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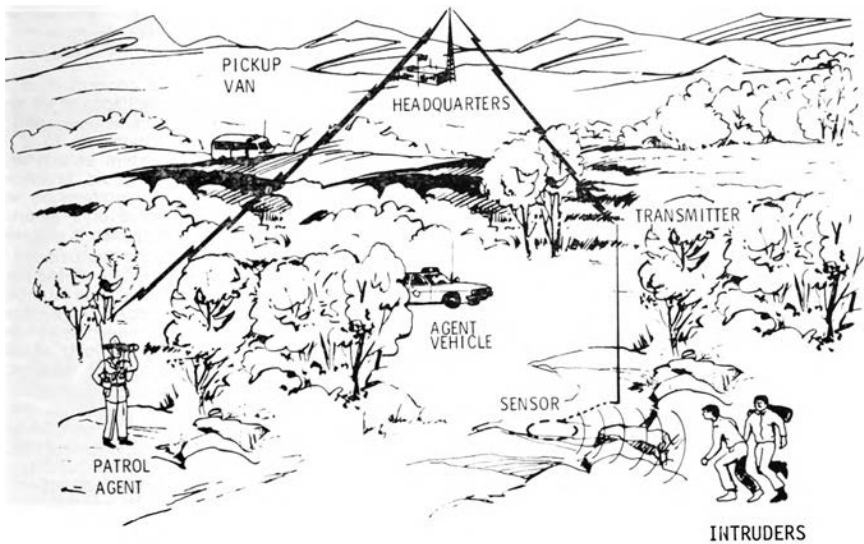
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## Sensing Intruders: Race and the Automation of Border Control

*Iván Chaar-López*

For two straight days, Sensor No. 139 sent radio signals to the Border Patrol's station in San Ysidro, California. A light flashed intermittently, as if someone or something activated it. To Border Patrol agents, the sensor's uninterrupted activation was a clear sign that it was malfunctioning. The light for Sensor No. 103, by contrast, was off when it suddenly turned on. Data of its activation were automatically recorded on a magnetic tape back at sector headquarters, where a desk officer radioed the nearest patrol car. "Minutes later," James P. Sterba wrote in the *New York Times* in 1973, "three Mexicans, attempting to sneak into the United States, were tracked down and caught as a result of the electronic detection system" installed "along the Mexican border."<sup>1</sup> The system described by Sterba was commonly known as the "electronic fence." It relied on different components: ground sensors, radio waves and transmitters, signal processors, computers, magnetic tapes, and Border Patrol agents, among others. "It [wa]s a far cry from the Patrol Inspector of fifty years ago," agents reflected, "who rode miles of desert on horseback or who walked miles of tote roads or border slash on snowshoes in search of foot prints to track down illegal aliens."<sup>2</sup> Sensors were programmed to detect different kinds of phenomena, from seismic sensors measuring the applied stress of footsteps to infrared sensors that measured body heat. All components of the electronic fence were meant to work in concert to monitor, record, and circulate information of those the *INS Reporter* called "intruders" (see fig. 1). But who were these intruders? And why were intrusion detection systems used to control them?

In the US public debate of the 1970s, the southern border was imagined as out of control due to the "thousands" of migrants who crossed it, overwhelming an understaffed US Border Patrol.<sup>3</sup> Officials at the Immigration and Naturalization Service (INS) answered this logistical challenge by mobilizing cybernetic ideas—the scientific study of communication and control mechanisms in organisms and machines—to make sense of the border and address the failures of the immigration system. Cybernetics emphasized that systems depended



**Figure 1.** Diagram of the Border Patrol's intrusion detection system, from Harry D. Frankel, "INS Research and Development Programs," *INS Reporter* 26.3 (1977–78), 35.

on information to execute its control mechanisms—in other words, to exist. Intrusion detection systems, like the one mapped by the *INS Reporter*, were designed to expand the reach of the Border Patrol by automatically monitoring and recording accurate information from phenomena. "These supersensitive devices," INS officer Robert J. Seitz held, "allow one officer monitoring the 'control box' to cover a far wider territory than could be observed on ordinary 'still watch.' Through use of the device he can call in patrol units to areas where the instrument indicates movement."<sup>4</sup> Ground sensors placed on different border locations multiplied the capacity of agents to detect the presence of intruders. These, in turn, were shaped by the technology into data-producing subjects, data inputs of a border information system. No longer hidden, intruders and their actions were now perceived and recorded by a system attuned to their existence. A *Washington Post* reporter commented that government actors found in sensors a way to "save many precious man hours" and maximize the work executed by Border Patrol agents. Cost-saving rationales in the 1970s were not uncommon for advocates of automation and of new electronic technologies. But, as the same reporter argued, sensors along the Mexican border were not just a cost-saving solution to a staffing problem. They were designed to help agents control "wetbacks and narcotic smugglers."<sup>5</sup> In depicting Mexicans through racist epithets that

on information to execute its control mechanisms—in other words, to exist. Intrusion detection systems, like the one mapped by the *INS Reporter*, were designed to expand the reach of the

marked them as unauthorized border crossers, cheap labor, and drug peddlers, the electronic fence was revealed as targeting Mexican bodies for exclusion.

Scholars in American studies and border studies have shown the myriad ways that certain immigrant communities were racially construed and targeted for exclusion by US immigration policies.<sup>6</sup> The border studies literature has probed how the southern borderlands have been transformed through military technologies and military doctrines since, at least, the air power operations of Brigadier General John J. Pershing against Pancho Villa and his revolutionary forces in the 1910s.<sup>7</sup> This essay contributes to these conversations by studying the co-construction of electronic technology and race. It is, as a result, in conversation with what Gabrielle Hecht calls technopolitics, or “the strategic practice of designing or using technology to constitute, embody, or enact political goals.”<sup>8</sup> Border technology obfuscated the ways its technical operations were entangled with discourses around unwanted populations. As such, it is crucial to understand how intrusion detection devices worked and how they targeted Mexicans as racialized intruders.

