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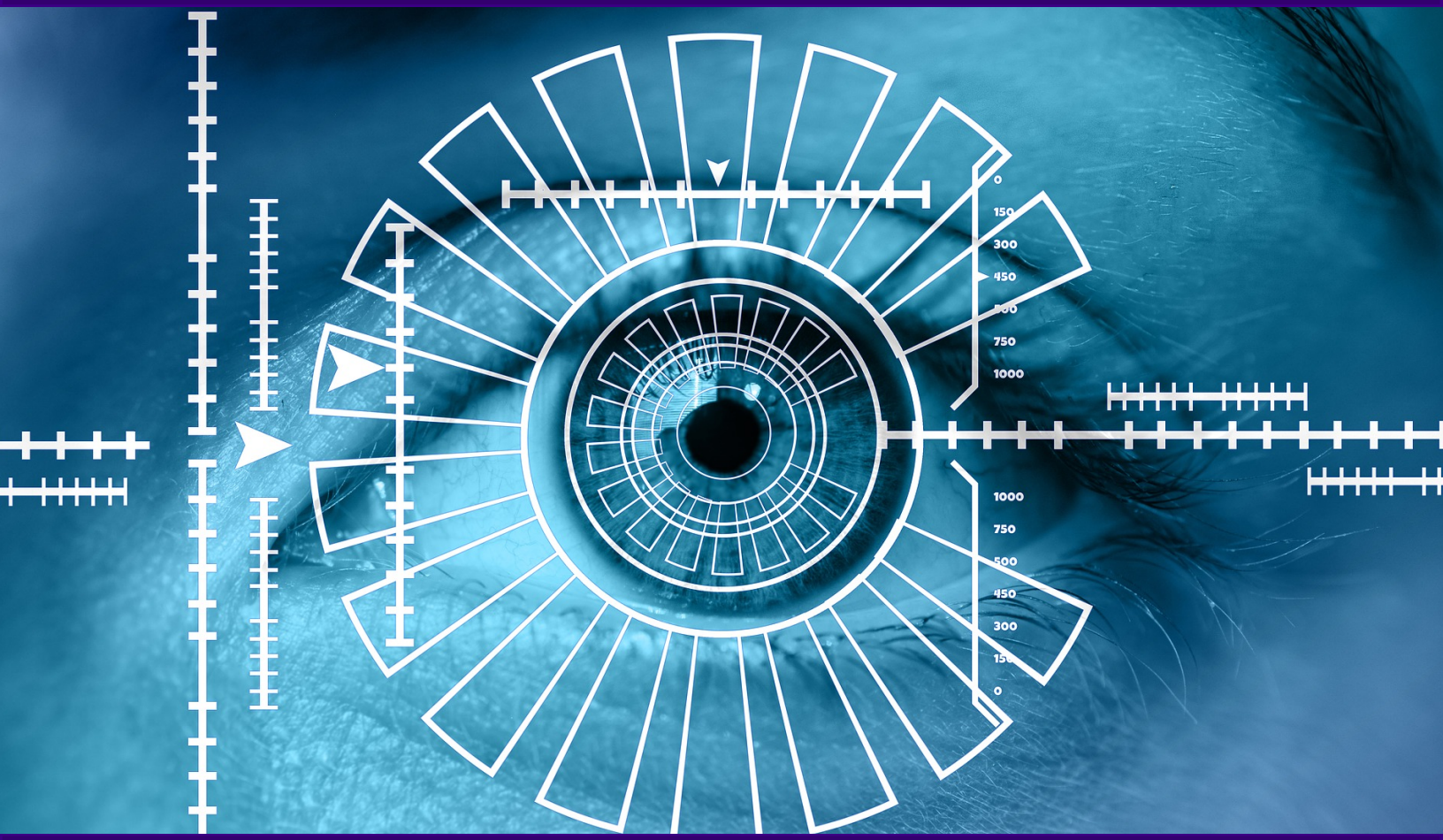

Big Brother on the Border: A Cross-National Analysis of Border Technology

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Henry M. Jackson School of International Studies
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A Cross-National Analysis of Border Technology

Faculty Advisor
Dr. Jessica Beyer

Evaluator
Adrian Shahbaz
Director for Technology and Democracy at Freedom House

Editors
Madeleine Cole
Maya Green

Coordinator
Ekin Njotoatmodjo

Researchers
Rochelle Bowyer
Morris Chang
Yogasai Gazula
Orlando Lugo
Raphael Kyle Caoile Manansala
Soraya Marashi
Ekin Njotoatmodjo
Nathaniel Poole
Eleanor Roads
Ashley Rho
Dale Su
Benjamin Visse
Michelle Wu

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Executive Summary

Crossing an international border can represent a shift in personal freedoms and economic opportunities, and for millions of people around the world each year, it marks a new beginning. However, borders are also politically charged and militarized spaces that nations have a mandate to secure. As technology advances, new systems are being developed and deployed in borderlands to monitor the movement of people. Border security technologies are developing faster than they can be regulated, resulting in dangerous opportunities for state and non-state actors alike to operate with little transparency or accountability.

This report examines 13 international borders around the world and the technology used to monitor them in order to present a cross-national comparative analysis of border security technology and its human rights implications. The report investigates what nations define as their most pressing border issues and the technologies utilized in response. The borders include: UK-France, Italy's maritime border, Israel-West Bank, Turkey-Syria, Nigeria, Ethiopia-Kenya, India-Bangladesh, Hong Kong-China, Indonesia-Malaysia, Australia, Colombia-Venezuela, Guatemala-Honduras, and US-Mexico.

Our report finds 29 distinct types of technology deployed at the borders we studied. There are widespread concerns surrounding the use of technology at borders, especially in the areas of data privacy and human rights. These concerns must be addressed in order to ensure safety and security for all people moving through international borderlands.

Drawing on findings from our case studies, we recommend the United Nations takes the following actions:

1. Establish guidelines for the collection, use, and security of personally identifiable data collected at international borders.
2. Develop guidelines to facilitate and regulate data sharing between states and between governments and private actors.
3. Urge states to implement a moratorium on the use of facial recognition technology as a part of border security systems until clear, enforceable regulations on its use are passed at a national level.
4. Condemn technology firms that sell products used for unethical purposes at borders.
5. Create an independent, multi-stakeholder advisory body to vet, analyze, and monitor the implementation of technology at international borders.
6. Conduct comprehensive international reviews measuring the negative human impacts of increased border securitization.
7. Urge states to increase transparency and oversight of border enforcement agencies to identify and replace strategies that violate human rights.

Report Findings

Our report examines border security technology at international borders around the world to determine how the use of technology impacts humans moving through these regions. We examine both the benefits and the dangers of border technology in order to inform the United Nations of their impact. Our case study produced the following major findings:

- In 10 of our 13 cases, migration is a major political issue.
- All case studies find some form of border security technology implemented beyond physical barriers and markers.
- The most widespread technologies applied at borders are biometrics, drones, cooperatively shared databases, closed-circuit television, and thermal imaging.
- In 11 cases, borders deploy technology produced by French, Israeli, or US firms.
- Six of our cases exhibited *Highly Invasive* levels biometric data collection, while seven exhibited *Moderately Invasive* collection levels, and no cases were considered to have the *Least Invasive* level of collection.
- Although almost all cases have evidence of biometric data collection, only seven borders have specific regulations around this data.
- Facial recognition technology is the most concerning border security technology in use at this time.

Case Study Methods

In order to ensure a thorough and accurate understanding of the variation in border spaces, this report examines 13 international border regions. Eight of our cases examine bilateral borders: United Kingdom-France, Turkey-Syria, Ethiopia-Kenya, India-Bangladesh, Indonesia-Malaysia, Colombia-Venezuela, Guatemala-Honduras, and United States-Mexico. Two cases, Italy and Australia, explore maritime borders, while one case, Nigeria, focuses on a single country's border with multiple nations. Finally, we focus on two cases that explore politically charged internal borders: Israel-West Bank and China-Hong Kong. We selected these cases to represent a relatively even geographic distribution and a range of technological capacities to control migration. Additionally, we chose borders with current and historical migration issues. Figure 1 provides a visual representation of our case studies on a global geopolitical map.

Within each case study, we provide background on the historical context of the border in question, major forms of migration occurring in these regions, and the current issues that border authorities are facing. The cases focus on providing a comprehensive understanding of the types of technology utilized at each border, noting any regulations these technologies must follow as well as relevant international agreements that play a role in the application of this technology. Cases note where concerns surrounding human rights and data privacy emerge and

end by offering policy recommendations specific to each border for the appropriate application of border technology.

Figure 1: Map of Cases

Common Government-Defined Issues Across Cases

Despite drastic differences in geography, level of technology, and style of governance, the 13 borders in this report have distinct similarities. In 10 of our 13 cases, migration into the country is considered to be a major political issue for border countries and one that leaders use to mobilize support. Only two of our cases, Indonesia-Malaysia and Ethiopia-Kenya, do not consider migration to be a major issue, while Hong Kong-China sees migration as a complex issue, but not necessarily one that leaders manipulate to win political power. In all ten cases where migration is a major political issue, asylum seekers and other forced migrants are the major groups crossing the border.

In addition to managing migration, we find that human smuggling and trafficking, the threat of terrorism, drug trafficking, and contraband trade are the most pressing issues facing border security authorities today. Many borders are also facing unique challenges such as cattle raiding at the Ethiopia-Kenya border, offshore detention centers at the Australia border, and "mainlandization" at the Hong Kong-China border. Due to the wide variation in the challenges faced, border authorities are required to implement a range of technologies to maintain security.

