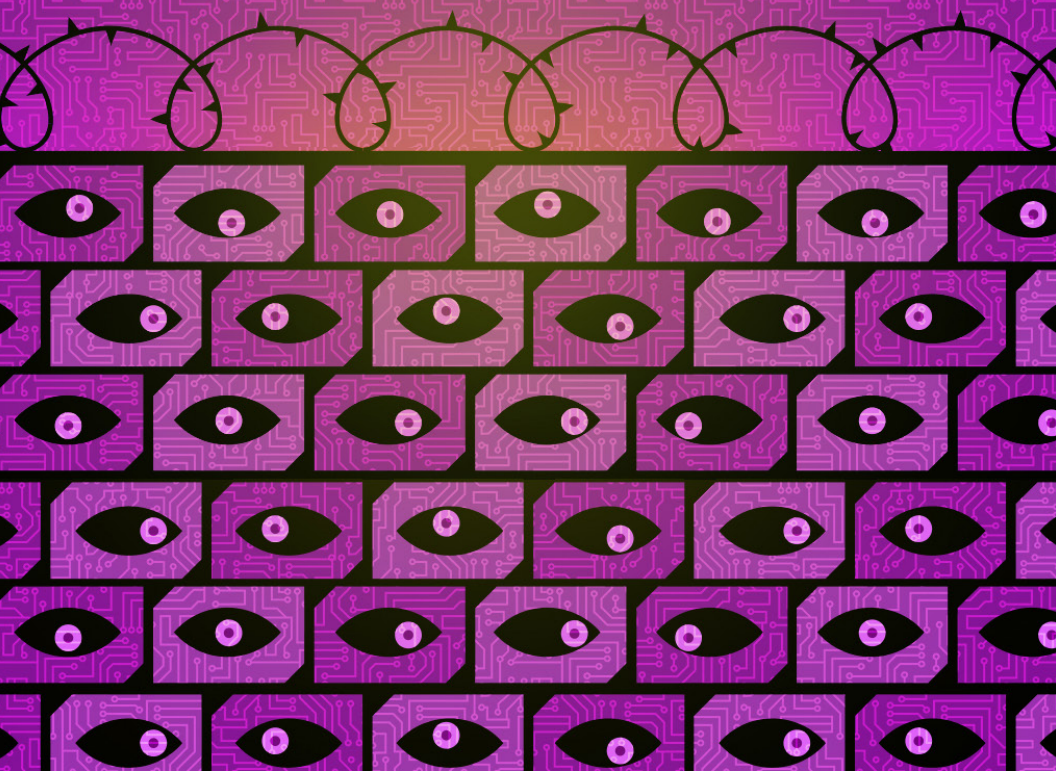


# **SURVEILLANCE TECHNOLOGY AT THE U.S.-MEXICO BORDER**

**A GUIDE FROM THE ELECTRONIC FRONTIER FOUNDATION**





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## About EFF

The Electronic Frontier Foundation is the leading nonprofit organization defending civil liberties in the digital world. Founded in 1990, EFF champions user privacy, free expression, and innovation through impact litigation, policy analysis, grassroots activism, and technology development. EFF’s mission is to ensure that technology supports freedom, justice, and innovation for all people of the world.

This guide was developed by EFF staff, including Veridiana Alimonti, Kim Carlson, Matthew Guariglia, Saira Hussain, Jason Kelley, Beryl Lipton, Dave Maass, José Martín, Shirin Mori, Paul Tepper, Carlos Wertheman, and Hannah Zhao.

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## Introduction

No matter who is in the White House or Congress, the U.S. government has continued to send more and more technology to the nation’s southern border with Mexico.

In the air and on the ground, on towers and on trucks, openly visible and disguised, in rural areas and urban centers, surveillance technology has turned the borderlands into a hostile environment for those who live and work there, and those who attempt to traverse it in search of sanctuary.

Much of this technology was either originally developed for military use or is a direct hand-me-down from the U.S. Department of Defense. Over the next 10 years, U.S. Customs and Border Protection is scheming to drastically expand its surveillance capabilities with new towers, artificial intelligence, drones, and even four-legged robots. State and local authorities are also adopting sophisticated technologies in the name of border security.

EFF conducted field research at the U.S.–Mexico border in 2022 and 2023. In preparation, our team created a binder of images of surveillance equipment we wanted to find and identify firsthand. It became a kind of bird-watcher’s guide that we shared with local folks during meetings. As they flipped through the pages, it was clear that many people had indeed seen this equipment, but they did not know what the tech was, what it did, or who operated it. People often asked us if they could have a copy.