To study the electronic fence is to grasp the intersections between automation, nation making, and racial sorting logics. I explore these intersections by discussing how “illegal aliens” were perceived as racial problems threatening the nation in the twentieth century and how INS responded to them. Officials thought border enforcement efforts had to be revamped. “Sign cutting” and communications operations in particular illustrate the ways that cybernetics gave officials the conceptual apparatus to structure the border as an information system. Attention to information led INS to import intrusion detection systems, originally developed for the Vietnam War, to the US–Mexico border. In Southeast Asia, these systems were used to automate security operations along South Vietnam’s borders. More important, they exposed how the US empire-nation sought to police and undo its own boundaries, boundaries once built domestically through the material entanglements between electronic technology, race, and conceptions of the frontier.

I argue that cybernetic ideas and intrusion detection systems were adopted to draw an electronic “line in the sand” in the management and administration of the US–Mexico border.<sup>9</sup> Drawing this electronic line generated two enduring effects. First, actors and machines traced the boundaries of the nation on the ground and on human bodies imagined as intruders. Second, people were abstracted into data inputs and outputs to be measured and analyzed. Despite its repeated failures to command territory and people, the electronic fence was part of an imperial control fantasy that spanned the globe—from the jungles of Southeast Asia to the southwestern borderlands. Technical breakdowns, such

as the case of Sensor No. 139, were endemic to the system, but these did not keep it from continuing to deliver the illusion of mastery. Decades prior to the post-9/11 increase in cybersecurity measures, the US–Mexico border of the 1970s was one of the critical spaces where government actors experimented with automating the control of racialized populations.

To understand border technopolitics, I trace relations between various ideas, institutional arrangements, and technical operations. Intrusion detection systems were part of what Mihir Pandya calls a “fragmented Cold War archive.”<sup>10</sup> Such fragmentation was the result of a concerted effort to produce gaps and omissions in the public record about technological and military research. This required the examination of various sources to help fill in the gaps. New ideas about the border circulated via articles written by INS officials in the *I and N Reporter* (renamed *INS Reporter*) and through their statements in the press. Similarly, analyzing how journalists described the illegal alien problem and the electronic fence shows how these were socially constructed. In addition, technical reports, congressional hearings, annual reports, authorization and budget requests, and press coverage reveal the institutional arrangements of the agencies responsible in managing the border. These sources also help me reconstruct the operations of border control. The operation of the electronic fence exposes how intruding illegal aliens were rendered “knowable.” Tracing ideas, institutional arrangements, and technical operations is a method that aims to grasp how discourses shaped technology just as technology affected the conditions of political possibility.

### **The Illegal Alien Problem and the Dawn of the Border as an Information System**

Restrictive immigration policy like that articulated in the National Origins Act of 1924 was pivotal in the construction of the illegal alien problem. This legislation instituted a quota system that limited the number of entrants to the United States from outside the Western Hemisphere and differentiated those entrants according to their national origin. The National Origins Act, Mae Ngai argues, “defined the world formally in terms of country and nationality but also in terms of race. The quota system distinguished persons of the ‘colored races’ from ‘white’ persons from ‘white’ countries.”<sup>11</sup> Some people deemed part of the colored races were granted entry into the US, except for those identified as excludable people ineligible for citizenship (i.e., Chinese and Japanese). These populations embodied a sense of foreignness that placed them outside the bounds of the US nation. Inside its territory, Ngai concludes,

“illegal aliens” “ha[d] no right to be present”; they were “at another juridical boundary.”<sup>12</sup> Numerical restriction contributed to the construction of a subject whose existence was an expression of the limit of the law.

As part of the Western Hemisphere, Latin American countries were not constrained by the quota system, although this did not mean that migrants from these countries were free from government and corporate attempts to monitor, restraint, and deport them. Mexican migrant workers in the Imperial Valley during the 1930s and 1940s, for example, were the targets of a concerted effort to make them into what Natalia Molina calls “deportable immigrants.”<sup>13</sup> Targeted for their participation in organized labor activities and their border-crossing practices, Mexican workers were construed by government officials at INS and the Border Patrol as potential carriers of disease. This imagined potential for disease opened the door for Mexican migrants to become deportable. In fact, the category of deportable alien was an accounting category used by INS officials to track, measure, and sort the interactions between Border Patrol and targeted populations. Deportable aliens were identified for transgressing the conditions of their admission or for crossing the border without authorization.<sup>14</sup> It helped differentiate bodies, between those who deserved to remain within and those who ought to be removed from the nation. US officials relied on the language of disease written into law since the Immigration Act of 1882, which prohibited the entry of any “convict, lunatic, idiot, or any person unable to take care of himself or herself without becoming a public charge.”<sup>15</sup> Molina argues that “racializing Mexicans and Mexican Americans alike as dependent disease carriers helped to mark both populations as deviant, dangerous, and outside the bounds of social membership within the United States.”<sup>16</sup> The category of deportable alien, combined with the spatial focus on the southern border, signaled that INS officials made it a priority to target a population imagined as intractably foreign. Even when these populations were outside the 1924 quota system, public and private actors developed different mechanisms through which their inclusion in and exclusion from the US nation was managed.

The role given to the Border Patrol during the Bracero Program reveals the management of Mexicans and Mexican Americans during the mid-twentieth century.<sup>17</sup> While large proportions of the US labor force were busy with military efforts during World War II, the US and Mexican governments pursued a temporary farmworker program that ran from 1942 to 1964. Known as the Bracero Program, it contributed to changing the demographics of the country through the steady, even if circulating, influx of Mexican workers.<sup>18</sup> The Border Patrol’s focus, during this period, was mostly directed to policing unsanctioned Mexican migration.<sup>19</sup> Such a narrow focus, Kelly Lytle Hernández argues,

drew a very particular color line around the political condition of illegality. Border Patrol practice, in other words, imported the borderlands' deeply rooted racial divides arising from conquest and capitalist economic development into the making of U.S. immigration law enforcement and, in turn, transformed the legal/illegal divide into a problem of race.<sup>20</sup>

In its 1947 *Annual Report*, INS held that “during the year the force became more concentrated along the Mexican border because of the unprecedented number of aliens entering illegally there.” That year the Border Patrol had 734 officers, or about 60 percent of its total force, authorized on the southern border, while 117 were on the Gulf and Florida. By contrast, 378 officers patrolled the entire Canadian border.<sup>21</sup> The higher presence of agents on the southern border betrayed two things. On the one hand, the problem of “deportable aliens” and “surreptitious entries” was construed by INS as a Mexican one, since “most of the immigration violations were created by an influx of Mexican aliens across the land border of the Southwest Region.”<sup>22</sup> On the other, the Border Patrol was a police force meant to discipline and punish Mexicans as a migrant labor population. Mexican presence in the US represented the failure of controlling the US–Mexico border.

