I believe you have no questions? Thank you very much. Well, this will conclude the Legislative Branch Appropriations Subcommittee hearing regarding fiscal year 2022 funding for the Library of Congress, the Government Accountability Office, and the Congressional Budget Office.

I want to thank Dr. Hayden, Comptroller Dodaro, and Dr. Swagel for your testimony today. I appreciate it very much.

ADDITIONAL COMMITTEE QUESTIONS

The hearing record will remain open for 7 days, allowing Members to submit statements and/or questions for the records, which should be sent to the subcommittee by close of business on Wednesday, May 5, 2021.

[The following questions were not asked at the hearing, but were submitted to the agencies for response subsequent to the hearing:]

QUESTIONS SUBMITTED TO HON. DR. CARLA HAYDEN

QUESTIONS SUBMITTED BY SENATOR JACK REED

NATIONAL LIBRARY SERVICE FOR THE BLIND AND PRINT DISABLED

Question. Since 1931, the National Library Service for the Blind and Print Disabled (NLS) has utilized a national network of libraries to provide books and magazines, among other printed texts, in braille and recorded formats to blind and print disabled individuals in the United States, and to Americans living abroad. The unique services NLS provides helps hundreds of thousands of readers—people who may not be able to hold a book in their hands, or veterans who have difficulty reading standard print—enjoy the freedom to read in their own way.

—Can you give an update on NLS' modernization efforts, including the roll-out of braille eReaders and the Braille and Audio Reading Download (BARD) Infrastructure Modernization?

Answer. Now celebrating its ninetieth anniversary, the Library of Congress' National Library Service for the Blind and Print Disabled (NLS) continues to innovate and adapt to meet the reading needs of blind and print disabled Americans across the Nation and oversees. Given that it's institutional history traverses phonographic records, cassette players and tapes, digital talking book machines and flash memory cartridges, and the Internet, all the while continuing to supply hard copy braille materials, it should be no surprise that NLS again sits at the precipice of an exciting modernized future.

In the last few years, NLS has updated its name, amended its laws and regulations, gone through an agency-wide reorganization, created a Modernization Program Office (MPO), and centralized and integrated its IT designs, resources, and business plans into a new, proactive, productive, and collaborative partnership with the Library's Office of the Chief Information Officer (OCIO), all important facets of its forward-thinking modernization efforts.

Related to the eReader initiative specifically (and thanks to the annually requested (fiscal year 2020–fiscal year 2024) $2.375M included in NLS's fiscal year 2021 appropriation), NLS is particularly pleased with the progress it is making to provide braille content in a modernized format (i.e., affordable, refreshable braille devices, or braille eReaders) to NLS's braille patrons and in furtherance of implementing a digital braille program.

In fiscal year 2021, NLS began a pilot to study all aspects of distribution implementation and the functionality of two prototype eBraille devices before a full-scale Nation-wide network distribution, collection of feedback from pilot patrons, and validation of distribution processes at network libraries, can commence. The pilot program with seven total libraries began in August. NLS procured 3,000 additional eReader devices for this pilot program and instructed pilot libraries on the enrollment of patrons, the assistance of pilot participants, the execution of patron surveys for data collection and analysis, and the distribution of devices. NLS also continues to provide technical training and quality assurance support, monitor two active listservs for regular feedback from patrons and library staff, and evaluate how much training, support, and maintenance will be necessary to deploy devices to the network in the future.

The initial pilot feedback has been very promising. In comparing braille downloads from fiscal year 2019 to fiscal year 2020, non-pilot libraries had a 20 percent increase while pilot libraries had a 126 percent increase. In the first 2 months of fiscal year 2021, pilot libraries saw a 515 percent increase in braille downloads over fiscal year 2020. This distribution, evaluation and assessment work will continue through fiscal year 2024. In addition, as also included in this NEPR programming, NLS procured 460 Stop-Gap Talking Book Players needed to maintain necessary patron-based inventory. This particular commercial interim device contains additional features NLS will test as it moves toward some form of digital delivery.