With that in mind, we began developing our binder into a zine for public release, using whenever possible our own photography, rather than allowing CBP and vendors to control the narrative through imagery. This guide includes the most common technologies, but it is not exhaustive. This guide aims to help people who work and live in the borderlands—such as journalists, humanitarian workers, researchers, immigration attorneys, and everyday folk—to identify and understand the capabilities of the technology they encounter and new technologies being proposed for their region. Equipped with this information, we hope it will give borderlands residents the information they need to confront and resist surveillance in their communities.



## Part 1: Surveillance Towers



Border patrol, 65 foot steel tower used by U. S. Border patrol for watching Rio Grande River, lead to top is enclosed so no one knows when a border patrolman enters. Tower built by WPA.

*Surveillance tower circa 1938. Source: National Archives.*

### Overview

Surveillance towers have been part of U.S. border policy since the very early days of the U.S. Border Patrol, with the Work Progress Administration installing manned watchtowers along the border in the 1930s. Efforts to surveil the border remotely with camera technology began in the mid-1990s, but those programs largely failed, at a cost to taxpayers in the hundreds of millions.

In 2011, the U.S. Department of Homeland Security, under significant pressure from Congress, cancelled the Secure Border Initiative SBI-net “virtual wall” project. But border officials didn’t abandon the concept, and the government has continued to install new surveillance towers and upgrade legacy ones.

As a result, the border is a patchwork of different camera systems that historically were incompatible with each other.

## Proposed Tower Locations

FUTURE IST PROGRAM DEPLOYMENTS		
Sector	New Deployments	Existing Legacy RVSS Upgrades
Big Bend	63	2
Rio Grande Valley	1	0
San Diego	48	21
Del Rio	52	29
El Paso	46	33
Laredo	31	5
Buffalo	16	0
Blaine	2	32
Detroit	6	0
Swanton	5	5
El Centro	66	45
<b>Total Future Deployments</b>	<b>336</b>	<b>172</b>

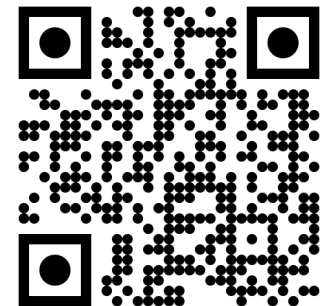
To address this, CBP/USBP is trying a new strategy—the Integrated Surveillance Tower (IST)/Consolidated Tower & Surveillance Equipment (CTSE) program. This will bring all the disparate systems under one umbrella. This coincides with a massive expansion of surveillance towers on both the Northern and Southern borders over the next decade.

The above chart from a October 2022 “industry briefing” presentation reveals the proposed locations of new ISTs as well as upgrades to older surveillance towers.

