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In accordance with Rule XI, clause 2(g)(5)*, of the *Rules of the House of Representatives*, witnesses are asked to disclose the following information. Please complete this form electronically by filling in the provided blanks.

Committee: Appropriations

Subcommittee: Legislative Branch

Hearing Date: March 4, 2020

Hearing Subject:

FY2021 Budget Request

Witness Name: M. Anthony Mills

Position/Title: Director of Science Policy

Witness Type: Governmental Non-governmental

Are you representing yourself or an organization? Self Organization

If you are representing an organization, please list what entity or entities you are representing:

R Street Institute

If you are a **non-governmental witness**, please list any federal grants or contracts (including subgrants or subcontracts) related to the hearing's subject matter that you or the organization(s) you represent at this hearing received in the current calendar year and previous two calendar years. Include the source and amount of each grant or contract. *If necessary, attach additional sheet(s) to provide more information.*

If you are a **non-governmental witness**, please list any contracts or payments originating with a foreign government and related to the hearing's subject matter that you or the organization(s) you represent at this hearing received in the current year and previous two calendar years. Include the amount and country of origin of each contract or payment. *If necessary, attach additional sheet(s) to provide more information.*

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Witness signature

March 4, 2020

Date

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- Written statement of proposed testimony
- Curriculum vitae or biography

*Rule XI, clause 2(g)(5), of the U.S. House of Representatives provides:

(5)(A) Each committee shall, to the greatest extent practicable, require witnesses who appear before it to submit in advance written statements of proposed testimony and to limit their initial presentations to the committee to brief summaries thereof.

(B) In the case of a witness appearing in a nongovernmental capacity, a written statement of proposed testimony shall include a curriculum vitae and a disclosure of any Federal grants or contracts, or contracts or payments originating with a foreign government, received during the current calendar year or either of the two previous calendar years by the witness or by an entity represented by the witness and related to the subject matter of the hearing.

(C) The disclosure referred to in subdivision (B) shall include—

(i) the amount and source of each Federal grant (or subgrant thereof) or contract (or subcontract thereof) related to the subject matter of the hearing; and

(ii) the amount and country of origin of any payment or contract related to the subject matter of the hearing originating with a foreign government.

(D) Such statements, with appropriate redactions to protect the privacy or security of the witness, shall be made publicly available in electronic form not later than one day after the witness appears.

**Written testimony of M. Anthony Mills, director of science policy, R Street Institute
Submitted to the U.S. House of Representatives, Committee on Appropriations,
Subcommittee on the Legislative Branch
March 4, 2020**

Dear Chairman Ryan, Ranking Member Herrera Beutler and members of the subcommittee:

Thank you for considering my testimony. I am director of science policy at the R Street Institute, and I write you today concerning prospects for increasing scientific and technical expertise in Congress.

It is well known that scientific and technological (S&T) advances are transforming the ways we communicate, produce goods and services, and conduct warfare, among other things. At the same time, our governmental institutions—Congress in particular—are not sufficiently prepared to tackle the many challenges and opportunities posed by these developments. In response to this perceived gap between the technical capacity of our elected officials and the growing importance of S&T, a bipartisan movement has gained momentum on Capitol Hill to equip Congress with more and better expertise.

However, there is no consensus as of yet about how best to achieve this. Different proposals have been proffered: refunding and reforming the Office of Technology Assessment (OTA); expanding the S&T capabilities of existing congressional agencies, such as the Governmental Accountability Office (GAO) or the Congressional Research Service (CRS); and creating a new congressional agency devoted to the task, to name a few. Thanks to the leadership of this subcommittee, multiple entities within Congress have expressed varying degrees of interest in some or all of these proposals.

To determine the best path forward, we should first clarify the nature of the problem we are trying to solve. What do we mean by “technical expertise” and how is it supposed to help or inform the lawmaking process? To what problem is “more and better technical expertise” an intended solution? Answering such questions will help us understand and evaluate current proposals to improve Congress’s S&T capacity.¹ To begin, I’d like to look briefly at the historical context that led to the creation of the OTA.

