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Superior speed and superior cost define high performance computing, which is always a relative idea. Although typically associated with the CDC6600—famously, the world fastest computer from 1964 to 1969 with over 100 units sold at about $7-10 million each—the notion of high performance computers (HPCs), or supercomputers, as a distinct type of machine began to emerge in the late 1950s.\(^1\) This is when the measuring stick of computing capacity as the number of floating point operations per second (FLOPS) was standardized at the American national laboratories tasked with the nuclear weapons design.\(^2\) Since then, the pursuit of speed chiefly by the means of the hardware design and architecture has distinguished the supercomputer from the computer. Since then and into the 1980s, American supercomputing knew no overseas rivalry. Exclusive devices that only governments and the military could afford, the supercomputers of the long 1970s entailed a nexus of computational and political power, meaning that their histories are the foremost histories of technopolitics.

In his article, Mario Daniels aptly calls HPCs the “perfect objects of techno-diplomacy” (755-781, 755). Overviewing the US export controls of HPCs during the detente era, “Safeguarding Detente: U.S. High Performance Computer Exports to the Soviet Union” advances a double argument. Daniels demonstrates that the controls were a key site where the principles of detente politics were translated into practice by focusing on the combined strategic and symbolic importance of supercomputer technology in the diplomatic negotiations of the 1970s. Daniels studies five particular cases of the HPCs export to the Soviet Union to analyze a system of safeguards at the heart of US detente policy, explaining its rise and fall in line with the debates among the experts. Following alternative interpretations, the article traces a key shift in understanding supercomputers not as stable artifacts but ‘learning devices,’ that is the devices potentially enabling advanced technological cultures. This was a key conceptual shift illuminating how US export control policy moved from the regulation of physical goods to the control over know-how (778).

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\(^1\) For an introduction to supercomputing technologies visit the Computer History Museum’s online exhibition on supercomputing at https://www.computerhistory.org/revolution/supercomputers/10/intro, last accessed on 1 Dec 2022.

The importance of Daniels’s insightful and well-documented arguments is multiplied dramatically by the striking negligence of the topic by historians of international relations and by historians of science and technology alike. On the one hand, a far cry from high profile and high impact crises and flagship international events such as the International Geophysical Year, export controls of technologies are simultaneously cryptic and mundane, generating only limited attention from a small number of specialists. On the other hand, supercomputing is renowned and understudied: the small ‘personal’ has long prevailed over the glamorous ‘super.’ While technical descriptions of particular supercomputers and celebrations of individual designers are in abundance, larger narratives are lacking, overshadowed by historians’ and media scholars’ interest in miniaturization and popular digital cultures.\(^3\)

Beyond the simple fact that Western supercomputers were sold to the Soviet Union is a notoriously difficult question of how we describe the Cold War: is it a story shaped by divisions or by choreographed interactions? Paul Edwards’s 1997 *The Closed World: Computers and the Politics of Discourse in Cold War America* established a paradigmatic image of the computer as a ‘cold war’ machine reproducing the closed spaces of the military control rooms on a global, geopolitical scale.\(^4\) Undoubtedly correct for certain areas of application, the metaphor is misleading when it becomes all-encompassing and is belied by the proliferation of computer-related ideas, objects, and people circulating across national borders. The history of the computer as a ‘cold war’ machine, meaning both competition and the entanglement of the capitalist and socialist modernities, is yet to be written.\(^5\) The five cases discussed by Daniels—the supercomputer for the Serpukhov proton synchrotron, the Kama truck factory, the booking systems of the Soviet tourist agency Intourist and the airline Aeroflot, and the failed case of the Moscow’s data center belonging to the UN’s global meteorological network—highlight the fact that Cold War history of science and technology and the history of the Cold War international relations share intellectual agenda and some of the methodological challenges. In particular, the challenges include the mystification of Soviet computational scarcity, the transnational embedding of bilateral relations, and the opacity of the expert-power nexus.