**WANT TO KNOW WHERE TO FIND CBP’S TOWERS?**

**VISIT EFF’S MAP:**

<https://eff.org/bordertowers>



## Integrated Fixed Tower (IFT)

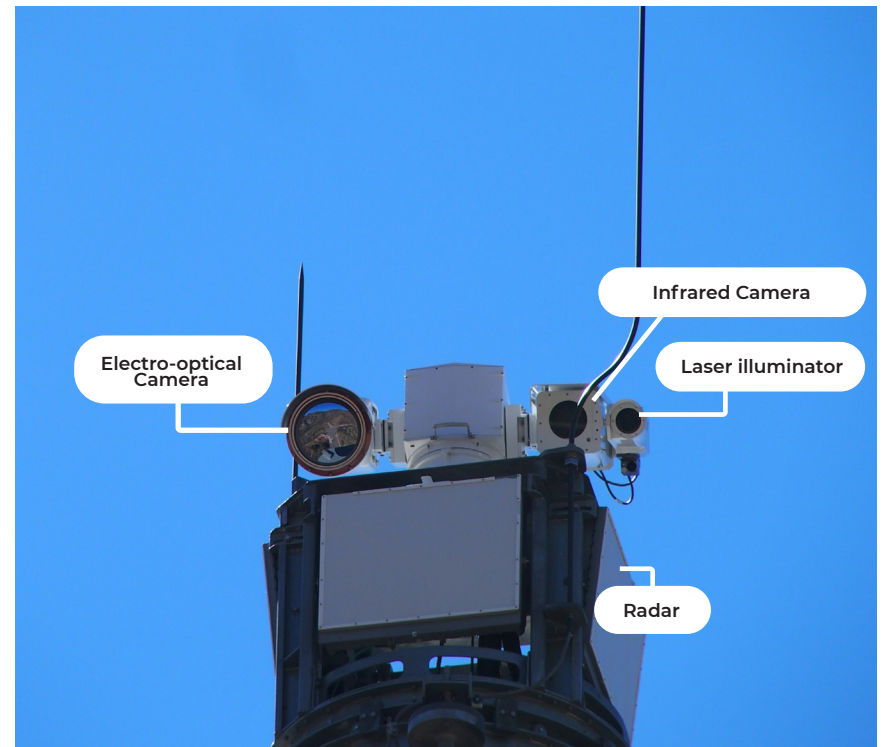


An IFT on Coronado Peak in Cochise County, Arizona. Source: EFF.

## Features of Technology

- **Agency:** Customs and Border Protection
- **Height:** 80-180 feet
- **Range:** 5-7.5 miles
- **Capabilities:** Long-range, persistent video, infrared, and radar
- **Vendor:** Elbit Systems of America
- **Estimated Number of Towers:** 50-60
- **Locations:** Southern Arizona

IFTs are exclusive to Southern Arizona, with many placed on the Tohono O'odham Nation's land. Usually found in rural or remote areas, these towers are sometimes built on legacy infrastructure from the previous SBInet program, which was cancelled in 2011. The towers are optimized for surveilling foot traffic, aircraft, and vehicles.



An IFT on Coronado Peak in Cochise County, Arizona. Source: EFF.



## Remote Video Surveillance System (RVSS)



An RVSS monopole above a neighborhood in Nogales, Ariz. Source: EFF.

## Features of Technology

- **Agency:** Customs and Border Protection
- **Height:** 60-200 feet
- **Range:** 3-5 miles, depending on sensors
- **Capabilities:** Long-range, persistent video, infrared, and radar
- **Vendor:** General Dynamics
- **Estimated Number of Towers:** Hundreds
- **Locations:** Remote, rural, and urban areas throughout the Southern and Northern borders

RVSSs are permanent monopole towers that are recognizable by a triangular or rectangular platform with two sensor arrays, each comprised of four components: electro-optical cameras, infrared cameras, laser illuminator, and a spot light. In some cases RVSS sensors are placed on other permanent fixed locations, such as water towers and buildings.

RVSSs can often be found very close to the border fence, including in residential neighborhoods (e.g., Nogales and Douglas, Ariz.), where the cameras are capable of looking at the homes of residents on both sides of the border.



Close up of RVSS sensors. Source: EFF.

## Relocatable Remote Video Surveillance System (R-RVSS)



Relocatable RVSS along the Rio Grande in South Texas. Source: EFF.

## Features of Technology

- **Agency:** Customs and Border Protection
- **Height:** 80 feet
- **Range:** 3-5 miles
- **Capabilities:** Electro-optical, infrared, radar
- **Vendor:** General Dynamics
- **Estimated Number of Towers:** 40+
- **Locations:** Rio Grande Valley, Texas

The R-RVSS towers have the same sensor rigs as the traditional “monopole” RVSS towers. The main difference is they are mounted on a trailer bed.

While these towers can be relocated to alternative locations, the evidence suggests CBP plans to maintain them in primary locations for long periods of time. To date, CBP has installed these exclusively in South Texas.



R-RVSS sensor rigs. Source: EFF.



## Autonomous Surveillance Tower



*Anduril Sentry tower in Imperial County, California. Source: EFF.*

## Features of Technology

- **Agency:** Customs and Border Protection
- **Height:** 33 feet
- **Range:** 1.5 miles (people), 2.2 miles (vehicles)
- **Capabilities:** Long-range, persistent video, infrared, thermal imaging, radar, drone integration
- **Vendor:** Anduril Industries
- **Estimated Number of Towers:** 200-300
- **Locations:** California, New Mexico, Texas

ASTs, previously known as “innovative surveillance towers,” typically refer to the Sentry tower system developed by Anduril Industries. These 33-foot, solar-powered towers are connected to artificial intelligence software that analyzes footage and controls the cameras. Because the systems are linked, the algorithm has the ability to track objects from tower to tower. ASTs are relocatable: they can be packed up and transferred to another location within a few hours.