The sense of foreignness with which immigrants were entangled, through categories like deportable alien and intruder, also invoked the idea of an enemy to a larger US public. In an article for the *Los Angeles Times*, Bob Williams told readers that US authorities had failed to prevent “illegal aliens” from establishing “a beachhead for the Third World” in the US. Williams adopted the language of war to identify Southern California as a “beachhead,” a defensive position from where landing forces could launch attacks. “Illegal aliens,” linked to the “Third World” but thought of as mostly Mexican, represented the landing enemy force. They were responsible for carrying out a “silent and sometimes invisible invasion.”<sup>23</sup> In a similar vein, INS commissioner Leonard F. Chapman described “illegal immigrants” as constituting a “vast and silent invasion . . . fast reaching the proportions of a national disaster.”<sup>24</sup> Referring to their entry in these terms positioned “illegal aliens” as untrustworthy, threatening, and unknowable subjects. They acted covertly, whenever and wherever no one could perceive their presence. Illegal aliens were not migrating to contribute to US society; they hid their true intents. They were an “invasion.” The propensity to use the language of war to talk about immigration and border enforcement colored these efforts with an existential hue. The “threat narrative,” as Leo R. Chavez has called it, identified Mexicans as people who could not become part of the US because they represented a danger to the imagined US community.<sup>25</sup> Their linguistic, kinship, religious and other cultural practices marked them

as inexorably separate from dominant conceptions of “America.” Mexicans, euphemistically named through categories like illegal aliens and deportable aliens, were the targets of a war over who could belong to the nation and who could not.

Anxieties about rising migration in the 1950s and early 1960s converged with panics around drug smuggling and consumption. In the Texan borderlands, for example, these panics had repercussions on Mexican families targeted by local and federal actors. Government officials mobilized images of Mexican domestic spaces as harbingers of disease and illegal narcotics throughout the 1950s, with the aim of construing them as criminal. Mexican families were rounded up, arrested, and photographed in attempts to document and make evident their supposedly deviant proclivities.<sup>26</sup> By the time President Richard Nixon embarked on his war on drugs in 1969, the notions that Mexicans and Mexican Americans were criminal and that the border was a nefarious zone were ingrained in the US public imaginary.<sup>27</sup> Newspapers constrained the ongoing pursuit to solve “the problem of illegal aliens” and the “drug-smuggling war” to the southern borderlands.<sup>28</sup> Federal government efforts like Operation Intercept in 1969, which instituted harsher inspection procedures on border crossing from Mexico, perpetuated the sense of the border and of its “foreign” subjects as lawless. Imagined as criminal, Mexicans and Mexican Americans were treated as threats, and so actors pushed for the development and deployment of practices and technologies to control them.<sup>29</sup> It was in this context of heightened anxieties over the safety of a national body overwhelmed by illegal migration and drug smuggling that cybernetic ideas began leaving their mark at INS.

Cybernetics blossomed at the intersection of military, academic, and industrial research in the United States during and after World War II. Norbert Wiener, a mathematician at the Massachusetts Institute of Technology (MIT), was among its foundational figures. He defined cybernetics as a new interdisciplinary field of scientific study dedicated to communication and control processes in machines and in living organisms. Cyberneticians thought that the production and circulation of messages/information explained how an entity sustained itself, as well as how it related to, cohered, or clashed with other entities.<sup>30</sup> In other words, “Wiener believed,” as Fred Turner contends,

that biological, mechanical, and information systems, including then-emerging digital computers, could be seen as analogues of one another. All controlled themselves by sending and receiving messages, and, metaphorically at least, all were simply patterns of ordered information in a world otherwise tending to entropy and noise.<sup>31</sup>



At MIT's Radiation Laboratory, for example, cybernetics helped researchers work out solutions to 1940s-era military problems, such as how to shoot an airplane from the sky. Academic and military researchers worked on how to track the course of an airplane, measure its movements, and predict its future position. Antiaircraft gun, gunner, airplane, pilot, projectile, and aerodynamics were imagined as an interlocking system that could be statistically defined in the pursuit of a goal—shooting down the plane. At the center of it all were messages and information that allowed for entities to be intelligible to each other.

Scholars positioned cybernetics as crucial to understanding a wide range of problems affecting all sorts of systems. Chief among these was the problem of government. Karl Deutsch, a Harvard professor of political science and key figure in the translation of cybernetics into the realm of politics in the early 1960s, argued that the problem of government was a question of steering—of controlling the inputs, outputs, and feedback loops of systems.<sup>32</sup> In a similar vein, Wiener argued that “society [could] only be understood through the study of the messages and the communication facilities which belong[ed] to it.”<sup>33</sup> Cybernetics engaged information by breaking down the behaviors of an entity or system into smaller points. These points were then assembled into patterns of order for transmission. Information consisted of a transmitted pattern “that [wa]s received and evaluated against the background of a statistical ensemble of related patterns.”<sup>34</sup> The task of government's control mechanisms was to organize the chaotic interactions of entities into patterns of order for the benefit of government's existence and survival.