Historical Background

The concept of “technology assessment” (TA) dates to the early 1960s, when the newly formed House Subcommittee on Science, Research, and Development, a subcommittee of the Committee on Science and Astronautics, held a series of hearings on ways to improve Congress’s “scientific and technical” decision-making capacity. The term was coined by subcommittee counsel Philip Yeager as a way “to describe the means of informing the Congress of the potential undesirable effects of new technology.”² It was popularized by Rep. Emilio Daddario (D-Conn.), chairman of the subcommittee, over the course of a protracted series of debates in Congress that spawned a

¹ See M. Anthony Mills, “The Many Meanings of ‘Technology Assessment,’” from which these remarks are partly adapted. <https://lincolnpolicy.org/wp-content/uploads/2020/02/MILLS.pdf>.

² Peter D. Blair, *Congress’s Own Think Tank: Learning from the Legacy of the Office of Technology Assessment (1972–1995)* (New York: Palgrave Macmillan, 2013), p. 12.

scholarly literature on TA and culminated in the creation of the OTA in 1972. What spurred Congress to act?

World War II transformed the public role of science and technology in the United States. During the war, the federal government began making substantial investments in and exerting considerable control over science and technology. By the 1950s, the federal government was by far the biggest patron of science, including both applied and basic research.³ The growth and creation of federal research institutions and projects in the postwar period, from the national laboratories to the Apollo program, exemplified this new partnership between science and government.⁴ Thus, in the postwar era, technological innovation driven by scientific discovery became increasingly vital for social and economic life.

These developments are pertinent to the OTA's origins in at least two ways. First, as the government became more involved with science and technology, it was the executive branch—particularly the Department of Defense—that took the lead, rather than the legislature. Besides footing the considerable bill for both government-backed and government-controlled R&D, Congress played little more than a perfunctory role in S&T policy. The executive branch, meanwhile, was spending more and more on basic and applied research, both in house and in nongovernmental research institutions supported by federal dollars.⁵ Not only did Congress cede S&T policy to the executive branch, it also found itself without the technical expertise needed to oversee the executive branch in these increasingly important areas, including the allocation of federal dollars for R&D.⁶ Congress's relative lack of technical expertise was thus a symptom of a larger trend: the weakening of congressional capacity that left the national legislature ineffective and overly deferential to executive agencies.⁷

Second, the postwar period saw increasing anxiety over the pace and effects of developments in both fields: growing consciousness of technology's social and environmental impacts, including public concerns related to nuclear power and the arms race; and anxieties about the perceived alliance between scientific research and the military, exacerbated by the Vietnam War.⁸ A growing chorus of environmentalists, social critics, philosophers and activists began to perceive science no longer as a servant of the public weal but as a handmaiden of the so-called military-industrial complex. There emerged a popular desire to “control” technology or even to arrest its development altogether.⁹

³ See Daniel Kevles, *The Physicists: The History of a Scientific Community in Modern America* (New York: Alfred A. Knopf, 1978).

⁴ See Peter Galison and Bruce Hevly, eds., *Big Science: The Growth of Large-Scale Research* (Stanford: Stanford University Press, 1992).

⁵ See “Technology: Process of Assessment and Choice,” National Academy of Sciences (NAS), Committee on Science & Astronautics, H.R. Report (July 1969), p. 24.

⁶ See Bruce L. R. Smith and Jeffrey K. Stine, “Technical Advice for Congress,” in *Science and Technology Advice for 12 Congress*, M. Granger Morgan and Jon M. Peha, eds. (Routledge, 2003), p. 31.

⁷ See, for example, Edward M. Kennedy, “Toward the Year 2000,” address before the World Future Society, June 3, 1975, reprinted in the *Congressional Record*, June 17, 1975, p. S10787.

⁸ See, e.g., the NAS report, “Technology: Process of Assessment and Choice,” *op. cit.*, p. 1.

⁹ See, e.g., Robert M. Margolis and David H. Guston, “Origins, Accomplishments, and Demise of OTA,” in *Science and Technology Advice for Congress*, M. Granger Morgan and Jon M. Peha, eds. (Routledge, 2003), pp. 54–55.

We should understand Congress's decision to create the OTA in this context: the weakening of Congress vis-à-vis the executive branch and a popular backlash against tech.

Three Rival Versions of Technology Assessment

Although clear about the need for a new congressional entity devoted entirely to TA, the Technology Assessment Act is ambiguous about the meaning and purpose of TA. At least three motivations for and attendant understandings of TA may be discerned in the text of the statute.