*ATS sensors, Southern California. Source: EFF.*

## Relocatable Long-Range Surveillance Tower (Relocatable IFT)



*Relocatable IFT in Cochise County, Ariz. Source: Colter Thomas (CC BY).*

### Features of Technology

- **Agency:** Customs and Border Protection
- **Height:** 80 feet
- **Range:** 5-7.5 miles
- **Capabilities:** Electro-optical, infrared, radar, artificial intelligence
- **Vendor:** Elbit Systems of America
- **Location:** Arizona

Also known as “Intelligence Relocatable Long-Range Surveillance Tower” or a “relocatable IFT,” this tower uses the same technology as Elbit Systems’ Integrated Fixed Towers, but it is installed on a trailer bed so that it can be relocated as necessary to other locations.

This is a relatively new type of tower. As of November 2023, the only installation known to us is on the Cochise County Community College campus near Douglas, Arizona.

## Part 2: Mobile Surveillance Towers



*A Teledyne FLIR Lightweight Vehicle Surveillance System (LVSS), also known as a Mobile Surveillance Capability Lite (MSC-Lite). Source: USBP.*

### Overview

CBP and local law enforcement agencies use a variety of truck-mounted towers. Agents will place covers over the windows to protect themselves from the sun while they monitor the cameras from within the vehicle’s cab. National Guard or other military personnel are often deployed to operate these vehicles.



## Mobile Surveillance Capability (MSC)



A Mobile Surveillance Capability (MSC) vehicle in Pima County, Arizona. This model made by FLIR is sometimes referred to as a Mobile Video Surveillance System (MVSS).  
Source: EFF.

## Features of Technology

- **Agency:** Customs and Border Protection
- **Capabilities:** Thermal imaging. Newer upgrades include tethered drones.
- **Vendors:** Teledyne FLIR, Telephonics
- **Estimated Number:** Hundreds

Mobile Surveillance Capability systems (MSCs) are surveillance towers based in the beds of trucks, allowing CBP to move them from location to location as needed. There are at least two different models available: FLIR's MSC, which specializes in thermal imaging, and the Telephonics model, which uses video and radar.

CBP reportedly has 165 MSCs deployed across 16 Border Patrol Sectors. CBP is rolling out a newer, slimmed down model of the FLIR system, referred to as both an Lightweight Video Surveillance System (LVSS) and an MSC-Lite.



Telephonics MSC. Source: USBP.



## Mobile Vehicle Surveillance System (MVSS)/Scope Trucks



Scope truck in Southern California. Source: USBP.



Scope truck in South Texas. Source: EFF.

## Features of Technology

- **Agency:** Customs and Border Protection, National Guard
- **Capabilities:** Video, infrared, laser rangefinders
- **Vendor:** Benchmark (formerly Tactical Micro), Strongwatch, Advanced EO
- **Estimated Number:** Hundreds
- **Location:** Texas

Mobile Vehicle Surveillance System, also sometimes referred to as “scope trucks,” are short- and medium-range surveillance towers mounted in truck beds. These systems also include analytical software that helps agents identify, classify, and track objects. Agents are able to review the video from within the cab of the vehicle.



A scope truck parked on ranch land in South Texas. Source: EFF.



Scope truck in South Texas. Source: Texas Air National Guard.



## Mobile Surveillance Platforms



A Teledyne FLIR SkyWatch tower. Source: CBP.

### Features of Technology

- **Agency:** Customs and Border Protection, local law enforcement
- **Capabilities:** Video, night vision, ground radar available as options
- **Vendor:** Teledyne FLIR, TerraHawk
- **Locations:** Throughout the border region, with concentrations in the Rio Grande Valley

