



MAKING *the* MODERN WORLD

Public-Private Partnerships and Advancements in Science and Technology from 1955 to 1975

PART 3 OF 4



In developing a prototype video game console, Ralph Baer wrote a four-page proposal to his superiors at Sanders Associates and was given \$2,500 and the aid of his colleagues Bill Harrison and Bill Rusch to develop the “Brown Box.” Baer was awarded a patent for the machine on April 17, 1973 and in his filing, he defined a video game console as “an apparatus for generating ‘dots’ upon the screen of the receiver to be manipulated by a participant.” In recognition of Ralph Baer’s efforts, President George Bush awarded him the National Medal of Technology in 2006. (Courtesy of the Smithsonian Museum of American History)

I’m in a military electronics company and I’m starting to write a document saying to myself, ‘How do I write this? This has nothing to do with anything!’ So, I made it sound like it applied to whatever the hell it was I was supposed to be doing. The first thing I don’t do is call it a toy. But I can call it gaming.

—Ralph Baer, *The Father of Video Games*

INTRODUCTION

Physicists, computer scientists and hardware engineers invented video games during the Cold War; military concerns framed the work lives of William Higinbotham, Steve Russell, and Ralph Baer. Higinbotham had previously worked at the atomic laboratory in Los Alamos, where he designed electronics for the world’s first atomic bomb. Steve Russell worked in a laboratory at MIT principally concerned with the development of artificial intelligence. Defense contractor Sanders Associates employed Ralph Baer in the construction of electronic circuit boards.

Their lives did not occur in a vacuum. Higinbotham, Russell, and Baer all let their imaginations take them beyond their immediate tasks. The three grafted interactive concepts of visual play onto hardware originally designed for military purposes. As each man built upon their predecessor’s work, the progenitor to the video game and the video game console was made real.

