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**Before the
Committee on Rules and Administration
United States Senate**

“Library of Congress Modernization Oversight”

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Mr. Chairman, Ranking Member Klobuchar, and Members of the Committee, it is an honor to appear before you today representing the Library of Congress on the important subject of information technology (IT) modernization. I would like to start by thanking the Committee for its support of the Library and our efforts to modernize.

Three years ago, during my confirmation hearing in this very room, we discussed the many challenges and opportunities presented by technology at the Library of Congress. I am pleased today to tell you that we have significantly improved the Library’s IT.

The Library is a different organization than it was just a short time ago. Over the last few years, we have stabilized and optimized our core IT infrastructure. We have streamlined and strengthened our IT management and governance. And we have centralized and professionalized our IT workforce. Altogether, that hard work has allowed us to close as implemented nearly 95% of the IT recommendations made by the Government Accountability Office (GAO) in 2015, and we will keep working until we close 100%.

While we are doing that, we have also started to completely overhaul the technology that powers every part of the agency. For example, the Office of the Chief Information Officer (OCIO) and the Copyright Office are working together to develop a modern Enterprise Copyright System that will make it easier for your constituents to protect their creative works. Modernizing the Copyright Office is a top agency priority. I believe in the team leading this effort -- Register Karyn Temple and Chief Information Officer Bud Barton. I believe in their dedication and commitment to the Library, and I am confident that we will deliver a modernized Copyright system. The Chief Information Officer (CIO) is working with the Congressional Research Service (CRS) to implement a new research and information system to support Congress. He is working with the National Library Service for the Blind and Print Disabled to completely rethink how we deliver content and services to the blind and print disabled communities; and we now have an agency-wide Digital Strategy under which we are leveraging technology to find innovative ways to expand access to our treasures. Embracing user-focused design and agile development, we have also continued to enhance congress.gov, launched a public website for CRS reports, and built a new, more user friendly home for the Constitution Annotated.

With all these efforts, we are transforming the Library into a more digitally enabled agency. While there is still work to be done, we have made great progress, and I am confident that we now have the framework and expertise in place to continue building on the progress made.

Strengthening Library of Congress IT

In its 2015 audits, GAO made 107 total recommendations to improve technology at the Library, including 31 public recommendations, 74 non-public recommendations, and 2 recommendations focused on Copyright Office technology. The recommendations covered IT leadership and strategic planning; IT investment and acquisition management; IT security and privacy; support for mission-specific IT needs; and the importance of coordination across the agency to avoid unnecessary IT spending and duplicative activities.

To date, the Library has implemented and closed 101 of the 107 GAO recommendations, including 27 public, 72 non-public, and both of the Copyright technology findings. Initial evidence has been submitted to GAO for the remaining six findings, and we are working closely with them to achieve 100% closure.

IT Leadership, Governance, and Management

In September 2015, the agency hired a permanent Chief Information Officer (CIO). Shortly after my confirmation in the fall of 2016, I elevated that position to report directly to me, and empowered our CIO, Bud Barton, with the authority and responsibility for all technology at the Library, as recommended by GAO. Under Mr. Barton's leadership, his office has been working steadily to build a framework for IT management and governance that will ensure that technology meets the strategic needs of the Library now and into the future.

The agency has created additional policies, via Library of Congress regulations and directives, to strengthen IT processes and governance mechanisms integral to effective and efficient IT management. As noted in a 2015 Inspector General report, it was once possible for parts of the Library to bypass the agency's IT investment review process. The Library has since changed the IT governance process to ensure all IT investments are identified and reviewed by executive management prior to execution. In addition, approved IT activities are now monitored throughout the investment lifecycle, and we continuously track IT spending across all appropriations to capture the breadth and depth of our IT resources. These changes help ensure accountability internally, to the taxpayers, and to Congress.

Earlier this year, we realigned our IT governance structure to improve our ability to strategically prioritize Library IT projects and investments over multiple years. With this improved structure, the head of each major Library service unit, including the Register of Copyrights and the Director of CRS, serve on the top technology strategy board, giving each part of the Library a voice in the process. We also have empowered a robust IT Project Management Office to ensure best practices are enforced and that major IT projects are developed in a consistent manner across the agency.