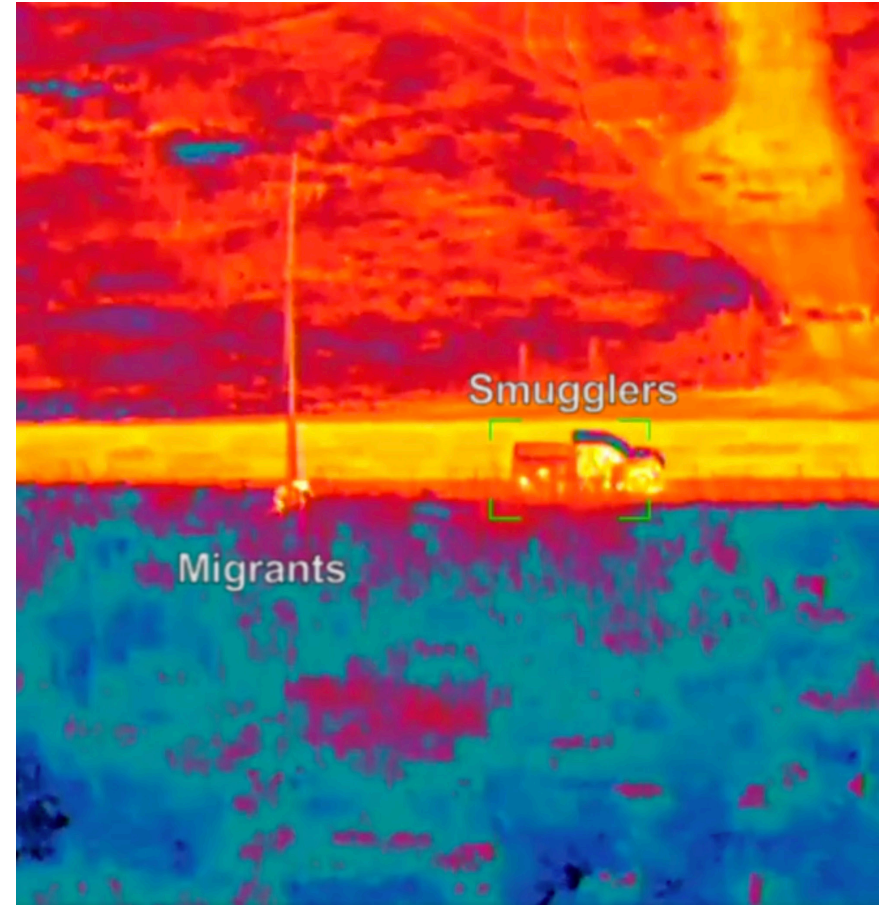


A TerraHawk MUST in downtown San Diego, California. Source: EFF.

SkyWatch towers are relocatable surveillance platforms that can accommodate long-range cameras and house personnel. These towers are also found along freeways and parking lots.

Mobile Utility Surveillance Towers (MUSTs) are similar platforms that are mounted on the roofs of vans. Although many of these systems were paid for with federal border security funds, they are often placed in shopping center parking lots or at public events.

## Part 3: Aerostats and Drones



Drone footage released by the USBP Tucson sector.

### Overview

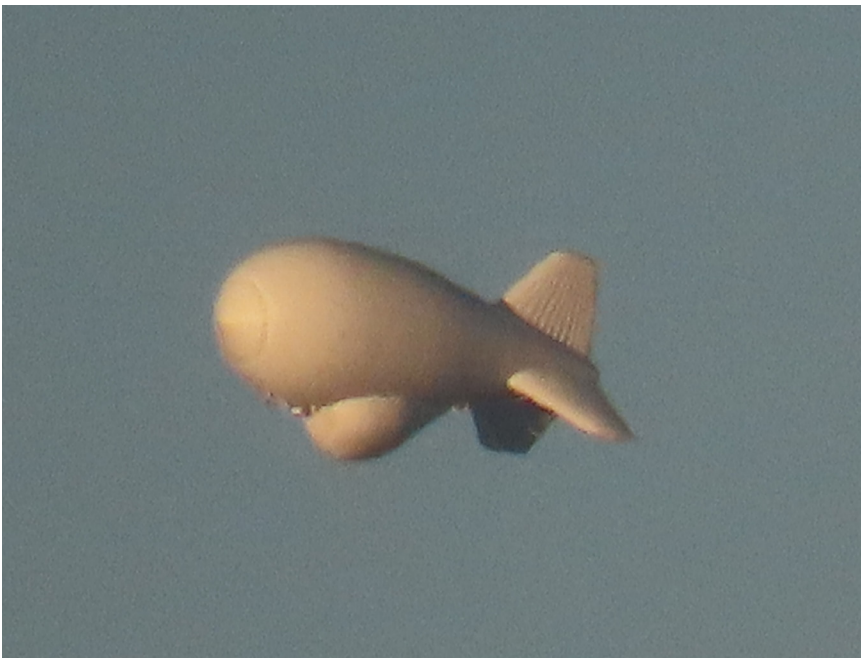
For many years, high-altitude aerial surveillance has been used at the border in order to see long distances and over geographical features such as mountains. However, in recent years, agencies have also begun deploying remotely piloted aerial systems for use in tactical situations (such as intercepting border crossings) or to conduct persistent surveillance over border areas, including residential areas.

This section does not include the large variety of airplanes and helicopter in use by all levels of law enforcement.

## Tethered Aerostat Radar System (TARS)



TARS moored at a CBP facility south of Eagle Pass, Texas. Source: EFF.