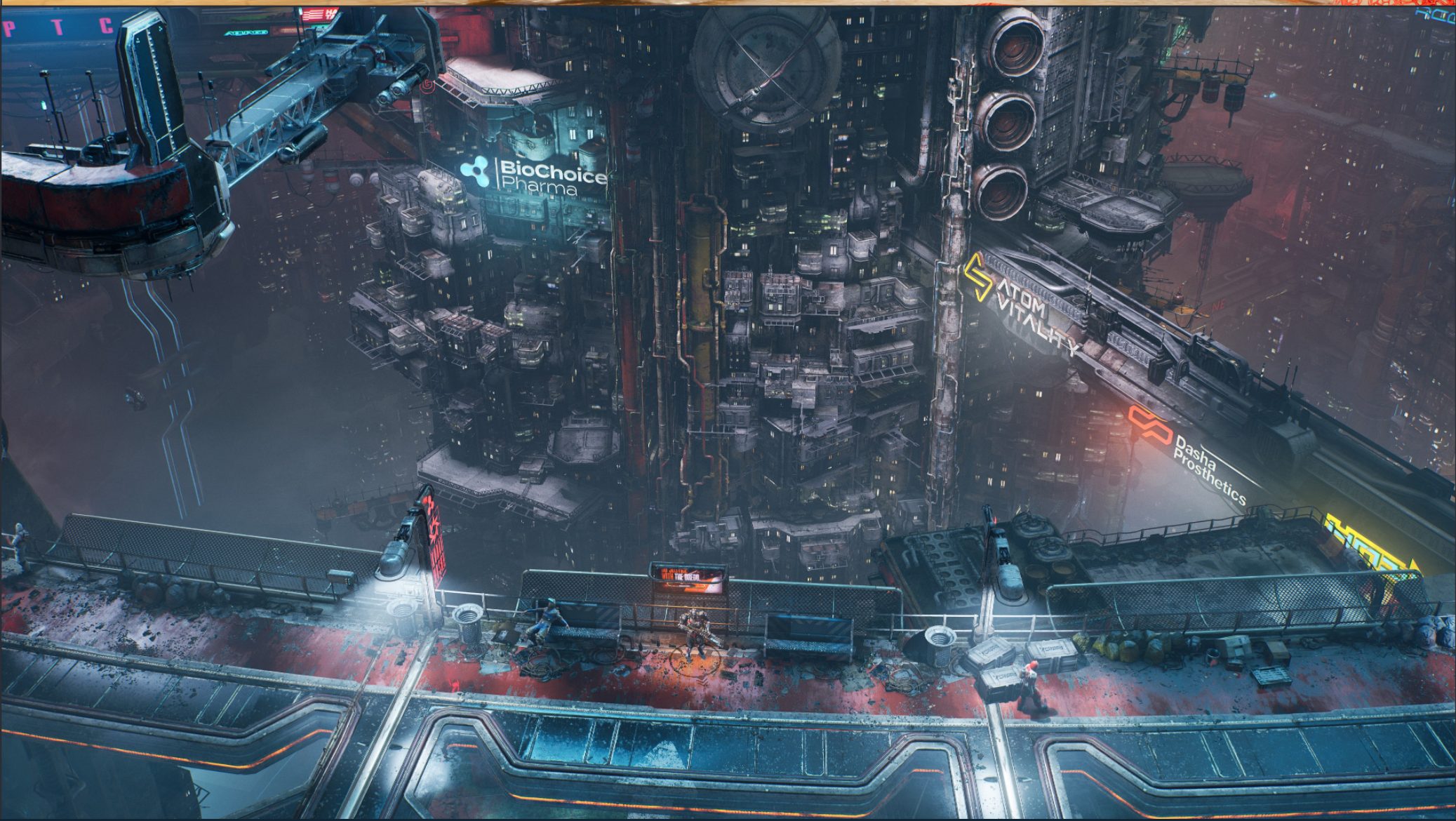
VIDEO GAMES

In 1958, American physicist William Higinbotham created and displayed the game *Tennis for Two* on an oscilloscope at Brookhaven National Laboratory in Long Island, New York. The laboratory was established in the 1940s under the then U.S. Atomic Energy Commission (now the U.S. Department of Energy) to conduct research in atomic energy, where it benefited from prominent public-private partnerships with Columbia University, Cornell University, Harvard University, Johns Hopkins University, MIT University, Princeton University, University of Pennsylvania, University of Rochester, and Yale University, among others. Realizing that science exhibits tended to be static and noninteractive, Higinbotham created *Tennis for Two* to showcase the power of digital computing. He stated, “[it] might liven up the place to have a game that people could play, and which would convey the message that our scientific endeavors have relevance for society.”

The 1962 game *Spacewar!* is considered the originator of the modern video game. The game featured two ships fighting in outer space, which fittingly placed it at the center of the U.S. and Soviet struggle for dominance in the “Space Race.” The game’s 1962 release occurred five years after *Sputnik I* took orbit, and seven years before the U.S. successfully landed on the moon. In stark contrast to *Tennis for Two*, creator Steve Russell and his team at the Massachusetts Institute of Technology laboratory used technology that would be familiar to modern gamers. *Spacewar!* players used buttons to maneuver their ship and fire weapons; their physical inputs were then visually displayed on a monitor. Because Russell and his team programmed the game on a Digital Equipment Corporation PDP-1 microcomputer using a programming language called LISP, *Spacewar!* could be installed on other PDP-1 computers at other institutes, making it the first video game to become available outside a single research institute. In appearance and style of play, *Tennis for Two* and *Spacewar!* foreshadowed games like *Pong*, *Asteroids*, and *Pac-Man*, which were commercially released in 1972, 1979, and 1980, respectively.