Facilitating the integration of cybernetics into the everyday operations of the Border Patrol was the fact that, to some extent, the border was already treated as an information environment. Evidence of this was the practice of sign cutting. Formally taught at the Border Patrol Academy, sign cutting was defined by one INS official as “recognizing and interpreting physical signs of the movement and activities of persons who have crossed the border without inspection.”<sup>35</sup> Changes imprinted on the natural landscape, such as footprints and vehicle tracks, were a priori understood as suspect. They were “signs” or evidence of the presence of someone or something that should not have been there. Traces left behind were data that Border Patrol agents could use not only to identify the presence of an “intruder” but also to figure out the individual's direction. To “cut” meant two things. First, agents broke the large border terrain into discrete or manageable segments to scrutinize. And second, agents severed the path of those attempting entry-without-inspection; track-producing subjects would be removed from the border and their tracks would reach a

dead end. Sign cutting strove to transform intruders from unknowable entities into knowable, excludable subjects.

While sign cutting was a central enforcement practice, it was also a way to enact the Border Patrol's exclusionary desire and its role in frontier making.<sup>36</sup> In an article celebrating the fifty years of the Border Patrol, the *I and N Reporter* described sign cutting as

a skill practiced by the American Indian, long before the arrival of Columbus. Later, it was practiced by hunters, frontiersmen and trappers who left the beaten trail to locate game or to detect an enemy in the area. Also, during the settlement of the West, sign cutting was used successfully to track down cattle rustlers and other outlaws.<sup>37</sup>

In its publication, INS imagined Border Patrol agents as “playing Indian” in performing sign cutting.<sup>38</sup> A purported Native American practice was appropriated by “frontiersmen” for the purposes of settling “the West.” The targets of the practice shifted depending on context—at times they were game; at others they were enemies or even law transgressors (“cattle rustlers and other outlaws”). In the end, they were subjects that sustained or disturbed the tenuous balance of the settler project. Now practiced in the modern borderlands, though especially in the Southwest, sign cutting rearticulated the frontier politics of managing and containing the other. Border Patrol agents tracked and apprehended unauthorized border crossers. Sign cutting perpetuated the settler project in the Southwest by enforcing its immigration law. It severed an undesirable subject from the national body.

Through cybernetic ideas, INS officials continued treating the border as a rich communication and information landscape with its particular set of practices (i.e., sign cutting) and sign-producing subjects/objects. What shifted slowly was treating the border as an information *system*. During the 1960s and 1970s, officials at INS reflected on the place of information and communications in INS operations. They were insistent that they lacked the adequate tools to manage both immigration requests and the growing influx of unauthorized entries.<sup>39</sup> One constant in their articles for the *I and N Reporter* was the centrality given to communication. George F. Klemcke, deputy assistant commissioner for enforcement at INS, even argued that “effective law enforcement requires a rapid, accurate, and smooth-flowing communications system for transmitting information and messages to the office responsible for taking action.”<sup>40</sup> Though the term *cybernetics* was not used, the usage of some of its key concepts (e.g., communication, information, messages) makes evident the influence the interdisciplinary science had at INS. “Modern” and “efficient”

law enforcement was imagined to depend on neatly circulating data flows that would direct INS personnel and resources wherever they were needed. This was, after all, as Paul N. Edwards shows, a period marked by business schools “theorizing management as a problem of information processing” and Rand Corporation strategists “increasingly formulat[ing] command as information processing and war itself as a problem of communication.”<sup>41</sup> Officials at INS were immersed in a discursive milieu marked by the language of cybernetics and systems thinking that permeated much business, policy, and military circles.

The border was construed as a system, as sets of interlocking and interacting entities held together through communication processes. It was an information system where control depended, among other things, on what Klemcke stressed ought to be “rapid, accurate, and smooth-flowing communications.” Actors understood that the effective circulation of information would give Border Patrol and investigative agents the most accurate data whenever they engaged unauthorized border crossers in the field. Communications operators, for example, were tasked with offering assistance to officials by providing data from the INS Main Index. This contained different data from forms like the G-361 (used for “alien” files and visa petition files) and the I-94 (used for stowaways, excludable aliens, and “unable to locate persons”).<sup>42</sup> The role of communications operators within the immigration system was, as Klemcke suggested, to facilitate all necessary information to agents in the field so that they could act. Using radio systems, they linked different border sectors and their actors to INS offices. By managing the flow and processing of information, communications operators and other INS agents controlled the border. Control of the border, similar to shooting down an airplane, meant agents had to make sure that the “right” people were identified before they were removed from US territory. Through technology, like radio communications, the chaotic flows of immigration and border enforcement were thought to be rendered manageable.

Government officials and the public insisted that the country was under threat of a “silent” and “invisible invasion.”<sup>43</sup> These two recurring tropes further exhibited an interest in treating the border as an information system. Actors believed that, to reveal surreptitious entries, they had to intervene in the field of the perceptible. Only then could they make the unknown knowable. In this sense, they participated in the development of what Donna Haraway argues is the history of science’s entanglements with militarism, capitalism, patriarchy, and empire. “The eyes have been used to signify a perverse capacity”; technological vision was the “unregulated gluttony” of a knowing subject distanced “from everybody and everything in the interests of unfettered power.”<sup>44</sup> The

desire to “instrumentalize” the aural and visual fields conveyed an interest in building specific ways of perceiving, of gathering information. To look at and hear something meant that its existence was objectified. This existence was made into extractable matter. Techniques of sound and vision on the US–Mexico border were meant to govern populations by extracting information: was there an “intruding” presence (i.e., human body or vehicle), when and where did they intrude, where were they headed. These data were necessary for the capture of intruders and their subsequent removal. The tropes of a “silent” and “invisible invasion” made evident the strategic value given to the domains of sound and vision as ways to establish order. Data on intruders were lacking without techniques of sound and vision.

Unassisted Border Patrol agents were no match for the control, communications, and information challenges presented to them by more than two thousand miles of southern border environment. Intrusion detection systems integrated techniques of sound and vision as ways to tackle the “silent” and “invisible invasion” of intruders. These techniques were automated in order to manage the recording and circulation of information from the vast landscape. Information was a tool leveraged against a specific population imagined as a threatening, invading force. US government officials and the general public insisted on the racial contours of those imagined as intruders. They were the “deportable aliens” and “illegal immigrants” against whom so much vitriol and so many institutional practices were leveled. The following section tackles the automation of control on the US–Mexico border by exploring how intrusion detection systems were developed and who participated on their design and for what purposes. Examining the operations of the “electronic fence” reveals how political objectives were embedded in it while also uncovering its limitations.