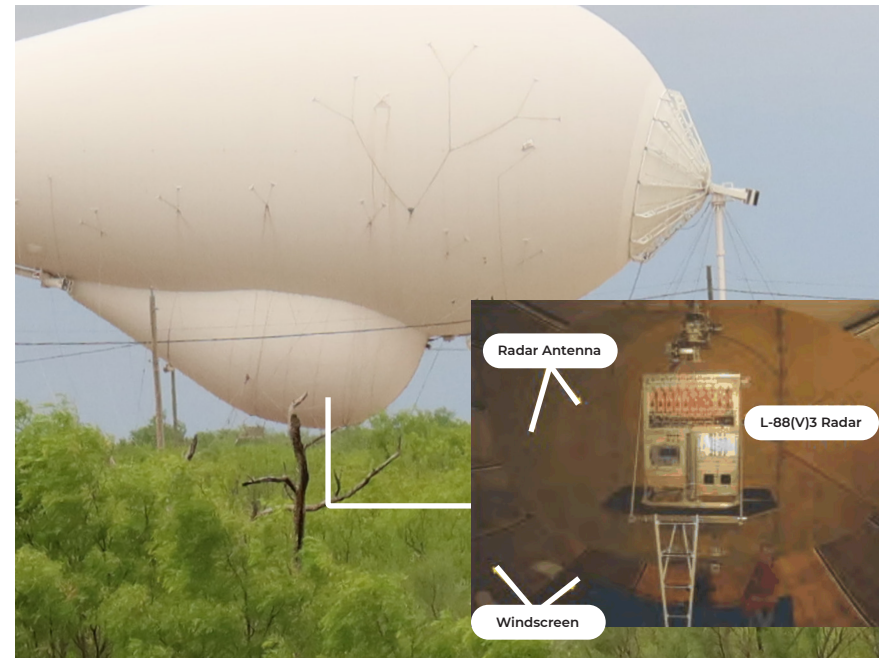
TARS in the air south of Deming, New Mexico. Source: EFF.

## Features of Technology

- **Agency:** Customs and Border Protection
- **Capabilities:** Radar
- **Contractor:** Altaeros Energies, QinetiQ, C Speed, Elevated Technologies, Skyship Services, Peraton
- **Number of Systems:** 8
- **Locations:** Arizona (Yuma, Sierra Vista), New Mexico (Deming), Texas (Marfa, Eagle Pass, Rio Grande City), Florida (Cudjoe Key), Puerto Rico (Lajas)

Tethered Aerostat Radar Systems (TARS) are permanently moored in six locations along the border (additional TARS are installed in Florida and Puerto Rico). These systems are primarily radar-based and focused on low-flying aircraft and ground vehicles.

CBP claims they can detect an aircraft from 200 miles away. The U.S. Air Force managed the TARS program until July 2013, when the program was transferred to CBP.



Payload windscreen (Source: EFF) and radar payload (Source: U.S. Department of Defense).



## Tactical Aerostat Systems (TAS)



*Tactical Aerostat, Nogales, Arizona. Source: EFF.*

### Features of Technology

- **Agency:** Customs and Border Protection
- **Capabilities:** Video
- **Vendor:** Peraton

Tactical Aerostats Systems are smaller, video-based, and can be packed up and moved to other locations.

For many years, CBP leased four TAS from the military in South Texas. In 2022, others were installed in Arizona and New Mexico, with plans to increase the total fleet to more than 20 aerostats.

In spring 2023, CBP's proposed budget included plans to decommission all TAS.

## MQ-9 Reaper



*Predator B. Source: CBP.*

### Features of Technology

- **Agency:** Customs and Border Protection
- **Capabilities:** Electro-optical, infrared, radar
- **Vendor:** General Atomics
- **Location:** Sierra Vista, Ariz., Corpus Christi, Texas

These large drones are the size of small planes and are similar to those used by the U.S. military abroad. The primary drones are based at an airfield near Fort Huachuca in Arizona. Generally, these will not be viewable due to the high altitude of the flights. In addition to border missions, CBP also “loans” the drones out for domestic law enforcement operations.



*Guardian. Source: CBP.*

## Medium Unmanned Aerial System (mUAS)



*Insitu Scaneagle with launcher. Source: U.S. Coast Guard.*

### Features of Technology

- **Agency:** Customs and Border Protection
- **Capabilities:** Video, infrared, VIDAR
- **Vendor:** Insitu
- **Number of systems:** 4



*Insitu Blackjack.  
Source: U.S. Marine Corps.*

CBP received four mUAS systems from the military for free in 2022. The drones include long-range video and infrared capabilities, as well as Video Detection and Ranging (VIDAR), a technology that uses video to perform similar functions as radar. The drones can fly for 12 hours at a time, but they are not able to take off independently and instead require a catapult or crossbow-like system to launch them into the air.