Low resource countries often have porous borders controlled and exploited by non-state actors, making governmental desires for effective border technology more pressing. Traditional border management tactics are unable to keep up with the demands that border authorities face today. Nigeria is in the process of establishing new technologies at its border to combat terrorist group Boko Haram and other threats, but as it stands, the border remains porous and subject to exploitation. Authorities at the Ethiopia-Kenya border get by with almost no technology, as other Ethiopian borders face greater threats and, therefore, have more pressing needs for securitization. This lack of official supervision, however, creates a vacuum that facilitates contraband trade, voter fraud, and other issues. At the Honduras-Guatemala border, authorities are unable to keep pace with the level of northbound migration that Central America has been facing. Meanwhile, corruption cripples these governments while powerful organized crime groups can access technology more easily than border authorities can.

Level of Border Technology

Our report finds that borders employ a variety of technologies in order to monitor their borderlands. These technologies can be as simple as trunked radio systems or as complex as predictive analytics databases. Simply summing the number of technologies found at borders is not an accurate indicator of the technological capacity of a border. However, taken together with other factors, such as the scope of the dominant border country's technology sector, we gleaned insight into how one border's technology measures against another. We refer to this measure as the "level of border technology."

In order to determine the level of border technology that a border possesses, we chose to develop a unique index that ranks our borders of study from *Low* to *High* based on their technological capacity. Points are assigned based on the existence of the most relevant categories of border technology: surveillance technology, biometrics, automated border controls, and migration databases. In addition to scoring one point for having technology in each of these categories, a border earns an additional point for being a technology exporter. Finally, a border receives up to an additional two points based on the dominant border power's "Technology Sector" score from Oxford Insight's *Government AI Readiness Index 2020*. In this Index, a country receives up to 100 points each for their technology sector capital, innovation capacity, and size, for a sum total of 300 points (Shearer et al., 2020). For our purposes, a country earning 0-99 points receives zero points for our index, between 100-199 earns one point, and between 200-300 earns 2 points. Taken together with the other factors, a border can score up to seven points, with 0-3 points having a *Low* level of technology, 4-5 points having a *Medium* level, and 6-7 points having a *High* level.

Out of the 13 cases, seven are designated as having a *High* level of technology, while one is considered to have a *Medium* level, and five have a *Low* level. Table 1 illustrates each

case border's level of technology. Borders are ranked in order of technology level with Israel (1) scoring highest, and Honduras (13) scoring lowest.

Table 1: Level of Border Technology

Borders	Technology Level	Borders	Technology Level
(1) Israel-West Bank Border	7	(8) Indonesia-Malaysia Border	5
(2) United States-Mexico Border	7	(9) Nigeria Border	3
(3) Hong Kong-China Border	6	(10) India-Bangladesh Border	3
(4) Turkey-Syria Border	6	(11) Ethiopia-Kenya Border	2
(5) Italian Maritime Border	6	(12) Colombia-Venezuela Border	1
(5) Australian Border	6	(13) Honduras-Guatemala Border	1
(7) UK-France Border	6		

Technology Types Across Cases

Twenty-nine distinct forms of technology are identified throughout our 13 case studies, the most widespread of which was biometric data collection technology. Drones, cooperative data sharing databases, closed-circuit television, and thermal imaging are also found frequently across cases. And, governments use various forms of automated border controls. Other types of technology are unique to each case – 14 of the 29 technologies are only found in a single case.

Border authorities largely select technologies based on geographic and security concerns unique to their regions, but cases that share concerns do not necessarily have shared technologies. For example, Italy and Australia have similar concerns surrounding managing migration in a maritime setting and have the resources to address these concerns. However, when comparing Italy's maritime security strategy to that of Australia, Italy deploys a number of maritime devices including hydrophones, drones, naval optronics, and vessel traffic management systems, while Australia only uses hydrophones. This demonstrates how although a few key categories of technology are utilized across border types, every border has its own unique combination of technologies to account for its geographic, geopolitical, and economic challenges.

In this section, we focus on the five most common technologies across cases: biometrics, drone surveillance, cooperative data sharing databases, closed-circuit television, and thermal imaging. Table 2 illustrates where each of these technologies are found.

Table 2: Technology Types Across Cases

	Biometrics	Drones	Cooperative Data Sharing	Closed-Circuit Television	Thermal Imaging
UK-France Border	x	x	x	x	x
Italian Maritime Border	x	x	x		x
Israel-West Bank Border	x				
Turkey-Syria Border	x	x	x	x	x
Nigeria Border	x	x	x		
Ethiopia-Kenya Border					
India-Bangladesh Border	x	x		x	x
Hong Kong-China Border	x		x	x	
Indonesia-Malaysia Border	x	x	x		
Australian Border	x			x	
Colombia-Venezuela Border	x	x			x
Honduras-Guatemala Border	x				
United States-Mexico Border	x	x		x	x

Biometrics

Twelve out of 13 cases see clear examples of biometric technology applied in border regions. Biometric data is data collected on unique physical characteristics which can then be used for automated recognition (*Biometrics*, n.d.). Although biometric technology can take many forms, fingerprinting is the most widespread, present in ten cases, followed by facial recognition in eight cases, while four cases utilize iris scans.

Biometric data is often integrated into automated processing systems that screen migrants and travelers. For example, Australia is in the process of implementing a SmartGates system using Enterprise Biometric Identification Services, a biometric data processing system developed by the company IDEMIA. SmartGates will utilize a combination of fingerprints, iris scans, and facial and voice recognition to allow for quick processing of travelers in airports.

Biometric data is also increasingly utilized in official travel documents as a way to authenticate identities and reduce the prevalence of stolen or counterfeit identification. Countries have implemented a variety of identification documents embedded with biometric data, the most widespread being ePassports, developed by Thales Group, which are in use in seven cases: Italy, Turkey, Malaysia, Colombia, India, the US, and the UK (as well as France). Additionally, Palestinians seeking to cross the border from the West Bank into Israel are required to have micro-chipped biometric identification cards that hold fingerprints, iris scans, and facial recognition data, as well as extensive biographic information on the cardholder and their family members. In six cases, citizens are currently required to register in nation-wide biometric databases, and a seventh - Nigeria - is in the process of rolling out its own system.

Drone Surveillance

Drones of various sizes and sophistication are utilized for border security management around the world and are present in eight of our 13 case studies: UK-France, Italy maritime,

Turkey-Syria, Nigeria, India-Bangladesh, Indonesia-Malaysia, Colombia-Venezuela, and US-Mexico. Drones, also referred to as unmanned aerial vehicles or unmanned surveillance aircraft, are deployed to conduct surveillance and reconnaissance across remote, rough terrain that often comprises border regions. The devices range dramatically in size and capabilities, from lightweight designs available for retail consumer purchase to advanced, military-grade models with advanced artificial intelligence and sensor technology built-in. Advanced models can fly for long periods and in adverse weather conditions but are more costly to purchase and operate.

Military-grade Heron and Searcher drones, made by Israeli Aerospace Industries (IAI) are utilized or planned to be deployed by European Union authorities in the Mediterranean and the Indian Border Security Force along the Bangladeshi frontier, while the US deploys domestically developed Predator drones along its southern border. Across cases, drones are equipped with a variety of add-ons, including 360-degree cameras, thermal imaging, object identification and tracking, and AI systems to synthesize the vast amounts of data collected.

Cooperative International Data Sharing

Cooperative data sharing in various forms is found across seven cases: UK-France, Italy, Turkey-Syria, Nigeria, Hong Kong-China, Indonesia-Malaysia, and the US-Mexico. Cooperative data sharing can be global initiatives, such as INTERPOL's Lost and Stolen Document's database, regional programs like those found in the EU, or bilateral data-sharing agreements like the US-Mexico Entry/Exit Data Sharing Initiative. Regional initiatives, like the EURODAC database, manage asylum seeker applications and movements. The cooperative EURODAC database allows for the enforcement of migration regulations, specifically the Dublin Agreement, outlining that asylum seekers must register in the first EU country they arrive in; the shared biometric database allows for states to cross-reference and verify applicants. The use of global cooperative databases like INTERPOL's is a key security measure in both Nigeria and the Indonesia-Malaysia border region. Global and regional cooperative databases help countries both identify unauthorized border crossers and allow for quick identification of verified travelers.

In addition to these more wide-reaching examples, other cases engaged in or plan to develop bilateral cooperative data sharing systems. One example under development is the US-Mexico Entry/Exit Data Sharing Initiative, which aims to enhance collaboration and record accuracy in immigration and law enforcement activities. The two designated national authorities, U.S. Customs and Border Protection and Mexico's National Migration Institute, will exchange the personally identifiable information of border crossers for easier facilitation of border crossing (U.S. Department of Homeland Security, 2017).

Closed-Circuit Television

One of the most ubiquitous technologies found both at the borders included in this study, and spread throughout national interiors, is closed-circuit television (CCTV). We found evidence of CCTV systems in use at the border in at least six cases: UK-France, Turkey-Syria, India-Bangladesh, Hong Kong-China, Australia, and US-Mexico. However, the ubiquity of these systems in municipalities around the world indicates that even where we could not find concrete evidence of their use at a border, they may have been present in some form. Most of our cases utilize CCTV at heavily trafficked ports of entry, with an often-undisclosed number of cameras broadcasting into a single feed to be monitored by border authorities.

In the few cases where specific numbers are available, reasonable extrapolation gives a sense of how widespread video surveillance is. At Coquelles Terminal in France, at least 500 cameras are installed for use in combination with drones, motion sensors, and agents on foot; meanwhile, one press report found that there are over 1,000 cameras used just by the Hong Kong Immigration at border crossings, a count that excludes and is likely overshadowed by the number used by the Hong Kong Police Force and Chinese authorities.

Not all of these CCTV installations are simple video feeds. At the Turkish border, cameras are outfitted with sensors that detect movement and instantly transmit coordinates to an operations sensor. In Australian airports, and throughout the border between Hong Kong and China, CCTV is used in combination with facial recognition technology to identify travelers, and in one case even alerts drivers if it senses them yawning while crossing the border.