Implementing effective governance ensures that IT activities are executed in a way that is repeatable and predictable for cross-agency partners, and addresses expectations from the Office of the Inspector General (OIG), GAO, and the Library's Congressional oversight committees.

IT Centralization

In November 2016, I addressed the need to strengthen our IT management by directing all technology activities be centrally coordinated through the Office of the Chief Information Officer (OCIO). Centralization culminated in October 2018 and represented a significant step to advance our work to address GAO's recommendations. With centralization, Library service units are able to focus on mission-specific operations, and we have a single authoritative source for technology that allows for a more efficient use of IT personnel and contract labor; reduces duplication in software, hardware, and overhead; and improves IT security.

A major part of IT centralization was the creation of an IT Partner Engagement Directorate within OCIO. This Directorate serves as the main interface between the office and the service units. Each service unit has a dedicated customer liaison who works directly with its leadership and staff to identify their specific IT needs and coordinate work across OCIO to ensure those needs are met.

IT centralization can be a challenging process for any organization accustomed to working under a more siloed approach. In the Library's case, it has been a necessary step to ensuring our technology services meet strategic agency objectives, while still providing good customer service to the service units, which remains paramount.

IT Infrastructure and Security

We are grateful for the significant congressional support we have received to stabilize the Library's IT infrastructure. In FY 2017, the Library requested and was approved for a three-year investment to upgrade our data center operations. We are aggressively moving forward to fully transition operations by the end of FY 2020 from the current, aging facility to a hybrid hosting environment that will dynamically support our digital needs, using both a new state-of-the-art data center and the Cloud. In FY 2018 and FY 2019, we built out the new hybrid hosting infrastructure and have begun to migrate core applications. This new approach will provide a more robust and flexible foundation for our technology. It will likewise be more scalable, ensuring our data capacity can grow as we do.

In addition, we have made significant IT security improvements, including closing and implementing major IT security recommendations made by GAO. We have increased coordination across our IT systems security officers, unifying them into one central office rather than dispersing the function across the service units. We have implemented multi-factor authentication for all users, enhancing security protections for access to sensitive Library resources. We have also implemented several cybersecurity enhancements to heighten the detection of threats, thwart

denial of service attacks, protect against malware and enable continuous monitoring so that issues are prevented, and if they occur, quickly identified and resolved.

Modernizing the U.S. Copyright Office is a Top Agency Priority

Copyright Office IT Modernization

The creative community and other users of the Copyright Office deserve a modern, efficient copyright system. The Library, including the Copyright Office and OCIO, are committed to providing all the necessary resources to ensure this modernization effort is a success. Thanks to the generous support of Congress, the Library is now one year into a five-year effort to design and implement a new Enterprise Copyright System (ECS), which will include recordation, registration, and searchable public records components.

In FY 2018 and FY 2019, OCIO and the Copyright Office solicited user experience feedback to inform the design of the new system; made progress in developing an online Recordation system that will for the first time allow users to record information related to copyright ownership using a digital platform; and launched development for a new Public Records system to allow the public to effectively search for information across the entire database of current and historic copyright records.

We are on track to release a Recordation pilot in the spring of 2020. It will be the first component of the ECS released to a population of limited users. In addition, a proof of concept for the Public Records system is scheduled to be released in late FY 2020, and development of the next-generation Registration system is anticipated to go into full scale development later this fiscal year, as well. Using agile software development, the ECS is being built to simplify and automate the online registration process for copyright customers beyond what is currently possible in the existing electronic Copyright (eCO) system.

In addition to ECS projects, copyright.gov has recently been refreshed to unveil a new visual design, improved navigation, security and performance enhancements, and new content and web tools. We released the Copyright Virtual Card Catalog online in FY 2018, and upgraded it in FY 2019 to provide the public easier access to more than 40 million digitized copyright records.

All of these projects have required the close collaboration of OCIO and the Copyright Office during a challenging time of organizational change. Under the leadership of Register Karyn Temple and CIO Bud Barton, the offices have jointly formed a Copyright Modernization Governance Board to act as a modernization steering committee and to facilitate the coordination necessary to accomplish a system transformation of this magnitude. The Copyright Office, with its expertise of both copyright law and its internal systems, provides required business features to OCIO. OCIO then uses its expertise to develop technology solutions to support those features for the Copyright Office.