NLS is also pleased with the progress it is making on its Braille and Audio Download (BARD) infrastructure modernization. Building on several years' work, NLS and OCIO successfully moved BARD to the cloud in January 2021, more than tripling its capacity for NLS users while making it both faster and more stable. Work is now underway on what OCIO and NLS are calling BARD 2.0, which is a complete redesign of the system to ensure it can meet the needs of NLS's growing patron base and serve as the focal point for future methods of content delivery. The new BARD will ultimately be able to support 10 times as many people with a more user-friendly interface and increased IT security. Whether it be a refreshable braille device, smart speakers, smart phones, or a talking book machine that can utilize traditional cartridges but also connect to the Internet and allow voice user interface,

a fully operational BARD 2.0 will be the key mechanism and centerpiece in getting NLS content into patrons' hands.

At the same time, OCIO and NLS are exploring options for the next-generation NLS device, including testing voice navigation, cellular delivery, and other advanced options for user interface and content management. They have also jointly developed a multi-year NLS Technology Roadmap, setting a path forward for the replacement of out-of-date legacy NLS systems that manage the full array of NLS's functionality for its network, its patrons, its staff, and its connections to the rest of the Library—from content delivery services, to content production services, to better communications and marketing, to enhanced customer service, to state-of-the-art enablers to allow for secure and efficient use of NLS' systems.

Finally, NLS has instituted the aforementioned Modernization Program Office (MPO) to assist NLS in better exhibiting modern project management best practices as it relates to these modernization projects and initiatives. The MPO will be working closely with the OCIO Project Management Office (PMO) on adopting the Library's Project Management Life Cycle (PMLC) and Systems Development Life Cycle (SDLC) within NLS to ensure full compliance with industry best practices (e.g., Project Management Book of Knowledge (PMBOK), GAO's Cost Estimating Guide, GAO's Schedule Assessment Guide) while executing the new eReader projects. In addition, the MPO is collaborating with the OCIO to ensure the agile Technology Roadmap is helping to lead and guide the asset and resource management, procurement, and strategic timing of key modernization initiatives.

In their efforts to continue to elevate digital experiences and to strategically enhance Library services, from digital braille implementation, to new modern IT systems and business practices, to new digital means of talking book delivery, NLS and its OCIO partners in the Library are continuing to move NLS into a modern, integrated, resource-wise and properly aligned mission *That All May Read.*

Question. Can you tell us about the Marrakesh Treaty ratification and the role of NLS in that treaty? What impact will that have on NLS and the United States?

Answer. The Library of Congress and its National Library Service for the Blind and Print Disabled (NLS) continue to be very excited about the Marrakesh Treaty and its implementation.

The Marrakesh Treaty to Facilitate Access to Published Works for Persons Who are Blind, Visually Impaired, or Otherwise Print Disabled concluded at Marrakesh, Morocco in June, 2013, and the United States signed the Treaty in October of that year. In June, 2018, the U.S. Senate ratified the Treaty and also passed the Marrakesh Treaty Implementation Act to amend U.S. law in accordance with the Treaty. The House passed the Act that September and it was signed into law in October 2018.

The Treaty entered into force in the U.S. in May 2019. In addition, the Library of Congress Technical Corrections Act was included as part of the fiscal year 2020 omnibus bill passed and signed into law in December of 2019. That legislation incorporated the terminology of the Treaty into NLS's authorizing statute. It also statutorily allowed NLS to participate in the international exchange of digital content whereas NLS's services were previously restricted to U.S. citizens and residents. Currently, there are now 79 contracting parties to the Treaty, including the European Union.

As you know, the Marrakesh Treaty seeks to increase access to printed materials for those who are blind, visually impaired, or otherwise print disabled by allowing cross-border exchange of accessible texts either directly or through authorized entities (AEs) such as libraries for the blind. Through the Treaty and the vital work of NLS, visually impaired Americans are gaining access to the world's languages, literature, and knowledge in accessible formats, primarily digital file exchange. On behalf of its patrons, NLS is acquiring, at minimal cost, thousands of titles in English and other languages from its counterparts around the world. Likewise, via Marrakesh, NLS, the Library, and the United States can contribute to substantially reducing the global "book famine," as less than 7 percent of all the books published each year are available in an accessible format. This famine is exacerbated by the fact that 90 percent of the world's 285 million people who are blind or visually impaired have low incomes and live in developing countries. Given that NLS has one of the largest accessible collections in the world, sharing it with other countries can make a tremendous difference.