Thermal Imaging

Six of our cases provide clear examples of thermal imaging technology used in conjunction with or outfitted on other technologies: UK-France, Italy-North Africa, Turkey-Syria, India-Bangladesh, Colombia-Venezuela, and US-Mexico. Thermal imaging cameras detect radiation and produce images from that radiation, improving border authorities' ability to detect objects and movement, particularly in low-visibility situations. In many cases, drones, vehicles, and towers are equipped with thermal imaging, but this technology is also used at the UK-France border and the Italian maritime border to detect objects in bodies of water.

Private Actors Driving the Growth of Technology at Borders

While we found seven countries to be active global exporters of technology used at borders, private corporations based in France, Israel, and the US are particularly prolific, with those three countries collectively supplying technology to 11 of 13 cases in our study. The companies surfacing in the most cases are Thales Group, Elbit Systems, and Israel Aerospace Industries. IDEMIA, Boeing, Palantir, and Microsoft appeared in two cases each. Italy is another

notable exporter, whose Leonardo S.p.A. is also found in at least two cases. Table 3 captures the patterns we found.

Table 3: Most Common Technology Exporters

Company Name	Number of Cases Found	Countries	Company Based In:
Thales Group	8	UK/France, Italy, Turkey, Nigeria, India, Malaysia, Colombia, US	France
Elbit Systems	5	UK, Italy, Israel, Nigeria, US	Israel
Israel Aerospace Industries (IAI)	3	Italy, Israel, India	Israel
IDEMIA	2	UK/France, Australia	France
Boeing	2	Indonesia, Colombia	US
Palantir	2	UK, US	US
Leonardo	2	Italy, Colombia	Italy
Microsoft	2	Israel, US	US

The private actor with the single widest reach is the France-based Thales Group. Collectively with IDEMIA, these two French corporations provide security solutions to nine of our 13 cases, although their products can be found in use in various capacities in many more countries around the world. Thales sells a range of products, including drones, thermal imaging cameras, biometric data systems, and ePassports. Thales is a particularly dominant supplier of ePassports, identification documents embedded with micro-chipped biometric and biographic data, which are found in seven cases: the US, Italy, Colombia, India, Malaysia, Turkey, and the UK (as well as France). Additionally, Thales developed Nigeria's new national eID which includes biometric information attached to a national database (*The New Nigerian National EID Program | Thales*, n.d.). Thales supplies key infrastructure for EURODAC, the biometric database used by the EU to track asylum seekers. The group also manufactures the BIOMIG Scanners found in Colombian airports that allow passengers to move quickly through security checkpoints with an iris scan. Similarly, IDEMIA is contracted with the EU and Australia to build automated entry-exit systems that utilize biometric data from travelers. In Australia, IDEMIA's Unisys Stealth system employs a combination of fingerprints, iris scans, and voice and facial recognition to identify travelers. In early 2021, IDEMIA entered into a contract with French authorities to build a biometric entry-exit system, although the specifications have yet to be released (IDEMIA, 2021).

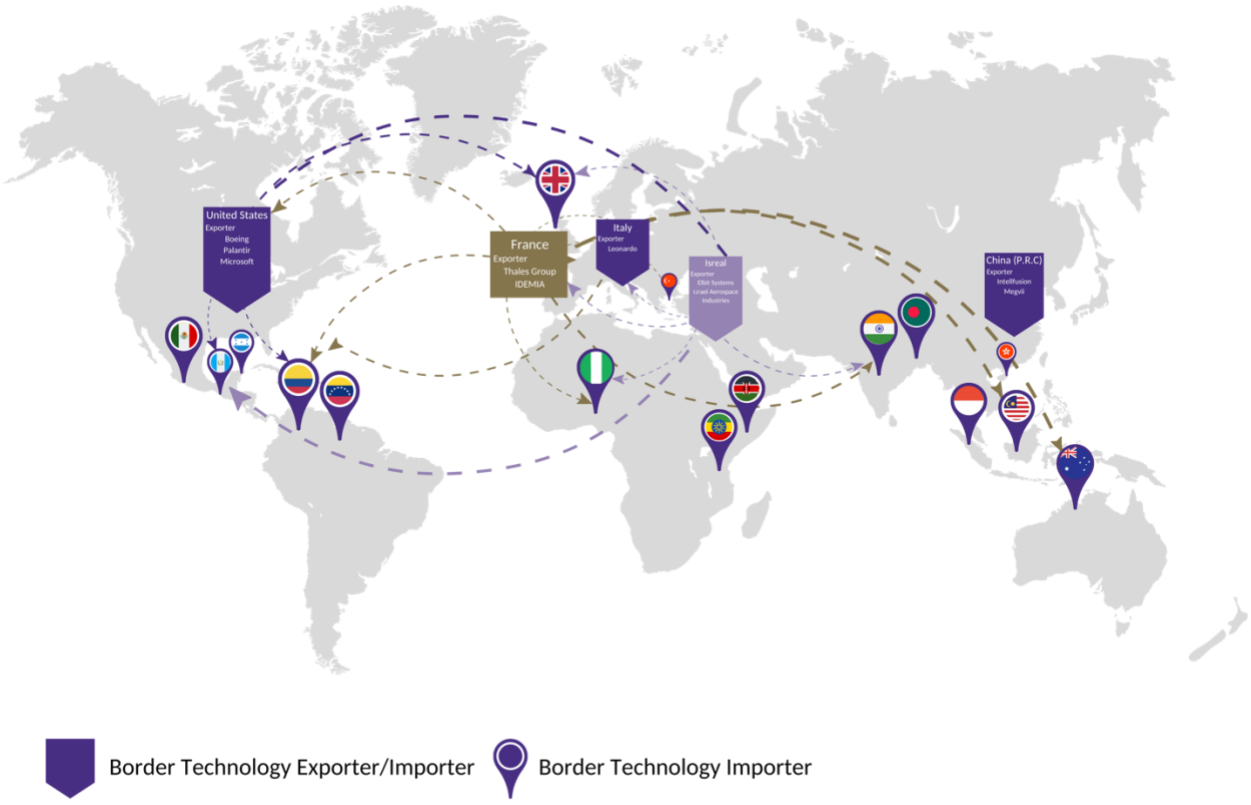
Elbit Systems, an Israel-based defense electronics company, is the second-largest supplier of security solutions, with their products deployed in five cases: Italy, Nigeria, the UK, the US, and its native Israel. Another dominant corporation is Israel Aerospace Industries (IAI), with drones and unmanned ground vehicles at borders in Italy, India, and the Israel-West Bank

region. These two companies showcase how Israel is positioned as a global leader in exporting border and defense technology. Not only do Elbit and IAI collectively have a worldwide scope, but they are also deeply embedded in the defense and border infrastructure of the countries that contract with them. Domestic technology producers in India, in particular, have signed a number of significant agreements with IAI for drone production and maintenance of national air defense systems. Both Elbit and IAI have also established large contracts with Frontex, the EU-wide Border and Coast Guard Agency, for drone surveillance of the Mediterranean Sea. The UK has likewise enlisted Elbit drones for maritime surveillance operations. Elbit Systems is not exclusively supplying drones, however, and in 2019 was awarded a $26 million contract by the U.S. Customs and Border Protection to install their proprietary Integrated Fixed Tower system for automated surveillance along the US-Mexico border (Parrish, 2019).

Although we expected to find technology developed by firms based in China across our cases, this did not appear as anticipated. It is widely known that Chinese technology companies build technology that can be utilized for border security, such as facial recognition systems. This technology is used around the world, particularly through the Belt and Road Initiative and agreements on Safe and Smart Cities; however, there was scant evidence of these products used in our case studies. In Italy, for example, Huawei is contracted to supply facial recognition technology to upgrade existing CCTV surveillance systems, but it does not seem to be applied specifically at the border. In the case of Australia, one technology company based in China - Nuctech - was found to supply a variety of systems, including x-ray and infrared body scanners, at both sea and airports, but recent press reports on the close ties of the company to the Chinese government have led some to question the security of their products. Governments in the West, specifically the US and Canada (though not included in our study), have banned Nuctech products or backtracked on planned contracts, illustrating how technology proliferation, and especially defense and security technology, is a modern flashpoint in global political conflicts (Kelsey Munro & Li, 2020).

Figure 2 shows the movement of technology from France, Israel, and the US to our case countries.

Figure 2: Movement of Technology



Level of Biometric Data Collection

Because 12 of 13 cases utilize biometric data collection at the border, distinguishing between the levels of invasiveness in this specific type of technology gives a better picture of the global situation. A simple binary of collecting biometric data or not fails to account for more invasive tactics, like mandatory national biometric database registration, and lumps together technology available to everyday consumers - such as the fingerprint scanners now common in smartphones - with more advanced systems, like iris scanning and voice recognition. To achieve a more nuanced distinction between cases, our report uses a metric developed by *Comparitech* analyst Paul Bischoff to rank our selected cases based on their level of biometric data collection and then breaks the index down into three categories: *Least*, *Moderately*, and *Highly Invasive*. Ranked out of 31 possible points, lower scores are indicative of a *Highly Invasive* program of biometric data collection, while higher scores illustrate collection methods that are the *Least Invasive*. Prior to applying the measures created by Bischoff, we validated the methods used to ensure accuracy and relevance for our report (Bischoff, 2021).