We are applying lessons learned from GAO and the Library's Inspector General to ensure projects are aligned with the Library's IT governance, project management and development processes. At the direction of Congress, the Copyright Office and OCIO collaborated on the release of a Modified Provisional IT Modernization plan in September 2017. This plan establishes an overall IT modernization strategy for improving user services, and led to the creation of the Copyright Modernization Office (CMO) within the Copyright Office in early 2018. The CMO represents the business interests of the Office, advocating for and optimizing outcomes that deliver on Office's internal and external customer priorities.

Collaborative efforts will continue as modernization goes forward. In fact, I am pleased to announce that the Copyright Office has hired a former OCIO development chief as a senior technical advisor reporting directly to the Register. This advisor will help plan and manage Copyright IT modernization and enhance collaboration between the Copyright Office and OCIO on IT matters, as needed.

Copyright IT modernization will result in a set of systems designed to support specific business functions important to users. Ultimately, the newly developed systems will be cloud-native and will leverage agile development concepts. As new Copyright Office applications are continuously developed, they will be enhanced incrementally through multiple iterations to ensure the Office can maintain a suite of IT services that will facilitate its ability to deliver quality, scalable services for the creative community and American public for years to come.

U.S. Copyright Office Work on Organization, Business Processes, and Change

As the Copyright Office overhauls its technological systems, it is important that it also evaluate and optimize the organizational structures and human resources that utilize these systems. Full modernization requires a multi-pronged approach to review and evaluate not only current processes and workflows in each division, but also the current organizational structure and culture of the Copyright Office itself. The Copyright Office has brought in outside experts to assist with these activities, and will continue to do so as modernization progresses.

First, in FY2018, the Copyright Office engaged the Office of Personnel Management's Human Resources Solutions division to conduct an organizational analysis and redesign. This process, which should be completed in early fiscal year 2020, will provide detailed findings and recommendations on how to achieve more effective operations, including recommendations for staffing levels, position management improvements, and organization restructuring options. The Copyright Office intends to use the resulting analysis to better align the Office with newly automated processes resulting from modernization. Going forward, this work will be helpful in building annual staffing plans, in justifying budget requests for staffing, and with succession planning.

Second, to prepare the organization for modernization initiatives in the coming year, the Copyright Office has contracted with an outside consultant to document current business processes and workflows in each division, working with managers and staff to think creatively about how

processes can improve operational efficiencies and workflows. A third initiative involves organizational change management, which is part of the Office’s strategic plan. A contractor is on-board to support the Office’s ability to adapt to change by building its internal capability and skills to improve communication, break silos, build trust across the organization, become a result-driven organization, and empower employees.

Modernization and Innovation across the Agency

The Library of Congress, as the pre-eminent repository of knowledge for the nation, relies upon technology to serve Congress and its constituents every day. CRS leverages Library technology to provide custom service on demand to nearly every congressional office and standing committee. Digital content on Library web pages are viewed 500 million times per year. The Copyright Office uses technology to manage hundreds of thousands of registrations each year. The National Library Service for the Blind and Print Disabled relies on technology to circulate over 20 million copies of braille and recorded books a year. Technology even allows Library staff to respond to more than a million reference requests a year from Congress, the public, and other federal agencies.

Expanding Digital Access to Library Collections and Programming

We are moving forward in significant ways to increase user access to our materials. OCIO is working with Library Services to begin planning the next generation Integrated Library Services system. New collections management, inventory, and library service platforms will take an integrated approach to managing the full lifecycle of digital and physical collections, replacing a number of legacy home-grown and licensed stand-alone software applications in the first major overhaul in over a decade.

The Library has created a Digital Strategy Office to partner with Library units on creating innovative digital projects to inspire the general public. This new office has launched a successful crowdsourcing transcription project, “By the People,” which allows public contributions to and interactions with digital collections while at the same time helping the Library to make its data more discoverable. Just last month, it was announced that the Library is receiving a \$1 million grant from the Andrew W. Mellon Foundation to explore how our collections can be combined with cutting edge technology to experiment with Big Data and inform other digital research. Our innovative “LC Labs” team will lead this effort.

More than 7 million new items were made available online in FY 2018, among them are the papers of Benjamin Franklin and Presidents Theodore Roosevelt and Woodrow Wilson, and Library staff responded to more than 103,000 reference requests online, including queries handled through the “Ask a Librarian” web page.