## Small Unmanned Aerial System (sUAS)



*A quadrotor. Source: CBP.*



*A fixed-wing UAV. Source: CBP.*

### Features of Technology

- **Agency:** Customs and Border Protection, local law enforcement
- **Capabilities:** Video, night vision, thermal imaging
- **Vendor:** Insitu, Vantage Robotics, Anafi, Skydio, Teal Drones. (Local agencies may use other vendors, such as DJI.)

Small UAS are highly portable systems that can be deployed in the field by an operator using a hand-held remote control. These are typically used for short-range surveillance. The Texas National Guard also uses drones to support its Operation Lone Star “brush teams,” which are tactical units of “elite soldiers” that intercept and arrest “trespassing migrants.”



## Part 4: Road and Ground



Automated License Plate Readers at the Eagle Pass International Bridge. Source: EFF.

### Automated License Plate Readers (ALPRs)

Automated License Plate Readers (ALPRs) are camera systems that photograph a vehicle's license plate and upload it along with GPS coordinates and time/date to a searchable database.

ALPRs can be disguised as speed trailers or traffic cones. They also can be mounted on patrol cars.

CBP has installed these systems at most border crossings and checkpoints across the Southwest.

## Features of Technology

- **Agencies:** Customs and Border Protection, Immigration and Customs Enforcement, Drug Enforcement Administration, state and local law enforcement
- **Capabilities:** Uses cameras to capture license plates and other vehicle features
- **Vendors:** Perceptics, Adaptive, Selex, Vigilant Solutions, Flock Safety, and others
- **Locations:** Ports of entry, checkpoints, highways, patrol cars



Uvalde, Texas checkpoint ALPR. Source: EFF.



ALPR Speed Trailer in Eagle Pass, Texas. Source: EFF.





Covert ALPR camera at a Border Patrol checkpoint near Ocotillo, California. Source: EFF.



Covert ALPR camera. Source: EFF.

These systems capture all angles of the vehicle, including the driver, and store the data for 15 years. Previously, CBP's vendor Perceptics suffered a breach resulting in a leak of drivers' data.

Many local law enforcement agencies in cities along the border have deployed ALPR cameras, often through federal grants or asset forfeiture funds. Data is shared across agencies.

These systems can track vehicles over long distances and identify vehicles traveling together. Investigators use ALPR data to target vehicles that are traveling routes supposedly known for smuggling.

## Buckeye Cameras



Buckeye Camera. Source: Dugan Meyer (CC BY).

### Features of Technology

- **Agency:** Customs and Border Protection, Immigration and Customs Enforcement, various Arizona sheriffs
- **Capabilities:** Motion-triggered cameras, real-time transmission
- **Vendor:** Buckeye
- **Estimated Number of Cameras:** Hundreds
- **Locations:** Border-wide, concentrations in Arizona

Buckeye Cameras were originally designed to capture wildlife, but have been repurposed for border surveillance and are now directly marketed to that sector. These motion-triggered cameras are placed in remote and rural areas and transmit photos back to officers. The Cochise County Sheriff's Office, which pioneered this technique, currently operates hundreds of these cameras. CBP has also deployed a large number of Buckeye Cameras.

## Unattended Ground Sensors (UGS)

### Features of Technology

- **Agency:** Customs and Border Protection
- **Capabilities:** Seismic sensors
- **Vendor:** Tremor Tech, Vortex, MCQ, WilliamsRDM



Vortex UGS. Source: GSA Advantage.

CBP has also installed sensors, often concealed, in rural areas to detect vehicles and foot traffic near the border. As of 2023, CBP is in the process of expanding this program.



## Q-Unmanned Ground Vehicle (QGV)/ Automated Ground Surveillance Vehicle (AGSV)



Ghost Robotics Q-UGVs at the 2023 Border Security Expo. Source: EFF.

### Features of Technology

- **Agency:** Customs and Border Protection
- **Capabilities:** Real-time video surveillance
- **Vendor:** Ghost Robotics
- **Status:** Currently in testing/under consideration
- **Locations:** Unknown areas of southwest border

The Vision 60 Q-UGV from Ghost Robotics can be autonomous or remotely controlled and are intended to be force multipliers in remote and hard-to-reach stretches of the border. Unlike other companies, which have pledged not to arm their robots, Ghost Robotics has advertised armed robots.