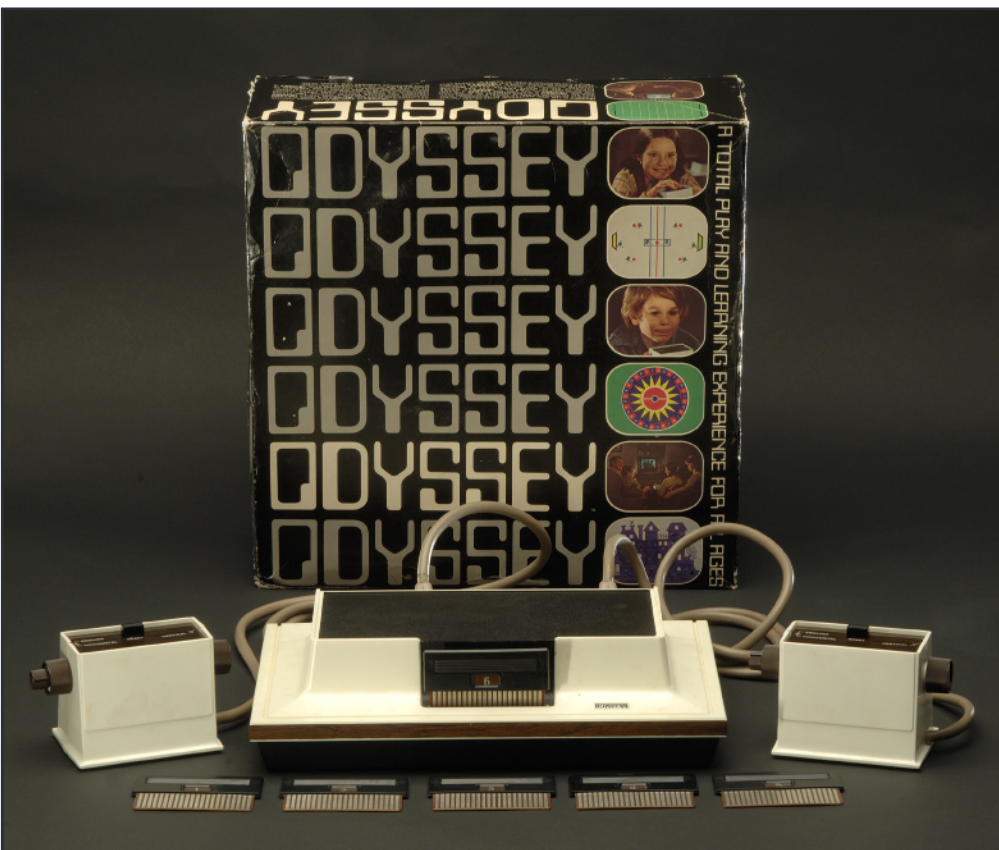
GAMING CONSOLES

Though Steven Russell invented the first distributable video game, the computer it ran on sold for \$120,000 in the 1960s, which was equivalent to more than \$1,000,000 dollars in 2020. While working for Sanders Associates, an electronics company that constructed flexible circuit boards for the U.S. military, German-American hardware engineer Ralph Baer recognized the proliferation of cheap home television sets made mass development of video games possible. He persuaded his supervisors at Sanders to grant him financial and personnel resources to develop a prototype, which the team named the “Brown Box,” so-called because the brown tape that covered the console gave it a wood veneer. Sanders Associates licensed Baer’s creation to Magnavox, which released the world’s first video game console, the Odyssey, in 1972.



From their nascent beginnings, modern video games are now a staple of global culture and feature prominently in electronic sports, literature, film, and television. Despite mainstream success, as was the case with their invention, independent developers continue to wield great influence in the industry over story-telling, graphics, and gameplay design. (Courtesy of Raccoon Logic and Neon Giant)

Following Magnavox’s introduction to the market, the world required only three generations of video game console systems to establish the industry as a leading global entertainment medium and art form, easily rivaling that of television and film. Emblematic of the second generation of consoles, in September of 1977, Atari released the 2600 console. Across its lifetime, the Atari 2600 sold more than 30 million units worldwide. The Nintendo Entertainment System was introduced to the United States in February of 1986, and, throughout its lifetime, sold more than 60 million units worldwide.



Baer’s “Brown Box” was sold for distribution to the Magnavox, a television company, which designed and released the Odyssey in September of 1972 as the world’s first commercially available video game console system. Sales were initially poor due to price and consumers’ poor understanding of the technology; many customers believed a Magnavox television was required to make the system function. To buoy sales, Magnavox lowered the console’s price and bundled it with televisions. By the time of its discontinuation in 1975, the console had sold more than 350,000 units worldwide. (Courtesy of the Smithsonian Museum of American History)

With the ninth generation of consoles released in 2020, games have become more ubiquitous than ever before, and are available on cell phones, tablets, virtual reality systems, and home computers worldwide.

Beyond the “Brown Box’s” 1970s aesthetic, the birth of video games and consoles was also indicative of their Cold War origins. Early video game design mirrored principles guiding military hardware itself: It must be simple to learn and easy to use. In designing controllers to his system, Baer drew inspiration from his work in military hardware. He used dials akin to tuning a radio, and attached metallic life-like firearms with interior electronics that communicated with the console system. Later video game consoles came with “joysticks” that mimicked the flight controls of military aircraft.

CONCLUSION

Like their colleagues developing transistors and microchips, GPS navigation, and networked computing, early game designers developed technologies in laboratories, technology, and equipment subsidized by the U.S. government that transcended their immediate Cold War purposes to shape our modern world. In the process, video game pioneers invented a novel virtual medium that fundamentally melded art and science. Yet their creation was more than engineers following their passion; video game inventors revisited existing technology with fresh perspectives to ask new questions and drive innovation. Public-private partnerships incentivized and exponentially increased the speed of scientific inquiry, modernization, and the rate with which these processes infiltrated all facets of human life.