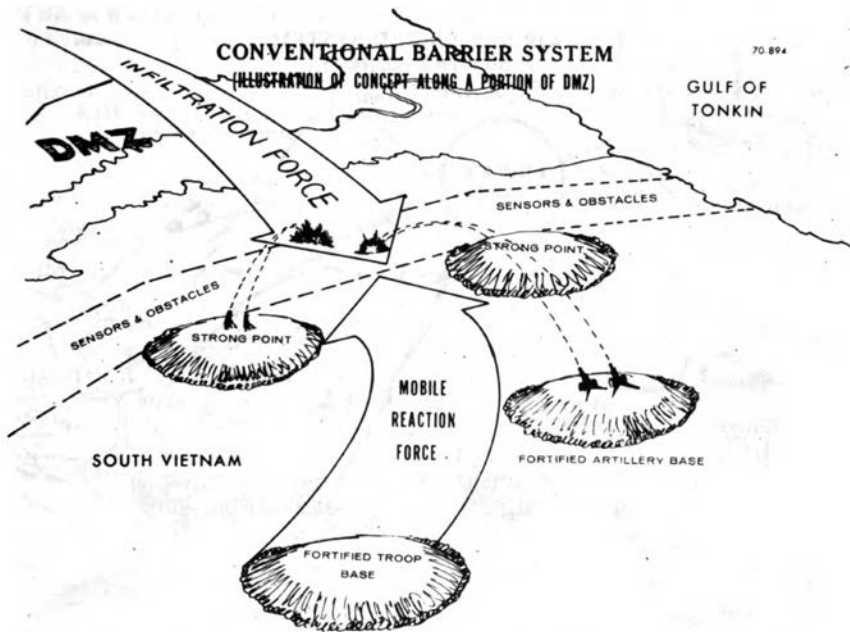
### **An Empire of Patterns of Order: Automating the Frontier**

The development of intrusion detection systems was one way that the boundaries of US Empire were redrawn during the Cold War. Writing about US Empire, Amy Kaplan argues that it “long followed a double impetus to construct boundaries and patrol all movement across them and to break down those borders through the desire of unfettered expansion.”<sup>45</sup> Engaged since 1947 in a global geopolitical struggle with the Soviet Union, the US government and its military sought to reinforce as well as expand the boundaries of their domains of influence. The Vietnam War (1955–75) marked one of those critical Cold War moments when the US aimed to “contain” the spread of communism. To do so, it intervened in the region by deploying financial

and military resources like personnel, weaponry, training, and soldiers. Such an interventionist approach meant actors imagined US territorial boundaries were negotiable whenever their interests were thought to be affected.<sup>46</sup>

During the Vietnam War, one of the main problems that the US military confronted was the surreptitious movements of Viet Cong fighters within South Vietnam and across the country's borders with North Vietnam. As the war grew in intensity during the mid-1960s, Secretary of Defense Robert McNamara tasked a group of academic scientists, known as the JASON Committee, to propose a solution to the military's Southeast Asian problem. They recommended the creation of an information system that the Defense Communications Planning Group (DCPG) was tasked with implementing. At its most basic, the system consisted of electronic sensors, signal processors, and electronic transmitters placed along the demilitarized zone "to prevent infiltration and supply from North Vietnam across South Vietnam's 43-mile frontier."<sup>47</sup> The "McNamara Line," or "McNamara Wall" as it was known by the public, "detect[ed] enemy personnel and vehicles." Future iterations of the system integrated computers to accelerate the analysis and circulation of intruder data such as site of intrusion, rate of movement and direction, while weapons were used "to counter the enemy incursions thus detected."<sup>48</sup> The system worked (see fig. 2) through a variety of sensors (i.e., seismic, magnetic, acoustic) dropped by parachute into or installed in a zone with enemy troop movements. Sensors were triggered by phenomena that a signal processor later interpreted as human- or machine-generated. A radio signal was then sent to a display terminal, where ground movement was mapped. Depending on the probable location of intruders, attack coordinates were radioed to fortified troop positions, artillery, or fighter jets to intercept the enemy force.

The operation of the McNamara Line was embedded with cybernetic ideas that tested the boundaries of technopolitical imagination. The connection of sensors to communications links (usually radio) and processing devices transformed the Vietnamese borderlands into a system to be monitored and tracked through seismic, magnetic, and acoustic data generated by entities.<sup>49</sup> For example, ground vibrations generated by troops or vehicles as well as any noise these produced were sensed by devices. "Silent" and "invisible" intrusions by Viet Cong and North Vietnamese forces were now perceptible and, consequently, knowable. Embracing the cybernetic vision of the world as an information system meant that actors, as Turner contends, dissolved the boundaries of distinction "into an account in which all [entities] were equally patterns of information."<sup>50</sup> As extractable matter, human bodies, machines, and other entities were also targetable matter. Treating entities as data-producing



**Figure 2.** Diagram of “McNamara Line” as a conventional barrier system, from *Investigation into Electronic Battlefield Program: Hearings before the Electronic Battlefield Subcomm. of the Comm. on Armed Services*, 91st Cong. (1971), 9.

subjects/objects to manage represented the cutting edge of technopolitical imagination and empire making; the US military automated information capture and communication to manage people and space. More to the point, the McNamara Line was among the first attempts to bring forth the technological dream of an “electronic battlefield.” Military officials hoped electronic and computer technologies like “sound and seismic devices” would substitute “visible and endangered human patrols that l[e]d to casualty lists.”<sup>51</sup> The large numbers of dead US soldiers had been a decisive factor for growing antiwar sentiment in the US public throughout the 1960s. Automation, officials thought, would save the life of soldiers because “[a sensor] doesn’t bleed, and if it dies out there in the jungle, you don’t have to write a letter home to the wife or parents.”<sup>52</sup> Military outposts near the demilitarized zone no longer relied on soldiers patrolling nearby areas to prevent intrusions. Their patrolling labor would be embedded in unmanned sensor devices that operated ceaselessly. Those watching and hearing were far removed from the sites and objects under scrutiny. Their remote location was part of a technopolitical drive

to extend the reach of government and military actors by mastering distance and living beings. The automation and unmanning of the battlefield offered military officials with a scenario in which the risk of death was minimized for their troops yet maximized for their enemy.