Because of the Treaty, NLS is adding a rich array of accessible versions of books in foreign languages and English more inexpensively and more quickly than previously possible. NLS is able to immediately access materials in foreign languages that expand beyond our traditional collection to better match current demographics. NLS currently holds titles in at least 36 different foreign languages, but the major-

ity of our foreign language collection is in Spanish. This makes sense given that about 70 percent of potential patrons who speak a language other than English speak Spanish. But we know from census data that they also speak French, Tagalog, German, Russian and Arabic, among many others. And now, NLS can work to better meet their needs.

To these ends, NLS is developing partnerships with international AEs to exchange collections. Current partners include the World Intellectual Property Organization (WIPO) and their Accessible Book Consortium (ABC), Canada's Center for Equitable Library Access (CELA), the UK's Royal National Institute of Blind People (RNIB), the Fundación Chile Música y Braille, and Germany's Deutsches Zentrum für barrierefreies Lesen (DZB Lesen). As well, NLS will continue to refine its internal collections, conversion, and cataloging processes and workflows to convert and import this content into our Braille and Audio Download (BARD) system.

The Library and NLS remain strongly committed to Marrakesh. Our efforts are already visible, impactful, and bearing important fruit for our patrons and blind and print disabled individuals worldwide!

More information about NLS's implementation of the treaty can be found at www.loc.gov/nls/about/organization/laws-regulations/marrakesh-treaty, www.loc.gov/nls/about/organization/laws-regulations/marrakesh-treaty/marrakesh-treaty-implementation, and www.loc.gov/nls/about/organization/standards-guidelines/collection-building-policy.

Further information about ABC can be found at www.accessiblebooksconsortium.org/portal/en/index.html and www.accessiblebooksconsortium.org/globalbooks/en.

Finally, a very informative Marrakesh update from the U.S. Register of Copyrights earlier this year can be found at https://blogs.loc.gov/copyright/2021/02/the-marrakesh-treaty-in-action-exciting-progress-in-access-to-published-works-for-the-blind-and-print-disabled-communities.

LIBRARY COLLECTIONS ACCESS PLATORM

Question. The Library is requesting $6.5 million and nine FTE to replace its legacy Integrated Library System (ILS) that was implemented in 1999. I understand that the new system, the Library Collections Access Platform (L–CAP) will integrate multiple standalone systems. This is one of your top priorities in the Library's fiscal year 2022 budget request.

—How will this new system integrate and streamline disparate Library processes, and how will it positively impact the user experience?

Answer. L–CAP is intended to consolidate the functions of several decades old systems into one modern IT system that is specifically designed to be both user friendly and adaptable for future technology advances. The transition to L–CAP can best be thought of as an evolutionary jump in the way the Library will be able to support the management, discovery and access to the millions of items in the Library's collections. The impact on user experience will be significant across a range of areas, including:

—*Consolidated Search across Library Collections*

L–CAP will provide Library users, including Congress and American citizens and their schools and libraries, with a consolidated user interface that will enable them to search across the Library's vast collections without specialized knowledge of the type of content they are searching. Today, the Library has two separate catalogs; the LC Catalog (catalog.loc.gov), which enables search of the Library's physical and some born-digital content; and the E-Resources Online Catalog (eresources.loc.gov), which enables access to the Library's licensed electronic resources. There is no universal search that will allow users to search all Library items in one place. L–CAP will enable users to search both types of content together in a single search interface.

—*Centralized Management of Descriptive Metadata & Support for New Format*

L–CAP will enable the Library to manage its descriptive metadata in a single system that will support multiple metadata formats. Today, the Library manages its collections metadata in the LC Catalog, the E-Resources Online Catalog and the Data Management Tool (DMT). The LC Catalog and E-Resources Catalog only support the aging MARC metadata format. The Library manages approximately 500,000 metadata records for born-digital items in DMT in a non-MARC format that is better suited to digital content. Consolidation of the Library's descriptive metadata in L–CAP will enable Library staff to work in a single system to acquire and catalog content of all types in the metadata formats that best support access to the Library's collections. L–CAP will also sup-

port the new Bibliographic Framework (BIBFRAME) metadata format that the Library is developing, which none of the legacy systems can incorporate.