Comparitech scores are calculated by assigning point values depending on the use of biometrics in various sectors. Points are allocated based on the responses to questions such as

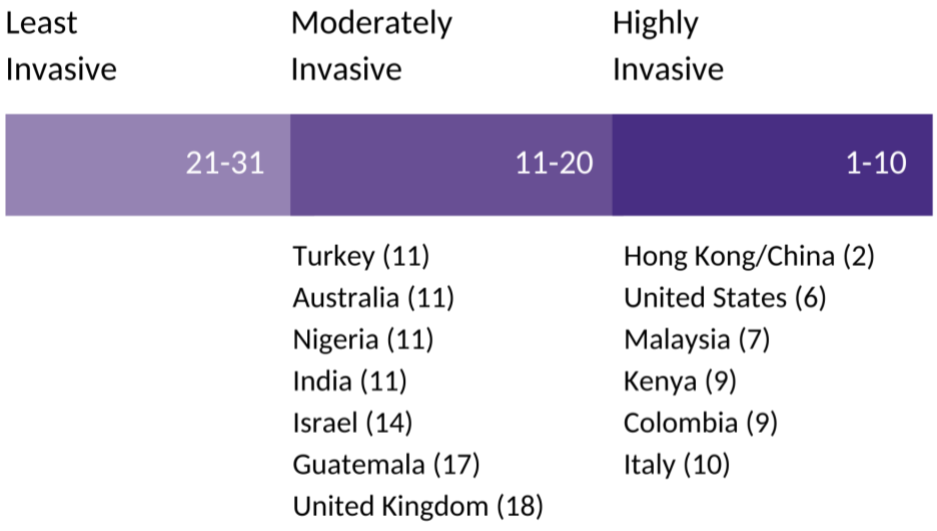
the use of biometric information in passports and national identification cards, whether the country has a legal structure to protect biometric data, the presence of biometrics in banking, the existence and size of biometric databases, and more.[1] In the cases of bilateral borders, we chose to examine the dominant border power state as the country in question.

Based on their scores, cases can earn a label of *Least*, *Moderately*, or *Highly* Invasive. To qualify as *Least Invasive*, scores must be between 21-31 points, while *Moderately Invasive* cases earn 11-20 points, and *Highly Invasive* cases score 10 points or lower. While *Highly Invasive* scores are a strong indicator that a country has extensive biometric databases, a lack of regulation, and widespread use of facial recognition, *Least* and *Moderately* invasive scores require more contextualization. Many countries scoring in the *Least* and *Moderately Invasive* categories have not implemented widespread use of biometrics, and also have not instituted laws to protect that data if new technologies were to be implemented in the future.

Our adaptation of *Comparitech*'s biometric data metric demonstrates that every case is characterized by invasive methods of biometric data collection. China-Hong Kong, Italy, Colombia, Kenya, the US, and Malaysia are all countries that are labeled as having *Highly Invasive* biometric data collection methods, while every other case is considered to have *Moderately Invasive* methods. There are no cases in which the dominant country controlling the border is considered to have the *Least Invasive* level of biometric data collection methods.

Figure 3 illustrates the scores earned across countries.

Figure 3: Level of Biometric Data Collection



[1] Comparitech's case study on biometric data presents full methodology for the point assignments used in our metric.

Biometric Data Regulations

The wide proliferation of highly invasive biometric data collection reiterates the need for clear regulations in order to protect individuals' right to privacy and control over their personally identifiable data. Across our 13 borders of study, seven case studies are found to have regulations specifically regarding the collection of biometric data.

The most well-known, and often regarded as among the world's strongest, data privacy laws are the EU's General Data Protection Regulation (GDPR). The GDPR specifically includes biometric data as protected personal information and sets strong standards for private companies' collection and use of this data. But organizations such as Human Rights Watch have warned that the GDPR is not a panacea for personal data privacy issues, specifically in that the regulation gives EU member state governments permission to collect data without consent in situations with concern for "national security, defense, or public security" – three categories of risk that are commonly invoked to validate border security upgrades (*The EU General Data Protection Regulation*, 2018). Even as countries such as Nigeria, Australia, and India consider implementing or amending their domestic privacy acts to fall in line with the GDPR, the rights of those at international borders are often unclear.

Certain multilateral agreements on migration and asylum, such as the Dublin Agreement, include provisions for the protection of biometric data collected in order to enforce the terms of the treaty. For example, the EURODAC regulations outline how the biometric and personal information of asylum seekers can be collected, stored, and disseminated among EU member states. But regulations are not a material confirmation of how invasive biometric data collection will be. In the case of Hong Kong, there are well-established, robust protections for personal data, and biometrics in particular, that include clear guidelines for necessity and proportionality, impact assessments, consent and transparency, and data security. Despite these regulations, Hong Kong received one of the lowest scores on our index, indicating that a *Highly Invasive* regime of data collection in part due to the extremely widespread use of CCTV equipped with facial recognition technology.

Although personal data and privacy regulations, including those that apply specifically to biometric information, are often extraterritorial - meaning, the rights of citizens protected under those laws are extended no matter where they are located in the world – there are some notable and glaring cases that have failed to institute even basic protections. The US and China, two world powers in security technology, do not have clear regulations regarding the collection and use of biometric data.

Data Collection and Privacy

The majority of cases with *High* levels of border technology express concern with data collection and privacy. Within this group of cases, concerns were targeted overwhelmingly towards the use of facial recognition technology, or FRT. In particular, FRT is a source of concern at the Hong Kong-China, Israel-West Bank, US-Mexico, UK-France, and Australian borders.

FRT is used on both sides of the Hong Kong-China border to manage the high volume of travelers, but this technology is also deployed across both countries with the help of closed-circuit television, resulting in a system of mass surveillance which has been the cause of data privacy concerns. Israel uses FRT to monitor the large numbers of Palestinians passing through the Israel-West Bank border each day, but there is evidence that the software has tracked people beyond the borderlands and into Israel and Palestine, creating a dangerous precedent for surveillance states.

The U.S. Department of Homeland Security uses FRT to control its borders as well, but this technology has been widely criticized across the US for its inherent biases, such as its inability to effectively identify people of color, its synergy with law enforcement cultures and protocols that disproportionately target people of color, and its likelihood to be used in targeting members of vulnerable communities, making its use acutely dangerous at the US-Mexico border. Similar concerns have been raised at the UK-France border, where automated ePassport gates use facial recognition. The inaccuracy of facial recognition technology is also a concern in Australia, where the Enterprise Biometric Identification Services system uses the technology and other biometric data to process thousands of travelers each day.

Policy Recommendations to the United Nations

Our report uncovers numerous cases of border security technology infringing on personal data privacy and human rights. As the most powerful intergovernmental organization in the world, the United Nations has the influence and the responsibility to shape the impact of border securitization on human lives. We encourage the UN to make bold moves to address data privacy and human rights concerns at borders; however, we also recognize the challenges that come with implementing wide-reaching regulations in the areas of data sharing, data privacy, and Internet of Things technology. Despite these obstacles, we believe that the UN has the institutions in place to have a genuine impact on how technology is used at international borders. With this in mind, we offer the following seven policy recommendations to the United Nations:

1. Establish guidelines for the collection, use, and security of personally identifiable data collected at international borders.
2. Develop guidelines to facilitate and regulate data sharing between states and between governments and private actors.
3. Urge states to implement a moratorium on the use of facial recognition technology as a part of border security systems until clear, enforceable regulations on its use are passed at a national level.
4. Condemn technology firms that sell products used for unethical purposes at borders.
5. Create an independent, multi-stakeholder advisory body to vet, analyze, and monitor the implementation of technology at international borders.
6. Conduct comprehensive international reviews measuring the negative human impacts of increased border securitization.
7. Urge states to increase transparency and oversight of border enforcement agencies to identify and replace strategies that violate human rights.

Recommendation #1: Establish guidelines for the collection, use, and security of personally identifiable data collected at international borders

Currently, no international standards exist for the collection, use, and security of personally identifiable data, collected at borders or otherwise. However, the current absence of these regulations should not deter the United Nations and the wider international community from working to develop regulatory norms for this type of data collection.

There is clear evidence that, when influential bodies legislate personal data rights of individuals and provide clear guidelines for the application of those new regulations, change can happen on an international level. We see potential for wider adoption of personal data privacy standards such as those outlined in the European Union's General Data Protection Regulation (GDPR). Already, countries around the world are moving towards similar standards.

For example, Australia's Privacy Act of 1988 was amended in December 2020 to more closely follow the GDPR, including specifically classifying biometric information that is commonly collected at borders as sensitive personal data (Christie, 2020). Likewise, the Indian legislature introduced the Personal Data Protection Bill (PDB) in 2019, also based on the GDPR (Kittane et al., 2021).

However, as more countries adopt broad regulations of personal data, more specific guidelines are needed in the context of international borders. Even strong regulations like the GDPR maintain exceptions for national security concerns, exempting common forms of data collection at borders that often occur under auspices of the national defense (Human Rights Watch, 2018). Law enforcement agencies are given leeway in their collection of personal data, especially biometric data, and at borders these powers are expanded. For example, although the UK passed the Data Protection Act in 2018 to be in line with the GDPR, further legislation that enhances the power of border authorities throws personal privacy protections into question. Specifically, the UK Counter-Terrorism and Border Security Act of 2019 allows for border enforcement agents to search any person, including any objects, including electronic devices, they have on their person, whether or not they are suspected of hostile activity (Index on Censorship, 2019). Many states in our study cited terrorism as a key concern for border security, and this act, in the case of the UK, leads to personal privacy at international borders to be of lessor concern for governments otherwise charged with upholding individuals rights.