New military technologies such as the McNamara Line were a testament to how the US southern borderlands continued to be implicated in the double impetus to enforce and undo the boundaries of the US empire-nation. The McNamara Line was partly developed at Fort Huachuca, Arizona, a former frontier outpost during the settlement of the Southwest in the late nineteenth century. One journalist described Fort Huachuca as an “Army post originally established to chase down intransigent Indians.”<sup>53</sup> In the popular imaginary, the post continued to be an instrument against the “enemies” of the settler colonial project. Since 1954, Fort Huachuca continued to test and set the boundaries of empire by hosting the Army Electronic Proving Ground (AEPG) whose chief concern was to experiment with electronic technology like intrusion detection devices and unmanned aerial systems.<sup>54</sup> Though not meant “to chase down intransigent Indians,” the McNamara Line tracked another kind of “intransigent” force. Sensor operators for this system were trained by the AEPG’s Combat Surveillance School to provide “security through vigilance.”<sup>55</sup> Security from an “intransigent” other was again, as the term *vigilance* betrays, intertwined with techniques of sound and vision. Sensor operators had to be in a state of alert watchfulness while they closely monitored the McNamara Line. Trained in a settler outpost for operations in a foreign territory, US soldiers in the Vietnamese borderlands embodied the role of a frontiersman enforcing, undoing, and expanding the boundaries of the US empire-nation.

The McNamara Line was endemic of how the porous borders of the empire-nation allowed, as Kaplan argues, for the foreign and domestic to converge. What McNamara proposed, an anonymous Pentagon official told the *New York Times*, furnished the military with the “ability to monitor even the most rugged border anywhere in the world.”<sup>56</sup> Remote control unfolded through automated techniques of sound and vision. When confronted with their very own “rugged border” with Mexico, the McNamara Line offered a way to automate some of the Border Patrol’s gatekeeping function. This gatekeeping aimed to protect the national body from the so-called silent and invisible invasion perpetrated by intruding Mexicans. In spring 1970 an engineer of the DCPG, the group responsible for the development of the McNamara Line, made an on-site survey of the Chula Vista, El Centro, and Yuma sectors. Though sensors had already been in use in some areas like Nogales, Arizona, it was not until the visit of the DCPG engineer that a concerted and systematic approach

was pursued by INS. The Chula Vista sector in California, which consisted of sixty miles of international land border, was chosen as the experimental site for the Border Patrol's new intrusion detection system because it was the busiest crossing point for entries-without-inspection. Soon after DCPG's visit to the border, the Sandia Corporation, an Albuquerque company operated by Western Electric, assisted in the installation of 177 sensors. An agreement was reached for experimental data to be collected from Border Patrol operations so that DCPG could improve sensors and operational techniques.<sup>57</sup>

The early seeds of a domestic-security military-academic-industrial complex were sown when INS was associated with the Department of Defense's vast technopolitical regime.<sup>58</sup> Research and development of the McNamara Line, for example, recruited a network of academic partners among whom were researchers at the MITRE Corporation and the Syracuse Research Corporation.<sup>59</sup> MITRE was founded in 1958 as a federally funded research center, and initially most of its workers were transferred from MIT's Lincoln Laboratory—the same laboratory that pursued foundational cybernetic and systems research under the leadership of Jay W. Forrester.<sup>60</sup> The Syracuse Research Corporation, on the other hand, was a nonprofit research and development company founded in 1957 by Syracuse University. Sources examined show that, while INS did not fund directly the development of the “electronic fence,” it did offer the military and its partners experimental space to test and improve the system. In addition to obtaining access to detection techniques developed by the Pentagon's academic partners, INS was also involved with electronics manufacturers. From 1970 to 1976, Sandia Corporation, Magnavox, Teledyne Geotech, and AEC were four of the electronics manufacturers that supplied expert knowledge and ground sensors for the electronic fence. INS spent \$8,742,457 from fiscal years 1971 to 1976.<sup>61</sup> Though the amount spent in intrusion detection systems accounted for a minute fraction of the INS budget, it set the conditions of possibility for, on the one hand, future collaborations between the Pentagon and INS and, on the other, for continued reliance on electronic technology for border control.

The electronic fence, once developed in the former frontier military post of Fort Huachuca, returned from the imperial battlefields of Vietnam to the southwestern frontier to help Border Patrol agents “chase down intransigent,” racialized “intruders.” Public debate, governmental policy, and Border Patrol practices shaped which populations were identified as intruders to be detected. Through supposedly neutral categories like illegal aliens, deportable aliens, and drug smugglers, INS officials targeted the exclusion of racialized populations. By 1973 INS claimed that Mexican nationals constituted 88



percent of all located “deportable aliens.” Officials believed that the problem of intrusions beyond ports of entry, especially post-1965, was predominantly a “Mexican” one.<sup>62</sup> A similar sentiment was expressed by Border Patrol officers who explained the growth of the policing force after 1970 as a result of “the resurgence of the illegal Mexican alien problem.”<sup>63</sup> Heightened anti-immigrant and anti-Mexican sentiments coalesced to construct the illegal alien problem as a Mexican problem. This rationale justified the installation of intrusion detection systems on the southern border and, as a result, tracking Mexicans as intruders. Expenditures for the electronic fence from 1970 to 1972 show that it was first budgeted for the Border Patrol sectors of Chula Vista, Del Río, El Paso, and Swanton.<sup>64</sup> The fact that three of the four sectors were along the US–Mexico border signaled an investment in the management of Mexicans. Installation of intrusion detection systems on the southern border reproduced the logic that, as Hernández argues, “the legal/illegal divide” was “a problem of race.” Heavier usage of the system along the southern border remained throughout the 1970s.