—*Single Knowledgebase to Undergird Access to Electronic Resources*

The Library currently relies on three separate very large databases to track information about electronic resources, such as electronic journals and e-books and their availability and accessibility:

1. The Library's OpenURL resolver, branded as FindIt!, determines if an item such as a journal article or book is available electronically and what the appropriate copy for a user is.
2. A web-scale discovery product that searches across articles in the Library's licensed electronic resources.
3. A third-party metadata service that delivers bibliographic records and coverage data with customized links to the Library licensed electronic resources.

Having that data in separate databases limits how the information can be leveraged and shared across systems. Under the new system all of that data will be managed within a single knowledgebase that will allow the above functionality to be combined seamlessly within L–CAP.

—*Full Support for Languages and Scripts*

The Library's legacy systems do not support the diverse range of languages and scripts represented in the Library's collections. Library users expect to be able to search in the languages and scripts they know. L–CAP will enable creation of the bibliographic and other data in non-Roman scripts to facilitate the user's ability to find collections materials by searching in those languages and scripts.

—*Integrate with Internal Digital Content Management Systems*

The Library's legacy systems are not able to incorporate new technological developments that are now available in the vendor marketplace, nor can they take advantage of technology modernization advances OCIO has implemented in the Library's IT infrastructure. As the Library modernizes its digital library services and storage, L–CAP will enable further integration across those services, and allow the Library to more easily adapt to innovative new technologies that become available.

Question. What is the Library doing to ensure that no essential services are negatively impacted by the implementation of this new platform?

Answer. The Library has been carefully planning for the next generation Library Collections Access Platform (L–CAP) for several years, with in-depth reviews of current Library systems, available technical solutions, and modern best practices. The effort will be jointly managed by the Library's Office of the Chief Information Officer and Library Services Service Units, bringing together deep technical and subject matter expertise to ensure that requirements and dependencies are fully understood and that the implementation of the new system will integrate smoothly with essential services.

As an extra precaution, the Library intends to maintain and upgrade existing systems and essential services while implementing L–CAP. The Principal Deputy Librarian and Associate Deputy Librarian for Library Services have ensured that the Library will maintain 3 years of vendor maintenance support for the LC Integrated Library System (ILS) and Electronic Resource Management System (ERMS) while developing L–CAP. To prolong the operational life of essential systems, the Library is planning to upgrade ERMS in fiscal year 2021 and ILS in fiscal year 22. These upgrades will ensure the Library can maintain both key legacy systems in production until they can be safely retired. However, both systems are over 20 years old, cannot be expanded to incorporate modern technology, and present growing risks to their sustainability as the years go by.

The request for additional staffing will enable the Library to operate and maintain its essential services while implementing L–CAP and ensure the time for a careful and coordinated transition. The actual migration to the new system will be carefully planned to transition from legacy platforms to L–CAP. For example, collections acquisition activities will close at the end of a fiscal year in the legacy ILS and start in the next fiscal year in the new L–CAP. This will ensure a full closeout and audit trail for the preceding fiscal year in the legacy system and population of subscription orders in the new system in the next fiscal year. Similarly, the Library will migrate patron data from the legacy ILS to the new L–CAP to ensure a seamless transition for our borrowers.

The additional base funding requested as part of the L–CAP effort will also enable continuous development of the system and ensure adequate resources to support new functionality and meet users' evolving expectations.

QUESTIONS SUBMITTED TO HON. DR. CARLA HAYDEN

QUESTIONS SUBMITTED BY SENATOR MIKE BRAUN

SECURITY

Question. Dr. Hayden, the Library included in its fiscal year 2022 budget request significant increases for security related projects. Ensuring the security of the Library's staff and public visitors, priceless collections, and cyber infrastructure are all important goals.

—Can you describe the importance of the security enhancements included in your budget request? Particularly the needs that were identified before the events of January 6?

Answer. We take the safety and security of the Library, both our employees and visitors and our collections and data, very seriously. Even before the events of January 6, we had identified three significant projects that are critical to continue safeguarding our workforce, our national treasures, and the information entrusted to us by Congress and the copyright community.