To remedy and prevent further risks regarding the collection, use, and security of personally identifiable data collected at international borders, we urge the UN Office of the High Commissioner for Human Rights (OHCHR) Special Rapporteur on the right to privacy to investigate the global data security issues currently seen at borders, and to draft guidelines in line with the Objectives for Safe, Orderly, and Regular Migration outlined in the *Global Compact on Migration* (GCM). Specifically, we call on the Special Rapporteur to ensure that data collection at international borders upholds Objective 11, Section (b) of the GCM, which compels member states to "establish appropriate structures and mechanisms for effective integrated border management...while upholding the principle of non-discrimination [and] respecting the right to privacy and protection of personal data" (Global Compact for Safe, Orderly and Regular Migration, 2018). Although non-binding, the GCM was agreed on by 193 member states, and adopted by 164. The Special Rapporteur is mandated to carry out such work, with a clear directive to "review government policies and laws on the...collection of personal data'' and "assist governments in developing best practices to bring global surveillance under the rule of law" (*OHCHR | Special Rapporteur on the Right to Privacy*, 2018). After a thorough review, the OHCHR and the Special Rapporteur should draft a voluntary international agreement that requires signatories to adhere to stronger regulation of the collection, use, and security of personally identifiable data collected at their borders. Such an international agreement would assure travelers and migrants that their data is secure no matter where they are in the world,

and that their personally identifiable information will only be used for appropriate, clearly defined purposes.

Recommendation #2: Develop guidelines to facilitate and regulate data sharing between states and between governments and private actors

The current lack of guidelines on data sharing creates concerns for individuals, states, and the private sector alike. Individuals suffer a lack of transparency for how their personal information is used. Governments' lack of coordination leads to the loss of potentially mutually beneficial data sharing, creating both bureaucratic inefficiencies and possible security risks. Private actors' role in states' collection and distribution of personal data related to migration is also largely obscured and, in many cases, unregulated. Despite the existence of regional and bilateral agreements on migration-related data sharing, there are not widely accepted international norms in this regard. Multilateral treaties that outline digital data sharing in criminal contexts exist, such as the Budapest Convention, but again are not widely ratified.

The lack of guidelines governing data sharing presents numerous human rights concerns, especially regarding privacy protections. For example, in the case of China, in order to facilitate the construction of e-governance systems, the government is granted extensive access to private sector data, and there are no laws in place regulating this power of data extraction and sharing (Wang, 2017). In both Colombia and Guatemala, law and border enforcement authorities are engaged in partnerships involving the US, specifically with the Departments of Defense and Homeland Security, and have pledged to share information, but regulations on the type or security of data to be shared are again unclear (NATO, 2020; Washington Office on Latin America (WOLA), 2016). Even in cases where regulations are in place, for example, in the EU where EURODAC regulations protect and facilitate the sharing of migrants' and asylum seekers' personal data in the Schengen Information System (SIS) and EURODAC database, if parties choose to exit another multilateral agreement, they lose access to these shared, regulated repositories of information. This, of course, was the case for the UK following Brexit; previously, British and French border authorities could coordinate security operations smoothly in part due to these shared databases, but after exiting the Union, the UK Border Force can no longer take part in continent-wide data sharing initiatives.

Building on our first recommendation for strong personally identifiable data collection and security standards, we call on the International Organization for Migration (IOM), the UN Migration Agency, to create guidelines for how inter-governmental and public-private data sharing related to migration should be regulated for efficiency and effectiveness, while upholding personal privacy protections. The IOM is a proper venue for developing these guidelines in accordance with their 2007 12-Point-Strategy, specifically point number 6, which describes their goal of being a "primary reference point for migration information, research, best practices, data collection, compatibility, and sharing" (IOM, 2007). Additionally, the IOM

serving as a setting for collaborative creation of these guidelines would be in line with Principle 3 of the *2015 Migration Governance Framework* (MiGOF) of "good migration governance rel[ying] on strong partnerships" (*Migration Governance Framework | IOM*, 2016).

Furthermore, the IOM 2019 Strategic Vision focuses specifically on the growing role of technology in migration governance. Point 27 highlights this double-edged sword that digital infrastructure can provide mobility and access to migrants, but that "the management of data security and privacy...will become more complex, particularly if it is outsourced to private actors." Point 46 continues that the IOM can be an "innovation leader, and trusted partner" to help migrants access services, while also upholding their rights to privacy and data security. The IOM should build on the UN Office of the High Commissioner for Refugees' Model Agreement on the Sharing of Personal Data of Refugees and Asylum-seekers to develop an applicable global framework (The Office of the United Nations High Commissioner for Refugees, n.d.). Given the IOM's capabilities and internal vision, it is well-positioned to create clear international guidelines for migration-related data sharing, both between government actors and with the private sector.

Recommendation #3: Urge states to implement a moratorium on the use of facial recognition technology as a part of border security systems until clear, enforceable regulations on its use are passed at a national level

Globally, states are implementing experimental facial recognition technology (FRT) without clear legal structures that address the potential negative impacts, or proper considerations of transparency for the people impacted. In case after case, there is overwhelming evidence that facial recognition technology reproduces racial and gender bias, as well as having high levels of inaccuracy, and posing great potential risks to exposing sensitive personally identifiable data.

Facial recognition technology demonstrates clear racial bias, particularly in its varying ranges of accuracy depending on the skin color of the subject. Research jointly conducted by MIT and Microsoft found that for lighter-skinned individuals the error rate was only 0.8%, but for those with darker skin, and specifically for Black women, the rate of misclassification reached up to 34.7% (Buolamwini & Gebru, 2018). In the United States, facial recognition technology led to the wrongful arrest of Robert Julian-Borchak Williams by the Detroit Police Department, falsely identifying him as a culprit in a shoplifting case (Hill, 2020). In an even more extreme case, police in South Wales (UK) reported that in 2017, 92% of matches made by their FRT system were false (Burgess, 2018). Additionally, because the artificial intelligence systems that support FRT are trained using historical datasets, the results in law enforcement can be particularly egregious. With a proliferation of predictive policing systems applied in migration contexts, these historical biases are likely to surface at international borders.

Even as these problems are widely known, law enforcement and immigration authorities have continued to expand the use of this technology. U.S. Customs and Border Protection (CBP), for example, requested an expansion of both the scope and depth of their current FRT trials, which is currently limited to 15 air and seaports. CBP also wants to eliminate the ability of travelers to opt out of being subjected to facial recognition technology. CBP intends to move forward with a growing program of facial recognition security at international points of entry, regardless of the risks to personally identifiable data. In at least one known case, in 2019 a facial recognition trial at the border between the US state of Texas and Mexico, subcontractors charged with implementing the technology suffered a ransomware attack, resulting in a leak of sensitive information (Rockwell, 2020).

We call on the United Nations High Commissioner for Human Rights Michelle Bachelet and the UN Human Rights Council to issue a statement urging a moratorium on the use of facial recognition technology as part of border security solutions until states have shown how they intend to address bias in the products they use and how they will ensure the highest level of security for personally identifiable data. In doing so, we are following the call of a broad coalition of US-based civil rights and liberties groups that recently petitioned President Biden to enact a moratorium on the federal use of facial recognition technology (American Civil Liberties Union, February 16, 2021). In June 2020, at the height of global protests against racism and police brutality, High Commissioner Bachelet issued a similar statement to our request, arguing that:

> there should be a moratorium on the use of facial recognition technology in the context of peaceful protests, until States meet certain conditions including human rights due diligence before deploying it. These include effective, independent oversight of its use; strict privacy and data protection laws; and full transparency about the use of image recordings and facial recognition technology in the context of assemblies" (United Nations Office of the High Commissioner for Human Rights, 2020).

We urge High Commissioner Bachelet to recognize that the need for human rights due diligence regarding the use of facial recognition technology does not only apply to the right of peaceful assembly, but also the freedom of movement and, specifically, the right to seek asylum. And while we acknowledge that there is no enforceable way for the UN to stop countries from using this technology, urging states to implement a moratorium sends a clear message that the potential and realized harms resulting from improper use of this technology will be broadly scrutinized.

Recommendation #4: Condemn technology firms that sell products used for unethical purposes at borders

Technology companies around the world sell their products to state and non-state border actors who then use this technology for unethical purposes. In selling their products to these actors, companies are oftentimes directly contradicting their ethics protocols. For example, in 2018 Microsoft published six ethical principles to guide its work with facial recognition technology. During this time, however, the company was invested in Israel-based AnyVision Interactive Technologies, a facial recognition technology firm which uses this technology to monitor the movement of Palestinians at the West Bank border and beyond (7amleh, 2020). AnyVision's work directly contradicted Microsoft's published ethical principles, specifically its sixth principle which states that "We [Microsoft] will advocate for safeguards for people's democratic freedoms in law enforcement surveillance scenarios and will not deploy facial recognition technology in scenarios that we believe will put these freedoms at risk" (*Six Principles to Guide Microsoft's Facial Recognition Work*, 2018). After receiving international criticism for the relationship, Microsoft made the decision to divest its AnyVision shareholdings in March 2020 (7amleh, 2020).

Microsoft's story is not unique. Many technology companies have become embroiled in controversy as they choose to sell their products to governments which use them for unethical purposes. However, lacking adequate pressure from the public, these companies may choose to shirk their responsibilities. In order to hold companies accountable, we recommend that the UN Office of the High Commissioner for Human Rights (OHCHR) bring this issue to the forefront by publishing a report which calls attention to technology companies that are selling their products for unethical uses in border spaces. In particular, this report should address companies whose involvement in border spaces stands in direct contradiction to their stated ethical principles.

Within the UN, OHCHR is the leader in establishing business and human rights agendas (UN Human Rights Office of the High Commissioner, n.d.). This report, if widely disseminated, has the potential to be the catalyst for companies who have received criticism for their involvement with unethical technology, but have not taken steps to address this breach in principles, to finally reevaluate their relationship within the world of border technology.