The first is what might be termed “canonical TA.” According to this definition, TA aims to “identify existing or probable impacts of technology or technological programs.”¹⁰ The motivation here is to understand and anticipate the nature and the “physical, biological, economic, social, or political effects” of emerging technologies so that benefits may be reaped and deleterious effects avoided or mitigated.¹¹ This is what is often referred to as TA’s “early warning” function. It tracks the popular anxieties of the day about the secondary and tertiary consequences of technology—effects other than those intended by the technology itself, be they positive or negative.¹² Thus understood, TA is a wide-ranging and holistic evaluation of the natures and effects of emerging technologies—what economist Guy Black characterizes as a “cross-disciplinary, problem-oriented and generalist type of expertise.”¹³

A second, narrower understanding of TA may also be discerned in the Technology Assessment Act. According to this view, S&T advice is needed as an input to guide the lawmaking process. As the statute puts it: “It is necessary for the Congress to equip itself with new and effective means for securing competent, unbiased information concerning” the effects of technology.¹⁴ The idea here is not so much to weigh the probable beneficial or adverse impacts of technology as to ensure that laws are formulated (or executive agencies overseen) in the light of the most up-to-date and reliable expert opinions. In this view, what Congress requires is more—and more reliable—technical information, typically of the quantitative variety. This is what might be termed “informational TA.”

A third motivation for—and attendant understanding of—TA is to provide Congress with its own in-house source of expertise, so as to decrease its dependence on the executive branch. According to the Technology Assessment Act, “the Federal agencies presently responsible directly to the Congress are not designed to provide the legislative branch with adequate and timely information, independently developed, relating to the potential impact of technological applications.” Moreover, “the present mechanisms of the Congress do not and are not designed to provide the legislative branch with such information.”¹⁵ The goal of such “legislative and oversight TA” is to empower Congress to deliberate on S&T policy challenges itself or else conduct meaningful oversight of executive agencies.

Though interrelated, these three definitions of technology assessment are conceptually distinct.

¹⁰ Public Law No. 92-484, 92d Congress, H.R. 10243 (October 13, 1972).

¹¹ *Ibid.*

¹² See, for example, NAS, p. 26.

¹³ Guy Black, “Technology Assessment—What Should It Be?,” Staff Discussion Paper 211, Program of Policy Studies in Science & Technology, George Washington University (1971), p. 3.

¹⁴ Pub. Law No. 92-484, 92d Cong., H.R. 10243 (1972).

¹⁵ *Ibid.*

Consider that canonical TA is neutral with respect to *who* performs technology assessments. If TA is a matter of evaluating the potential effects of emerging technologies, then it is something that could, in principle, be performed by any branch of government or qualified private organization.¹⁶ For its part, informational TA need not encompass the more holistic, cross-disciplinary and qualitative components that are central to canonical TA. Nor is there any reason, at first sight, to assume that such informational expertise should be housed in an explicitly political institution such as the U.S. Congress (as opposed to other governmental or academic institutions). In contrast to these, legislative and oversight TA is explicitly political in motivation, intended to help Congress take power back from the executive branch. Its goals are primarily institutional rather than informational.¹⁷

All three conceptions of TA were clearly discernible in the debates that led up to the creation of the OTA and are reflected in the language of the statute itself. Yet, as a matter of historical fact, the political arguments that won the day were those that appealed first and foremost to Congress's institutional needs. Congress needed "better information and advice" to "make decisions which involve the use of new technology"—which is to say, informational TA.¹⁸ Thus OTA was promoted by its supporters as a partial solution to the problem of congressional capacity. In effect, informational TA was needed to shore up legislative and oversight TA, empowering Congress to both make decisions about S&T and rein in executive agencies.

An unintended result of this institutional justification for the OTA was that canonical TA tended to get overshadowed in political debates and, ultimately, in the practice of the OTA itself.¹⁹ Over time, the OTA evolved into a "more information-oriented agency, as opposed to a policy advocate 'assessing' alternatives," one that "more closely resembles the CRS than it did in its hypothetical stage."²⁰ Even the political motivation for outfitting Congress with S&T information—legislative and oversight TA—would recede from institutional memory. By the time congressional Republicans began calling for the OTA's elimination in the 1990s, arguments about the secondary and tertiary effects of technology or the expansion of the administrative state were conspicuous only by their relative absence. Instead, debates over the OTA's future tended to focus on whether the office was duplicative of other information-oriented service agencies.