Defense and INS collaborations were also the result of the intersection between military engagements and law enforcement. When government officials announced that INS would test intrusion detection systems on the southern border, Attorney General John N. Mitchell was quoted as saying, “We are piggybacking [Department of Defense’s] R&D to a greater and greater degree,” particularly for “military gadgetry . . . to detect narcotics of all kinds.”<sup>65</sup> Nixon’s declaration of drug abuse as “public enemy number one” in 1971 coincided with growing public opposition to the Vietnam War. The program for de-escalation in Southeast Asia seemed to have made the war against narcotics on US soil an attractive proposition for electronics manufacturers already invested heavily in defense. To manage the integration of INS as a node in the defense technopolitical regime, “Nixon went outside the ‘normal routine’ to select former Marine Corps general Leonard Chapman” as the new INS commissioner.<sup>66</sup> His role as an administrator in the Marine Corps was noted for his experience in developing and integrating computers and automation for military management.<sup>67</sup> While at INS, Chapman pushed for more clearly defined collaborations with the Pentagon, and the creation of a new Research and Development (R&D) Branch in the Office of Planning and Evaluation.

R&D funded work on devices, techniques, and systems that improved control between ports of entry by detecting and apprehending subjects.<sup>68</sup> In his reflection of paradigmatic INS R&D programs, Harry D. Frankel commented how, prior to the creation of this branch in 1974–75, the INS had made minimal use of modern technology. Among the technologies previously used by

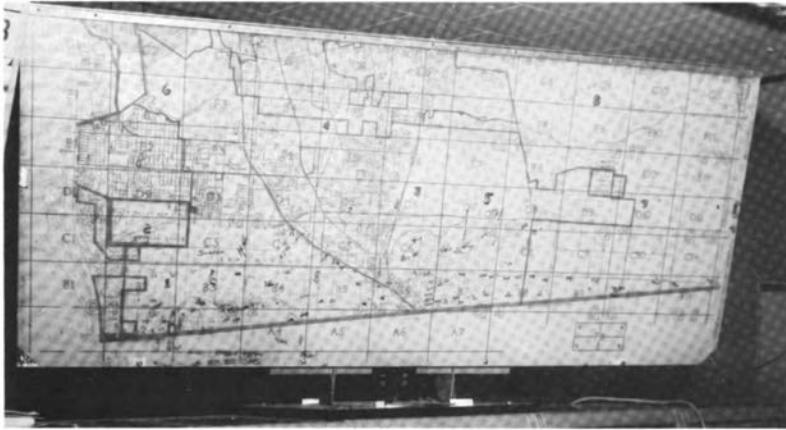
the Border Patrol were airplanes, autogiros, cars, and radio communications.<sup>69</sup> The installation and use of the electronic fence since 1970 laid some of the institutional groundwork for relying on electronic and digital technologies. But what changed with the R&D branch was that the INS could now play a role in developing technology “to cop[e] with such problems as illegal entries, apprehension of illegal entrants, case backlogs, and access to central files.”<sup>70</sup> Frankel, who was the programs manager at R&D, documented the array of projects pursued at INS, such as the use of intrusion sensor systems, radars, and night vision devices. These projects were pursued in cooperation with various institutional partners, among them the Drug Enforcement Administration, Army, Navy, Marine Corps, and National Aeronautics and Space Administration. For example, “test and evaluation of long-range, infrared imaging devices,” Frankel argued, were thought to possibly “extend the Border Patrol Agent’s capability to detect and apprehend undocumented aliens at or near the borders under virtually any weather or terrain conditions.” Technically speaking, the use of infrared imaging devices meant that migrants were handled as heat-generating entities to be measured and statistically differentiated from the surrounding environment. Projects were, in other words, framed by a cybernetic vision that imagined the border environment as a system of interconnected entities, all producing data that could be tracked, circulated, and registered. Electronic technologies like infrared imaging devices and intrusion detection systems were used to reveal the intruder body. Doing so, Frankel and other INS officials thought, led to more effectively controlling the flows of drug smuggling and unauthorized immigration.

Intrusion detection systems and other electronic technology later developed by R&D aimed to break down the circulation of things and beings along the border through the automation of perception. Sensors in the system were programmed to sign-cut. Just like Border Patrol agents sought racialized intruders by interpreting data on a discrete segment of the border, ground sensors recorded data from the border environment. Ground sensors registered different kinds of signals, and the signal processor they were wired to deciphered whether or not the signal was produced by a human being.<sup>71</sup> In the case of seismic sensors, signal processors known as variance frequency discriminators (VFD) were programmed through the use of “pattern recognition techniques” to discriminate between signals. This allowed “separating valid targets from false alarm sources with least errors.”<sup>72</sup> VFD were meant to discriminate between the seismic data generated by different phenomena like vehicles, people, rain, and helicopters. In the context of the southern border, breaking border-crosser movements into electrical outputs transformed human bodies into abstract

data-producing entities. They were preinscribed as foreign entities, intruders to be removed from the US nation.

The life stories of unauthorized border crossers were irrelevant to the kinds of data privileged by the electronic fence. Ground sensors were used to make surreptitious bodies into knowable quantities. Every moment these sensors were triggered by human movement, data were collected pertaining to the time of activation, date, sensor location, sector area, and probable direction. Once agents were dispatched, their name and the status of their actions were all entered into the system's memory.<sup>73</sup> Collected data were used in reports, INS electronics engineer Thomas C. Henneberger Jr. explained, "as sources of intelligence on border crossing activities, or as analytical tools for evaluating the effectiveness of [the system's] sensors." Sensor data were analyzed to determine potential shifts in border crossings such as increase/decrease of activations in an area of a border sector. By analyzing these data and identifying "alien intrusion pattern[s]," sensors were relocated to higher transit zones or around them to broaden the system's monitoring capacity.<sup>74</sup> "Manpower" was equally reallocated and distributed as a result of data analysis. Placing data recording and management as components of border enforcement meant that migrant bodies and the overall border environment were construed as patterns of order. Intruder data, like intruder bodies, awaited capture.