Recommendation #5: Create an independent, multi-stakeholder advisory body to vet, analyze, and monitor the implementation of technology at international borders

As it stands, there is no international advisory body to monitor the technology being implemented at international borders. Countries may purchase and deploy any technology they deem appropriate for ensuring border security, and there is no means of tracking this technology or its effectiveness. Some countries have internal impact assessments, such as

those produced by the U.S. Department of Homeland Security (Eckardt & Cantor, n.d.; "DHS/ICE/PIA-054 ICE Use of Facial Recognition Services," n.d.), or advisory groups, such as the United Kingdom's Border Vision Advisory Group (*USW Professor Asked to Join Border Security Advisory Group*, 2021). However, these internal measures are in danger of producing biased results in line with the government's national security mission, rather than a rigorous interrogation of possible negative effects.

We recommend that an independent, multistakeholder advisory body to the UN be established to vet, analyze, and monitor the implementation of technology at international borders. An advisory body may take a similar form to the planned body on global AI cooperation outlined in the Secretary General's 2020 *Roadmap for Digital Cooperation* (United Nations, 2020). This body would involve experts from a diversity of Member governments, civil society groups with a focus in technology and national security, and leading technology firms involved in the development of border security technologies. In monitoring the kinds of technology being implemented at international borders, identifying potentially harmful technologies, and then producing global 'situation reports' on their findings, this body would act as the central authority on border security technologies.

The advisory body that we recommend would not only administer guidance and intel to the international community on the technology deployed on borders; it would also provide individual assistance to nations through a voluntary vetting process. During this process, the UN advisory body would review the country in question based on its border technology, ensuring that technology is adequately fulfilling its intended purpose. In the case that human rights or privacy concerns emerge, the advisory body would then make recommendations based on the country's obligations under international law.

In establishing an advisory body to act as a central authority on border security technology, there would no longer be any uncertainty or secrecy around countries' use of these technologies. In addition, countries with any level of border technology would be able to seek guidance on best practices moving forward.

Recommendation #6: Conduct comprehensive international reviews measuring the negative human impacts of increased border securitization

Many technologies deployed in border spaces are known to have dangerous human impacts. From racially biased facial recognition technology to weaponized drones and towers, the increased securitization of borders around the world subject migrants to dangerous situations. In addition, highly surveilled borders force migrants in critical situations to pursue dangerous border crossing strategies in an effort to bypass these technologies.

Reviews of the negative human impact of increased border securitization have been conducted by non-governmental organizations, such as Amnesty International or Human Rights Watch, or research institutions, but with limited scopes (*Human Rights Watch Submission to*

the Special Rapporteur's Report, 2021; Amnesty International, n.d.). As it stands, there are no comprehensive international reviews measuring the dangers of border technologies for humans in these spaces. In order to fill this gap in knowledge, the UN High Commissioner for Refugees (UNHCR) should conduct comprehensive international reviews on border technology and securitization schemes. These analyses should examine the types of technology being developed and deployed on borders, and the negative impacts that these developments have on humans in these spaces, particularly forced migrants. Although the reviews should be comprehensive in nature, special attention should be paid to borders with high investment in deterrence strategies. To account for rapid technological enhancements occurring at borders, these systematic reviews should be conducted on a yearly basis.

The knowledge gleaned from these reviews would provide vital insight into how technologies meant to ease the burdens of border authorities can also have dangerous consequences for migrants. Perhaps most importantly, these reviews would help us understand the human cost of ensuring border security.

Recommendation #7: Urge states to increase transparency and oversight of border enforcement agencies to identify and replace strategies that violate human rights

Authorities at international borders often use violent and invasive tactics to accomplish their border security goals. In countries where government corruption runs rampant, such as Colombia and Guatemala, border authorities are not held accountable for their actions and use violent and unjust tactics as a result (Human Rights Watch, 2019). In other countries, such as Turkey and India, indiscriminate shootings and unprovoked beatings remain the norm (*Indian Border Forces Killed 25 Bangladeshis This Year*, 2020; *Turkey/Syria: Border Guards Shoot, Block Fleeing Syrians*, 2018). In the United States, despite a well-documented history of human rights violations by the Customs and Border Patrol and the Immigration and Customs Enforcement, these violations continue. In addition, many countries use detention centers, including seven cases in this report, to house undocumented migrants and asylum seekers, and these spaces are also prone to abuse (Amnesty International, 2019a). The Australian Border Force Act 2015 prohibits unauthorized disclosure of information on the conditions of offshore detention centers to the media, signaling increased secrecy in these facilities (Doherty, 2016).

The bad behavior by border enforcement agencies is unacceptable. Nations must increase transparency and oversight of border enforcement agencies to correct operations that violate human rights. To help facilitate this rectification, the UNHCR should partner with the United Nations Office of Counter-Terrorism to build off of its *Handbook on Human Rights and Screening in Border Security and Management*, which aims to guide Member State border security and management in appropriate protocols for protecting human rights at their borders (United Nations Office of Counter-Terrorism, 2018). This guidebook explores the processing of individuals at international borders in the context of counterterrorism, focusing specifically on

the screening and assessing of individuals; however, its recommendations can be adapted and expanded to establish more comprehensive guidelines for appropriate border security practices. With these expanded guidelines, UN Member States would be able to review their border security agencies' current tactics for managing their border regions, and correct practices that are regarded as inhumane and unjust.

Chapter 1: Europe

The United Kingdom-France Border

Introduction

Asylum seekers, migrant workers, and business and leisure travelers are the main groups crossing the border from France into the United Kingdom. Authorities at this border must also monitor the illegal movement of people in the forms of smuggling and trafficking, as well as the activities of criminals and terrorist organizations. In order to manage this mostly maritime border, a number of technologies have been employed by both governments in ferry ports and train stations, primarily on the French side of the border. These technologies include drones, cooperative databases, and closed-circuit television, among others. The use of these technologies presents human rights and data privacy concerns, which should be addressed by drafting decisive legal frameworks on the national level to protect the rights of those who cross the border and promoting increased cooperation and information sharing between British and French border authorities to ensure security and safety for all.

Table 4: Summary of Findings

Border Profile			
Level of Border Technology	High (6)	**Technology**	Cooperative Data Sharing; Predictive Analytics; Biometrics; Automated Border Controls; Drones; Closed-Circuit Television; Night Vision Devices; Thermal Imaging; X-ray; Passive Millimeter-Wave Imaging
Level of Biometric Data Collection	Moderately Invasive (18)	**Legislation for Biometric Data**	Yes
Automated Border Control	Yes	**Border Technology Exporter**	Yes
Private Companies Involved	Thales Group; Tekever; Elbit Systems; Palantir; IBM; Northrop Grumman; FLIR Systems; L3 Communications; Rapiscan Systems; Roke Manor Research; IDEMIA; Sopra Steria; Chess Dynamics	**Concerns Regarding the Use of Technology**	Data privacy; Lack of effectivity; Lack of regulation; Violations of international law

Background

The border between the United Kingdom and the French Republic is made up of both a maritime and land component. The maritime border between the two countries spans the English Channel as well as part of the North Sea and Atlantic Ocean and was negotiated through a series of international arbitrations. The two countries are connected by multiple ferry routes that traverse the English Channel. The Channel Tunnel is the lone land component of the border, built under the Treaty of Canterbury signed in 1986 ("Canterbury Celebration Marks Channel Tunnel Treaty," 2011). Operational since 1994, the tunnel is over 50 kilometers long and connects the UK port city Folkestone to the French port city Coquelles, functioning as the sole land link between the island of Great Britain and the European mainland. In 1991, both countries signed the Sangatte Protocol, which allowed the French to establish a border checkpoint manned by French personnel on the British side of the Channel Tunnel and vice versa, known as juxtaposed controls (*Protocol Between the Government of the United Kingdom*, 1991). In addition to the Sangatte Protocol, the UK and France signed the Treaty of Le Touquet in 2003, which expanded juxtaposed controls to cross-Channel ferry terminals ports Dunkirk, Calais, and Dover (Samuel & Krol, 2017).

Since the 1980s, many northwestern European countries such as the UK and France have been flooded with migrant workers looking for seasonal work as well as asylum seekers fleeing dangerous areas of the world (Muus, 2001). The onset of the Syrian civil war as well as ongoing violence in other countries such as Afghanistan and Iraq during the past decade exacerbated this issue, leading to a massive migration of asylum seekers to European Union (EU) countries known as the European migrant crisis ("Migrant Crisis," 2016). In the aftermath of the Brexit vote in 2016, the migrant crisis was cited as one of the major reasons UK citizens voted in favor of leaving the EU (Mueller, 2021). Additionally, the rising threat of terrorism has forced both the UK and France to ramp up border security and propose improved technological measures to protect their national securities.

Current Border Issues

At the UK-France border, the main forms of migration occurring are migrant workers looking for temporary or seasonal work, asylum seekers fleeing conflict or persecution, and leisure and business travelers. The influx of asylum seekers to the UK is a result of the ongoing conflicts in the Middle East, and seasonal workers typically come to the UK in search of farm work. Many of these migrant workers and asylum seekers cross the UK-France border through unauthorized means. A Pew Research Center report released estimated that between 800,000 to 1.2 million unauthorized immigrants were living in the UK in 2017, accounting for nearly a quarter of the total number of unauthorized immigrants living in the EU during this time (Connor & Passel, 2019). Although border security technology cannot address the root causes

of migration, it can have a hand in controlling issues such as human smuggling, trafficking, and terrorism.