Conclusion

Armed with this historical background and these conceptual distinctions, we are better positioned to assess current proposals for improving S&T expertise in Congress and chart a course forward.

¹⁶ Indeed, some early proposals included an executive branch technology assessment office or a hybrid.

¹⁷ See David Whiteman, "Technology Assessment," in *The Politics of Technology Assessment*, David O'Brien and Donald Marchand, eds. (Lexington Books, 1982).

¹⁸ House of Representatives, Congressional Record (February 8, 1972), p. 3203. Quoted in Kunkle, "New Challenge or the Past Revisited?," *op. cit.*

¹⁹ See Peter D. Blair, "Technology Assessment: Current Trends and the Myth of a Formula," adapted from plenary remarks at the First Meeting of the International Association of Technology Assessment and Forecasting Institutions (May 2, 1994), https://www.princeton.edu/~ota/ns20/blair_f.html; Blair, *Congress's Own Think Tank*, *op. cit.*; Bimber, *The Politics of Expertise in Congress*, *op. cit.*; and Kunkle, "New Challenge or the Past Revisited?," *op. cit.*

²⁰ Kunkle, "New Challenge or the Past Revisited?," *op. cit.*

Today, a quarter-century after the OTA was shuttered, the canonical conception of TA as an early warning system is largely absent from policy debates about congressional expertise. Surprisingly, even the institutional dynamics that originally drove the creation of the congressional agency, namely the relative weakening of Congress vis-à-vis the executive, tend to get short shrift. Instead, current proposals—e.g., creating a nimbler and “networked” S&T advisory body for Congress or outfitting the CRS or the GAO with greater capacity to offer timely S&T advice to all members—mostly focus on Congress’s informational needs. Implicit in these proposals is the idea that inputting more and better expert information into the legislative process will improve that process and produce better policy outcomes.

There is little doubt that members and their staffs are busy and would benefit from more adequate ways to access and discern trustworthy and reliable S&T expertise—informational TA. This would very likely improve the lawmaking process and may even lead to better policy outcomes. If this were all that was needed, proposals to augment existing congressional capabilities might well be sufficient to fill the expertise gap. But increasing Congress’s S&T capacity is not only vital for such technocratic reasons. Framed in terms of the broader historical and conceptual issues at stake, efforts to satisfy Congress’s informational needs are plainly necessary but not sufficient.

It is no less true—in fact, it is arguably *more* true—today than when the OTA was created that there is an imbalance of power between the legislative and executive branches partly resulting from an imbalance of expertise.²¹ As in 1972, Congress needs informational TA *as well as* legislative and oversight TA. What’s more, in an age of populist anxiety and backlash against tech, there is urgent need for citizens and their representatives to be able to deliberate together about the social, ethical and political impacts of emerging technologies with requisite expert involvement and a plurality of stakeholders. This is precisely what canonical TA was intended to facilitate—and it is something a revived and reformed OTA would be well positioned to help us achieve.

Efforts to build such a capacity out of existing congressional capabilities, such as the GAO, are welcome. But the simplest path forward would be to revive the OTA by providing sufficient funds for a pilot program in the next legislative appropriations bill, as the House Appropriations Committee has previously done. (The authorizing statute remains on the books and OTA funding lies within the jurisdiction of this subcommittee.) What, precisely, should such a congressional agency look like? How should it be organized and operate? Such questions are open to debate. This subcommittee should continue to stimulate and lead that debate by proposing funds to reopen the OTA.

Thank you for your time and consideration. I would be happy to answer any questions the subcommittee or its staff may have.

²¹ M. Anthony Mills, “Congress’s Knowledge Deficit Renders it Powerless,” *The Fulcrum*.
<https://thefulcrum.us/balance-of-power/balance-of-power-congress>

Biography: M. Anthony Mills is director of science policy at the R Street Institute, a think tank headquartered in Washington, D.C. R Street's science policy program aims to equip policymakers with more and better scientific expertise and to advance public policies that stimulate scientific research. Dr. Mills researches and writes about a range of topics including science and technology and the role of expertise in governance. He holds a bachelor's degree in philosophy, French and comparative literature from Northwestern University, where he also received a master's degree in French, as well as a Ph.D. in philosophy from the University of Notre Dame.