The electronic fence, much like its Southeast Asian counterpart, however, was part of an imperial control fantasy. This system attempted to actualize an imagined capacity to master the messiness of the borderlands. Returning to the opening *New York Times* story of the electronic fence, it is evident that the system was not without its failures and limitations. Sterba's story began by mentioning that the alarm display map (see fig. 3) showed a sensor was steadily activated for two days. This was not supposed to happen. Lights on the display map should have flashed only when a sensor was activated and, in so doing, let operators know the specific sensor triggered and its location. But its constant activation was indicative, as Sterba stated, of "an obvious malfunction." Starting his story with the failing Sensor No. 139, Sterba conveyed to his readers that failure was integral to the electronic fence. Sometimes "the electronic readout console becomes a Christmas tree, and stopping the swarm of illegal aliens crossing the border is an exercise in futility." Sensors failed and were swarmed. But the Border Patrol was also stymied by its inability to respond to accurate activations. The system was dependent on the kinds of resources the Border Patrol had to respond to sensor alerts.



The alarm display map, situated above the console, shows the border area and sensor locations. When a sensor is tripped, a light on the display map lights up to indicate the location of the sensor.

**Figure 3.** Alarm display map, from Thomas C. Henneberger Jr., “The Electronics Support Program of INS,” *INS Reporter* 26.4 (1978), 59.

Stories abound in INS publications and official materials of other kinds of failures that interfered with effective Border Patrol operations. Initially, sensors in the system were developed to operate for brief periods of time and, as a consequence, could not endure long-term, wide-area operations.<sup>75</sup> This led to sensors losing power or failing to keep up with the harsh southern desert environment. Meanwhile, cattle and helicopters triggered sensors leading sometimes to signals being processed by the system as human-generated.<sup>76</sup> Personnel were then dispatched to corroborate the source of such signals only to find no one there. This was indicative, Henneberger concluded, of how “technological improvements invari[a]bly introduce[d] new and often unanticipated problems.”<sup>77</sup> False positives, like cattle sensor activations processed as human ones, became a new problem for the immigration system at a moment when budgeting and personnel resources were hard to come by. Not only did the Border Patrol fail to achieve an operational goal of 90 percent response rate to sensor-detected intrusions, it also had to contend with the movements of nonhuman actors “confusing” ground sensors.<sup>78</sup> Failures did not keep INS from funding research and development of intrusion detection systems. On the contrary, failures renewed its commitment to testing, improving, and deploying more information technology that sensed—monitored, tracked, and made knowable—the unceasing flows of migrant bodies across the southern border.<sup>79</sup>

## Conclusion

This essay examined an unexplored moment in the history of the automation of border enforcement as a way to reconceptualize the entanglements between discourse, politics, and technology in nation making. Throughout the twentieth century, anti-Mexican discourse permeated public discussions and governmental debate about immigration and border enforcement. Unauthorized border crossings post-1965 were especially imagined as an “illegal Mexican alien problem.” As a result, actors at INS and the Border Patrol prioritized intervening in the southern borderlands to create a semblance of control. An electronic fence, originally developed to monitor enemies in the battlefields of Vietnam, was installed in 1970 along the border with Mexico. This system, officials hoped, would institute order on an “out of control” border by monitoring and tracking intruders. The development and operations of this system revealed how racial imaginaries shaped the kinds of “intransigent” subjects it would target. INS focus on illegal aliens, deportable aliens, and drug smugglers further demarcated the boundaries of those imagined as inextricably foreign: Mexicans.

The electronic fence of the 1970s created the conditions of possibility for future entanglements between border enforcement, electronic technologies, and techniques of sound and vision. In the early 2000s the US government pursued the creation of a “system of systems” known as SBInet in an attempt to exert operational control over the border. The system of systems, as Tamara Vukov and Mimi Sheller demonstrate, relied on “a logic of complete sensory mastery and information capture/integration. The guiding vision for SBInet [wa]s one of total, integrated sensing (integrating remote, midrange, and close sensing) through the achievement of an omniscient sensory field of capture of all border movements.”<sup>80</sup> Such a technopolitical arrangement—built on the convergence of drones, CCTV systems, ground sensors, computers, and databases—continued to treat the borderlands as a data-filled environment to be sensed, that is, to be managed and ordered.

The history of the electronic fence is also a story about the productivity of failure and (un)expected results. The McNamara Line did not succeed in preventing enemy incursions into South Vietnam. After their transfer to the US–Mexico border, sensors periodically failed to deliver relevant data on intrusions to Border Patrol agents, as demonstrated by the cases of Sensor No. 139 near San Ysidro and of sensors triggered by cattle. Their intermittent failure, however, did not dissuade actors from continuing to invest in their development and use. The promise of technological mastery over lands and people was much more powerful than technical breakdown. The electronic fence, similar

to Donald Trump's fascination with the "border wall" today, was emblematic of the chimera of control.

Border enforcement efforts like the electronic fence were not implemented on the southern US borderlands without generating a response from unauthorized border crossers. Decades later, as part of Operation Gatekeeper in 1994, intrusion detection systems were combined with massive Border Patrol mobilizations and other technologies to clamp down on unauthorized border crossing activity between Tijuana and San Diego. And yet, despite the enhanced efforts of the border technopolitical regime, "undocumented workers" found creative ways to make their way across the border. One such maneuver was acquiring a Border Crossing Card that allowed migrants to cross into the US but not to work "legally."<sup>81</sup> Others opted to follow unauthorized border crossing networks farther east where their lives were threatened by the violence of the Arizona-Sonora desert and of *coyotes* (smugglers).<sup>82</sup>

Intrusion detection systems were the material articulations of an infrastructure programmed to target a racialized subject. Ongoing controversies around immigration enforcement and border walls are a testament to the ways that, similar to the case of the electronic fence, marking the nation's borders on land has necessarily implied marking other bodies. Trump's "border wall" today is linked to his and his political coalition's desire to police Mexicans imagined as "criminals," and Arabs and Muslims imagined as "terrorists." In this sense "the border," an assemblage of artifacts and practices, has been a technology designed to administer racial inclusion and exclusion. It is also a contested space where the boundaries of belonging are policed through the efforts of both military and nonmilitary actors. In short, to make the border and the nation has been to draw a racial line through investments in infrastructures of enmity.

#### Notes

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