Human Smuggling and Trafficking

Migrant workers and asylum seekers utilize various methods to enter the UK without detection by authorities, most commonly smuggling themselves aboard or underneath lorries to cross the English Channel (Freedman, 2018). More recently, migrant workers and asylum seekers have attempted to cross the English Channel on small boats, a journey that nearly 7,000 people have undertaken since August 2020 (Bulman, 2020). There have even been attempts to walk through the Channel Tunnel, which have resulted in temporary closures of the tunnel (Dearden, 2016b). Before attempting to cross the border, many of these people resided in the "Jungle," which was a refugee camp established within the city of Calais, France beginning in 2009. Starting in 2014 with the onset of the European migrant crisis, the "Jungle" expanded rapidly in population, reaching approximately 6,000 monthly arrivals by October 2015 (Freedman, 2018). In a 2016 survey conducted by Doctors Without Borders, it was found that over 80% of the population living in the "Jungle" were aiming to reach the UK (Dearden, 2016). The "Jungle" was dismantled by French authorities in October 2016; however, there are still many migrant workers living in the region (Freedman, 2018). Trafficking is another common issue on the UK-France border, fueled by the desires of migrant workers and asylum seekers to reach the UK at any cost.

Acknowledging these issues, the UK and French governments have each taken steps to contain smuggling and trafficking across the UK-France border. Attempts by the UK to curb these unauthorized migrations started as early as 1994 with the formal implementation of juxtaposed controls on the Channel Tunnel, expanding to cross-Channel ferry terminals in 2003 (Independent Chief Inspector of Borders and Immigration, 2013). In 2015, the UK and France announced that they would bolster security at border crossings to disrupt and apprehend human traffickers (Associated Press, 2015). Additionally, the UK has floated the possibility of venturing into more aggressive security measures like deploying the navy to prevent asylum seekers from setting foot on British soil (Stone, 2020).

A recent government policy that reworked the UK's immigration system may negatively impact the presence of trafficking across the UK-France border. In February 2020, the UK released a policy paper outlining a new points-based immigration system, which closes off immigration routes to low-skilled and temporary workers (*The UK's Points-Based Immigration System*, 2020). According to allianceHR, a UK group which specializes in promoting fair employment and ethical trade, this will lead to greater demand for low-skilled and temporary workers in the UK, which will cause businesses to turn to underground trafficking rings to recruit potential workers and create even greater demand for trafficking (Camp, 2020).

Major human rights concerns revolving around this issue are the dangers posed to migrant workers and asylum seekers when they try to cross the UK-France border through unconventional means, as well as the dangers they would be placed in if sent back to their home countries. According to a UN report, "many migrants…[resort] to precarious routes between States because of a lack of regular migration opportunities" (Emmerson, 2016). There are an unknown number of migrant workers and asylum seekers who have died while trying to cross the border undetected, either drowning in the Channel, being electrocuted in the Channel Tunnel, being suffocated, or being run over (Dearden, 2016b). Additionally, many of these crossers are asylum seekers that are fleeing from war zones and persecution. A major myth surrounding the "Jungle" was that its population consisted mostly of economic migrants, however researchers associated with Doctors Without Borders concluded that most people residing in the camp were asylum seekers that would face persecution and even death if returned to their home countries (Dearden, 2016). However, when UK officials visited the "Jungle" in early 2015, they noted that "many migrants in Calais appear to want to come to the UK to work in what they believed to be an unregulated job market…yet the migrants we met in Calais were overwhelmingly from regions suffering from war, internal conflict and failure of the state, who would appear eligible to apply for asylum in Europe" (Freedman, 2018). To reduce the number of people making risky border crossing journeys, immigration lawyers and charities have suggested the creation of safe and legal routes to the UK for asylum seekers (Bulman, 2020).

Terrorism

Another issue at the UK-France border is the growing threat of terrorist attacks occurring throughout the UK and France, something that has put both countries on high alert for suspicious individuals crossing into their territories. Many European citizens attribute the problem of terrorism to the EU migrant crisis. In a 2016 study done by Pew Research, it was found that 52% of UK citizens and 46% of French citizens believe that refugees will increase the likelihood of terrorism in their countries (Wike et al., 2016).

In the wake of the London and Manchester terror attacks in 2017, the UK passed the 2019 Counter-Terrorism and Border Security Act, which includes longer sentences for terror offenders, a ban on expressing support for terror groups, and gives agencies such as UK Border Force (UKBF) the right to detain and question any suspicious individuals (*Counter-Terrorism and Border Security Act 2019*, 2019). Similarly, France has been plagued with its share of terror attacks, the most recent one occurring in October 2020, when a Tunisian migrant that crossed into France from Italy stabbed three people to death ("France Terror Attacks," 2020). This prompted France to call for major reforms to the Schengen Agreement, which guarantees free movement within the EU, in the form of increased security presence at border crossings. Additionally, France has considered investing in a biometric border entry-exit system to better

track the flow of people entering and exiting the country (IDEMIA, 2021b).

There are major human rights concerns regarding how the UK and France are using the border to counter terrorism. In 2016, the United Nations warned that increased securitization following the European migrant crisis may actually lead to more terror attacks while violating the rights of refugees at the same time. In a report, UN investigators outlined that while many believed terrorists were using the migrant flow to enter European countries, most of the data collected did not back up that belief, showing instead that many of the asylum seekers were actually victims and targets of terrorist organizations (Emmerson, 2016).

Border Technology

Many technologies have been deployed on the UK-France border in order to prevent the unauthorized entries of migrant workers and asylum seekers into the UK, as well as to restrict the movement of criminals and terrorist organizations. The following is a comprehensive list of technology that has been or will soon be installed at the UK-France border for the purpose of border security.

Cooperative Data Sharing

Eurodac is a large-scale IT system that has helped manage asylum applications for the EU since 2003. By storing fingerprints of asylum seekers that have filed applications, asylum authorities are easily able to determine whether an applicant has filed multiple times throughout multiple EU countries. Before Brexit, EURODAC was used by 32 countries, including both France and the UK, but the UK has since been disconnected (European Agency for the Operational Management of Large Scale IT Systems, 2020). A core portion of EURODAC is provided for by Thales Group, which has been active in the development and maintenance of this system since its acquisition of Cogent Solutions, which was the original company involved in EURODAC development since 2002 (Omanovic, 2021).

The Schengen Information System (SIS) is a database that is shared between Schengen member states for the purpose of security and border management in the absence of internal borders. SIS currently allows for national authorities to create alerts on specific people or objects of interest, which will contain information pertaining to the target, why the target is sought by authorities, and steps to be taken when the target is located. Data on people is limited to name, year of birth, reason(s) for alert, and action to be taken. In 2018, legislation was passed to add new functionalities to SIS, such as palm prints, fingerprints, facial images, as well as DNA samples (European Commission, 2016). These improvements will be used to track the movements of terror suspects as well as confirm the identities of missing persons and are expected to be fully implemented by the end of 2021. SIS is operational in 30 European countries, including 26 EU member states and four Schengen-associated countries. Before

Brexit, both France and the UK had access to SIS, though because the UK was never a party to the Schengen Agreement, it was only given limited access to SIS as an EU member state. After Brexit however, the UK was disconnected from SIS in 2021 (O'Carroll, 2020).

In early 2021, the French contracted IDEMIA, a French biometrics and security company, as well as Sopra Steria, a European IT consultancy, in early 2021 to create an entry/exit system that will be implemented on its Schengen area external borders (IDEMIA, 2021b). While IDEMIA's press statement indicates that the system will utilize biometrics as a method of identifying people crossing, it does not specify what types of biometrics will be active. Because the UK has never been involved in the Schengen Agreement, there is a possibility that once operational, this technology will be deployed along the UK-France border.

Predictive Analytics

In 2020, Palantir was hired by the UK to create a data analytics platform to monitor the UK-France border (Pegg, 2020). Dubbed the Border Flow Tool, the UK intends to utilize it to analyze the flow of trade and passenger flow across the border from the EU to the UK after the UK's departure from the EU (*Provision of a Foundry Data Connector*, 2020). Information that is required for analysis will be pulled from databases managed by UK government agencies and collated in Palantir's Foundry platform, which will then be used to determine what border controls should be implemented by the UK in response to the ones set up by EU member states (Omanovic, 2021). It is unknown what data Palantir will have access to, but it has been stated that data from the Home Office will be used in the border analysis (Pegg, 2020).

Biometrics

In 2018, Heathrow Airport in London trialed a facial recognition system for the purposes of bolstering airport security and optimizing the time it takes passengers to navigate through the system (Kobie, 2018). While facial recognition has been crucial in detecting cases of identity fraud, many concerns continue to surround the technology, raising questions about its accuracy. In June 2017, South Wales police utilized facial recognition cameras domestically for the first time, however over 92% of matches made by the system were incorrect. Groups such as Big Brother Watch have publicly announced their opposition to this technology, warning of the threat that facial recognition poses to civil liberties (Burgess, 2018).

A technology that utilizes fingerprinting on the border is the UK's Biometric Residence Permit (BRP). The BRP is used by the government to confirm a non-EU foreigner's identity and their right to work or study in the UK (*Biometric Residence Permits (BRPs)*, 2014). The BRP collects ten fingerprints as well as a photo of the applicant's face to be stored in a biometric database, which was developed by IBM in 2009 (Omanovic, 2021). Upon exiting and re-entering the UK, BRP holders may be requested by border control officers to prove their identity by

scanning their fingerprints to see if they match in the system. It is worth noting however, that the UK does not formally operate a biometric border exit-entry system (Camp, 2020).

Automated Border Controls

The UK has implemented an automated border control system dubbed ePassport gates in many airport terminals as well as certain juxtaposed controls in France (*EPassport Gates to Ease Travel for Passengers*, 2018). These gates are equipped with passport scanners that are capable of reading biometric or "chipped" passports, as well as facial recognition that will check a passenger's face against the photo in their passport (*Entering the UK*, 2014). Passengers belonging to the European Economic Area, Switzerland, Australia, Canada, New Zealand, Japan, the United States, Singapore, and South Korea are eligible to pass through ePassport gates.