Computational scarcity is no less of a relative concept than supercomputing. Heavily instrumentalized by both the American observers and the Soviet computer experts themselves, the notion of the computer gap separating the capitalist ‘haves’ from the Soviet ‘have-nots,’ is not always analytically potent as an explanation for actor motivations. In fact, most of the post-war world did not possess American economic power and the share of computational resources that came with it. Famously, the Washington embargo on CDC6600 for the French nuclear program triggered the national ‘Plan Calcul’ policy approved by President Charles de Gaulle in 1966.\(^6\) But more importantly, the arguments based on scarcity are negative arguments. Privileging absence,
the notion of scarcity does not help to elucidate how the computers on the ground were embedded in other technologies.

The case of the supercomputer for the Serpukhov proton synchrotron is characteristic of this integration, complicating received ideas about Soviet technological failure and the unidirectional flow of knowledge. At the time of its construction in 1967, the accelerator held the world record in beam energy attracting a global community of researchers in particle physics. The Serpukhov installation thus belongs to a complex scientific and international landscape that helps explain the Soviet acceptance of the safeguards regime. The recollections of local nuclear scientists are silent about the British supercomputer and the significance of its sale, personally authorized by President Richard Nixon. Rather, their work, life, and folklore were influenced by the bubble chamber ‘Mirabelle,’ President George Pompidou’s visit, and a house purposefully built to accommodate some two hundred scientists and their families, which is still known as a ‘French house’ among the locals.\(^7\) CERN bulletins from the period also show that local computational cultures were entangled with scientific data analysis: data-tapes from CERN-Serpukhov experiments were flown to Geneva to be processed on CDC6600 with a telex printout of the results in the Soviet control rooms. In order to accelerate data processing, direct links between the BESM6 computer and CDC3100 were being developed by August 1970.\(^8\) Although anecdotal, these points of evidence highlight that the presence of Western engineers required by export controls might have not been perceived as an ‘intrusion’ that was accepted by the Soviets out of despair. Rather, the relativity of computational scarcity and its capacity to stimulate transnational exchanges transcending bilateral frameworks demand the further exploration and taking into account of the bottom-up agency of the experts.

In this respect, Daniels’s close reading of the 1976 report criticizing computer safeguards by J. Fred Bucy of Texas Instruments and his panel of experts is particularly interesting and invites further considerations about who navigated the boundaries separating different elements of the Cold War university-military-industrial complex and power structures as well as how they did so. Daniels observes that “in the 1970s, export controls had become first and foremost about the regulation of computers” and correlates this observation with the affiliations of committee members—one of the four subcommittees working out the details of the ‘Bucy Report’ consisted of representatives of the semiconductor industry (776). Yet questions remain regarding the importance of individuals and their communal loyalties. What made the semiconductor industry representatives a credible authority in the first place? Why not invite the representatives of the professional organizations such as the Association for Computing Machinery (ACM), whose leadership had been among the first visitors to the Soviet Union during the bilateral Soviet-American computer experts exchanges of the late 1950s? Why not the include experts from RAND, the think-tank that did not shy away from hosting Soviet visitors and published English language reviews on Soviet and East European computing and cybernetics, accumulating tremendous regional expertise? Finally, semiconductor industries were hardly unanimous in their disinterest in closer ties with the Soviets either as witnessed by later events. A Sun Microsystems delegation flew to Moscow in 1992: the Americans were searching collaborations with Russian


developers who had already conducted negotiations with several foreign firms. In 2004, Boris Babayan, the Lenin Prize winner and the chief architect of the Soviet supercomputers ‘Elbrus,’ was named an Intel fellow.⁹

In *Science, Cold War and the American State*, Allan Needle observes that historicizing the Cold War relationships among experts, security apparatus, and politicians is extraordinarily complex given that neither community was monolithic.¹⁰ “Safeguarding Detente” performs just such an extraordinary analysis. The article advances our understanding of computer export controls as a Cold War technocratic initiative and invites further dialogue between the history of science and technology and international relations.


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