OCIO has supported these initiatives, and many more, through the redesign of LOC.gov. The redesign has utilized agile development with continuous integration of content onto the new platform. A hub for dozens of programs, LOC.gov provides access to the Library’s unique subject

matter expertise and millions of digitized items including photos, videos, audio, books, newspapers, maps, and more. New designs have also graced our online exhibitions and catalog, providing improved accessibility and an experience optimized for mobile device users.

Legislative Information, the Law Library, and CRS

Millions of users rely on the Library's web properties for legislative information. These users now have access to more information than in years past with the release of a new congressional committee schedule on congress.gov and a new public website containing every currently published CRS report - over 7,200 published products. And to celebrate Constitution Day this year, we unveiled a new website for the Constitution Annotated – the 3,000 page compendium of how the Constitution has been interpreted over time – that allows users to easily search and browse the full text online and from their smart phone.

OCIO has adopted principles of agile development and continuous delivery for congress.gov, with new content and improved functionality delivered every few weeks. Between FY 2017 and FY 2019, OCIO collaborated with CRS, the Law Library, and congressional staff and stakeholders to complete over 40 major releases of congress.gov that included new features, design enhancements, and performance improvements. With the support of Congress, the Library looks forward to further improving the site to better support Congress and expand public awareness of the legislative process.

Recognizing that Congress and the American people are increasingly using electronic resources, the Law Library is similarly embracing digital services. It has completely digitized the U.S. Statutes at Large – the official print version of U.S. Law – and added metadata to make the collection more discoverable. The Law Library has also started a large multi-year effort, in collaboration with the Government Publishing Office, to digitize and make accessible volumes of the U.S. Congressional Serial Set dating back to the first volume published in 1817.

The Library continues to invest resources into delivering information to Congress. With FY 2019 congressional funding, OCIO and CRS have worked together to complete a pilot for a modernized authoring and publishing tool, known as the Integrated Research Information System (IRIS). The full system is expected to be complete by the end of FY 2024. IRIS will leverage the latest advances in web-based technologies to provide more efficient service to Congress and support innovation in CRS operations, while continuing to protect the security and confidentiality of congressional data. The modernized system will change the model for producing CRS products from a paper-based approach to a digital-first approach, as well as support additional platforms for which there has been a growing demand in Congress, such as service via mobile devices. We look forward to continuing to engage with Congress as we boost CRS' ability to provide timely, objective, nonpartisan and confidential research to Members and staff.

Preparing the National Library Service for the Blind and Print Disabled for the 21st Century

The National Library Service for the Blind and Print Disabled is modernizing its technology to meet the needs of Americans who are blind, visually impaired or print disabled. In 2017, the National Library Service launched a new homepage with enhanced accessibility features for the visually impaired. The Braille and Audio Reading Download (BARD) mobile app, which launched in 2015, continues to grow in use. There are now more mobile app users than users of the original BARD website. With the support of Congress, OCIO will work to support BARD's scalability in FY 2020 by beginning a three-year effort to move BARD to the cloud.

This year, OCIO has been working closely with the National Library Service to enhance several systems that support their mission. A multi-disciplinary team collaborated to upgrade the BARD's infrastructure to support increasing user demand, make its front-end user interface more intuitive for print disabled PC users, and improve overall system performance.

Looking to the future, the National Library Service is implementing an ambitious plan to convert braille and talking book materials to modern digital formats and to take advantage of new technologies, such as voice recognition and artificial intelligence, to provide more books to more eligible patrons at a lower overall cost. We look forward to continuing to work with Congress and stakeholders in the blind and print disabled communities as the National Library Service modernization takes shape.

In Conclusion

In closing, the Library has made significant progress in righting our technology ship since 2015, and we are dedicated to accomplishing the work that lies ahead. We have a well-designed roadmap in place to enable the agency to be truly user-centered and more digitally enabled for Congress, researchers, and all of your constituents visiting our websites at home. We are optimizing our information technology to support a more agile technology landscape that can adapt to each business unit's needs, and we are strongly committed to advancing critical modernization projects within a IT centralized framework, including the essential services of the U.S. Copyright Office.

I thank you again for your continued interest and support for the Library of Congress, and for inviting me to update the Committee on these topics.