The overhaul and modernization of the Library's nearly 20-year-old Integrated Electronic Security System (IESS) is critical to supporting the security missions of the Library of Congress and U.S. Capitol Police (USCP). The USCP relies on the IESS as a force multiplier, as it enables a robust platform for a networked electronic access control system, intrusion detection sensor monitoring, and campus-wide closed circuit camera coverage. The IESS is essential for the detection and prevention of criminal activity, providing critical security monitoring for the protection of both life and property at all Library facilities both on Capitol Hill and in outlying locations. The system safeguards the staff, public visitors, priceless collections, and high-value assets. Additionally, the IESS provides important security support and situational awareness for the Library and the entire Capitol Complex perimeter. The events of January 6, 2021, further underscore the importance of the IESS and the need to modernize the system.

Over the last few decades, emergency services have also become increasingly reliant on the availability of reliable cellular connectivity for both internal command and control functions and to quickly and effectively communicate with the public and other external parties. Unfortunately, the Library's architecture precludes strong cellular connectivity without an internal antenna system, and the Library's cellular system is both outdated and inadequate to meet modern demands. The current legacy 3G system was installed in 2004 and is now at the end of its service life. The system is also incompatible with advanced 5G connectivity. The Library's Security and Emergency Preparedness Directorate, the USCP, and the Architect of the Capitol have all requested that the Library upgrade its cellular system to support safety and security operations. Our budget request will allow us to implement a modern cellular solution that will ensure connectivity for USCP, AOC, and Library staff, as well as congressional and other Library visitors. The timing for this project has become critical, because the major cellular providers are ending their support for 3G service. T-Mobile has announced plans to end 3G service on January 1, 2022. The other major carriers are expected to follow. If we do not move forward with a new cellular system quickly, we risk losing cellular service inside Library buildings.

On the cybersecurity front, the threat to the Library and legislative branch data has escalated steadily over the last decade, with increasingly complex attacks regularly identified and prevented. The Library's IT security is constantly tested, with nearly 200,000 attempted cyberattacks a year. We have implemented a very strong IT security program for the Library. However, over the last few years, Cloud technology has advanced rapidly, and it is now a critical part of our IT modernization efforts. As we mature our Cloud hosting, we also need to mature our IT security posture for the Cloud. To stay ahead of the growing sophistication of the most advanced and persistent threats, the Library must be able to maintain and consistently mature a comprehensive suite of cybersecurity tools and training. Our fiscal 2022 request will let us expand the robust IT security protections we've implemented for our traditional IT operations to our Cloud hosted IT systems. We will be using the best tools available and leveraging artificial intelligence to make sure

we can stay ahead of the growing threats coming out of places like China, Russia, Iran, and North Korea.

Following the events of January 6, the Library has identified a number of additional smaller projects that would enhance our ability to respond to emergencies. The projects range from reinforcing collection storage facilities and internal door improvements to replacing the Library's emergency public address system and securing exposed infrastructure cabling. We are also working with the Architect of the Capitol to prioritize a number of significant projects, such as the modernization of the Madison building's over 40-year-old fire alarm system and the hardening of external doors and windows to prevent perimeter breaches.

Question. For security generally and post-January 6, how are you coordinating with other Legislative Branch entities on security?

Answer. The Library maintains close and continuous coordination with the U.S. Capitol Police Operations and Command and Control Bureaus, Physical Security Division, and the Legislative Branch Emergency Management Task Force. The Library's physical security is coordinated through the Capitol Police, with the Library's Security and Emergency Preparedness Directorate an active partner.

The Library is also a very active participant in the Legislative Branch Cybersecurity Working Group and the Legislative Branch Chief Information Security Officer Council. We coordinate closely with the House and Senate Sergeant at Arms, as well as all of the legislative branch technology offices to ensure everyone is on the same page in regards to the threats we are seeing. Our IT security operations center is tied into the Senate cybersecurity threat intelligence platform, and routinely talks with the House, Senate, and the U.S. Capitol Police.

CONCLUSION OF HEARINGS

Senator REED. With that, the Committee will stand adjourned.

[Whereupon, at 3:00 p.m., Wednesday, April 28, the hearings were concluded, and the subcommittee was recessed, to reconvene subject to the call of the Chair.]