## Rescue Beacons



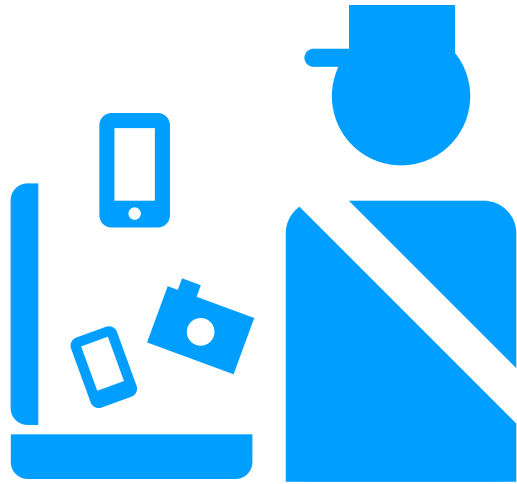
Source: CBP.

Rescue Beacons are not primarily surveillance technologies, but it is worth recognizing them in the desert. CBP sets these up so that migrants can call for assistance when lost, stranded, or injured. They are approximately 35 feet tall and topped with strobe lights and located throughout the border.

The Border Ecologies Network has documented the location of these beacons throughout Arizona at [azbeaconmap.org](http://azbeaconmap.org)

## Acronyms

- **ALPR** - Automated License Plate Reader
- **AGSV** - Automated Ground Surveillance Vehicle
- **AST** - Autonomous Surveillance Tower
- **CTSE** - Consolidated Tower & Surveillance Equipment
- **DEA** - Drug Enforcement Administration
- **EFF** - Electronic Frontier Foundation
- **ICE** - Immigration & Customs Enforcement
- **IFT** - Integrated Fixed Tower
- **IST** - Integrated Surveillance Tower
- **CBP** - Customs & Border Protection
- **LVSS** - Lightweight Vehicle Surveillance System
- **MSC** - Mobile Surveillance Capability
- **MVSS** - Mobile Video Surveillance System
- **mUAS** - Medium Unmanned Aerial System
- **RVSS** - Remote Video Surveillance System
- **R-RVSS** - Relocatable Remote Video Surveillance System
- **TARS** - Tethered Aerostat Radar System
- **TAS** - Tactical Aerostat System
- **sUAS** - Small Unmanned Aerial System
- **UGS** - Unattended Ground Sensor
- **USBP** - United States Border Patrol



## Crossing the U.S. Border?

Border agents may demand your digital data. Here are some things to keep in mind.

### Before the Trip

**Reduce the data you carry.** Consider using temporary devices, deleting data from your regular devices, or shifting data to the cloud.

**Encrypt.** Use strong full-disk encryption, not just weak screen-lock passwords.

**Passwords.** Use software to make them long, unpredictable, and memorable.

**Backup.** In case agents seize your devices, backup your data. Power down. Do it before arriving at the border, to block high-tech attacks.

**Disable biometric locks.** They are weaker than passwords, so don't rely on them.

**Apps and browsers.** Agents use them to get from devices to cloud content. Consider logging out, removing saved login credentials, and uninstalling.

**But be aware:** Unusual precautions may make border agents suspicious.

## At the Border

What if border agents instruct you to unlock your devices, provide your passwords, or disclose your social media information? There is no "right" answer.

**Be safe.** Stay calm and respectful. Do not lie to agents, which can be a crime.

**If you comply,** agents may scrutinize and copy your sensitive data.

**If you refuse,** agents may seize your devices. They also may escalate the encounter, for example, by detaining you for more time.

**If you are a U.S. citizen,** agents must let you enter the country.

**If you are a lawful permanent resident,** agents might raise complicated questions about your continued status as a resident.

**If you are a foreign visitor,** agents might deny you entry.

### After Your Trip

**If you had problems:** Write down the details of what happened, including names of officers.





# Learn how to spot surveillance at the border.

As surveillance technology becomes ubiquitous along the U.S.-Mexico border, the equipment is still sometimes unknown or invisible to even the activists, humanitarians, researchers, and journalists working everyday in the borderlands.

Based on public records research, open source intelligence, and fact-finding trips, EFF has compiled this zine to serve as an illustrated guide to border security technology.

Our aim is to help folks living in and serving border communities to spot, identify, and understand the surveillance systems they might encounter on the ground, on the road, and in the air.