Drones

In 2016, drones equipped with thermal imaging cameras were deployed by Eurotunnel, the company in charge of operating the Channel Tunnel, to detect asylum seekers attempting to cross into the UK illegally. Eurotunnel stated that drone usage had been considered since 2015 due to the migrant crisis, and that the recent deployment was in anticipation of increased attempts by migrant workers and asylum seekers from the "Jungle" to cross the border illegally following the Brexit vote (Dearden, 2016b). Although unable to enter the tunnel, these drones surveil the tunnel entrance as well as surrounding areas. While the manufacturer of these drones was not released to the public, image comparisons show that the drones most likely belong to Thales (*Contractors | Calais Research*, n.d.). Besides usage around the entrance to the Channel Tunnel, a drone with the tail number G-TEKV was reported to have been deployed by UKBF on the English Channel to search for migrants crossing on boats in January 2020 (Omanovic, 2021). Confirmed to be an AR5 model, G-TEKV was manufactured by Portuguese arms company Tekever and is part of a research project aimed at utilizing unmanned technologies to conduct maritime surveillance. While not part of the same project, the Hermes 900, developed by Israeli defense company Elbit Systems, has also been utilized by the UK to conduct and test maritime surveillance operations (Omanovic, 2021).

Closed-Circuit Television (CCTV)

Video surveillance is used throughout juxtaposed controls such as Coquelles, Calais, and Dunkirk (HO News Team, 2017). One of the biggest users of CCTV on the border would be the Coquelles Terminal, which operates over 500 cameras in addition to the drones operated by Eurotunnel, as well as fencing with motion sensors, security guards, and law enforcement officials (Dearden, 2016b). While used on a lesser scale, the port of Calais is known to be using at least 40 CCTV cameras to monitor activities in and around the port (FLIR Systems, n.d.). It can

be assumed that video surveillance is common throughout the rest of the UK-France border, though the total number of units in operation are unknown.

CCTV has also been adapted for use on lorries crossing the UK-France border. UK law states that vehicles which are found to have carried 'clandestine entrants' into the UK will face a fine of up to £2,000 for each entrant carried across the border (*Secure Your Vehicle to Help Stop Illegal Immigration*, 2014). This move effectively pits lorry operators against migrant workers and asylum seekers who wish to enter the UK without going through border controls. To limit the number of undetected stowaways, companies such as SmartWitness have developed CCTV systems installed on lorries to monitor the vehicle at all times and will send an alert to the driver if a disturbance is detected. In 2015, SmartWitness saw sales jump by 20% as more drivers began to use their products to guard against the possibility of stowaways ("Haulage Firms Hit with £12 Million Fines for Illegal Stowaways," 2015). While not physically installed on the border, these cameras play an important role in preventing migrant workers and asylum seekers from smuggling themselves across the Channel.

Day/Night Vision System

Chess Dynamics Ltd., a UK-based security and defense company, won a contract from the Home Office near the end of 2015 to supply UKBF's fleet of five patrol boats with Day/Night Vision Systems (*Provision of Goods & Services in Relation to Day/Night Vision Systems*, 2016). The Day/Night Vision System is designed to identify images at any time of the day and is most likely being used to detect and prevent illegal crossings of the English Channel.

Thermal Imaging Cameras

Thermal imaging cameras are known to be used in the port of Calais to prevent illegal Channel crossings and are part of the equipment installed on the Eurotunnel drones thought to be developed by Thales. Because there are times when CCTV cannot provide a clear image, thermal imaging cameras are used to complement the capabilities of CCTV, operating at night and in times of low visibility such as heavy rain and fog. The two thermal imaging cameras in Calais are developed by FLIR Systems, an Oregon-based company that specializes in thermal imaging technology. Capable of detecting the head and shoulders of a person in water just over 400 meters away, FLIR's SR-50 thermal imaging cameras were integrated into the port of Calais's security network by Thales (FLIR Systems, n.d.).

X-Ray Scanners

UKBF employs a variety of x-ray scanning equipment on the UK-France border, such as freight pallet scanners and baggage scanners designed for luggage (Maintenance of Legacy X-Ray Equipment, 2016). This equipment is deployed throughout the UK as well as the UKBF-

operated juxtaposed control in Coquelles. X-ray scanning is used to detect if anything is being carried across the border illegally within passenger luggage or being smuggled via freight. Originally, UKBF intended to use x-ray scanners to detect unauthorized border crossings, however France's nuclear regulator has restricted their use to illegal items only, citing health concerns associated with this technology (Doyle, 2010). The x-ray scanners being used by UKBF are sourced from two main manufacturers: the UK division of L-3 Communications Ltd., one of the top 10 US government contractors during the Iraq War specializing in aerospace and defense, and Rapiscan Systems Ltd., an American company specializing in metal detectors and x-ray systems (Chatterjee, 2006).

Passive Millimeter-Wave Imaging (PMMWI)

An alternative to x-ray scanners, passive millimeter-wave imaging (PMMWI) is a scanning technique that utilizes natural radiation instead of high-energy electromagnetic radiation to detect concealed items. This is used by UKBF at juxtaposed controls in northern France on soft-sided freight vehicles to detect any concealed persons aboard the vehicle. Since x-ray scanning contains radiation harmful to the body, UKBF opted to use PMMWI to avoid harming potential stowaways. PMMWI scanners were first introduced to the border by Roke Manor Research in 2002 under the name PANDORA as a method for border security officers to save time yet provide adequate security (Roke Manor Research, n.d.). As of 2016, the UK has acknowledged the deployment of five scanners in juxtaposed controls: two in Calais, two in Coquelles, and one in the port of Zeebrugge in Belgium (Tenders Electronic Daily, 2016).

Regulations for Use of Border Technology

There is little to no regulation on a national level or on the EU level regarding the use of technology on the UK-France border, with minor exceptions. With regards to facial recognition, the UK has released a snapshot paper on their stance towards the technology as well as regulations that apply. While police and private use of facial recognition is governed by multiple regulations such as the 2018 Data Protection Act and the EU's General Data Protection Regulation respectively, there has been no mention regarding the regulation of facial recognition for border use (*Snapshot Paper - Facial Recognition Technology*, 2020). There may also be a lack of enforcement of international regulations on the UK-France border as well as on other EU borders. A UN report has stated that mass surveillance conducted by many EU countries at the border may be considered a violation of Article 12 of the Universal Declaration of Human Rights if done without proper justification, although no specific country was named (Emmerson, 2016). Data privacy on the UK-France border is also at risk with new counterterrorism laws that the UK enacted. The UK's 2019 Counter-Terrorism and Border Security Act gives border authorities the right to detain people of "reasonable suspicion" at the

border for the crime of "hostile activity" towards the state as well as investigate their electronic devices for information related to terrorism (Index on Censorship, 2019). However, these two terms are vague and allow for broad interpretation by border authorities, which may qualify as a violation of data privacy. Regarding border security as a whole, UKBF has created the Home Office Border Vision Advisory Group (BVAG), a group that is meant to advise UKBF on border security enhancement and conduct academic research into advanced border solutions (*USW Professor Asked to Join Border Security Advisory Group*, 2021). However, it is unknown if BVAG will provide recommendations for regulating border security technology.

International Involvement

The following section highlights the most relevant examples of how the UK-France border has been influenced by acts of international involvement. Multilateral international agreements such as the Dublin Regulation provide legal frameworks to deal with member state responsibilities over asylum applications and the free flow of people within the EU. Bilateral arrangements between the UK and France such as juxtaposed controls have mainly sought to restrict the unauthorized flow of migrant workers and asylum seekers into the UK.

Dublin Regulation

Although the UK left the EU in 2020, prior to 2020 both the UK and France were bound by the Dublin Regulation, an EU law that helps determine which member state is responsible for examining an asylum application (United Nations High Commissioner for Refugees, n.d.). Under the Dublin system, asylum applications are processed by the first EU country they enter, and fingerprints are taken from applicants to prevent them from submitting multiple applications across multiple member states. For easy comparison and sharing amongst asylum authorities, the prints are then put into EURODAC, the EU's asylum fingerprint database (European Agency for the Operational Management of Large Scale IT Systems, n.d.). If an asylum seeker is found in another member state than the one where they first arrived, the Dublin system sends them back to their first country of arrival for processing ("Explaining the Rules for Migrants," 2015).

Although the Dublin Regulation clearly states that asylum seekers must file an application in the first EU country they arrive in, they often do not want to apply for asylum in the first member state they arrive in. There are many reasons for this, such as social rights a country offers, the chances of finding work, presence of friends and acquaintances, as well as language preferences (Garcés-Mascareñas, 2015). In these cases, applicants refuse to be fingerprinted and avoid registering in their country of arrival, which is usually Italy or Greece ("Explaining the Rules for Migrants," 2015). They then continue their journey further into the EU and apply for asylum in a member state that meets their preferences, such as the UK.

Juxtaposed Controls

Juxtaposed controls are arrangements between the UK and France to establish border checkpoints in the opposing country at cross-Channel routes as a result of the Sangatte Protocol and the Treaty of Le Touquet ("Explaining the Rules for Migrants," 2015). Juxtaposed controls enable UKBF officers to inspect departees on the French side of the border before they depart for the UK, and vice versa (HO News Team, 2017). While customs checks still occur in the destination country in most cases, conducting a preliminary border inspection in the departure country allows UKBF to prevent asylum seekers from making an asylum application in the UK (Independent Chief Inspector of Borders and Immigration, 2013). In 2016 alone, UKBF stopped over 56,000 attempts at unauthorized entries to the UK through juxtaposed controls (HO News Team, 2017). After Brexit, the utility of juxtaposed controls has become more critical than ever for the UK. Because the UK was forced to leave the Dublin Regulation as a result of Brexit, they no longer have the authority to return asylum seekers to France using the Dublin Regulation, meaning that as a party to the 1951 Refugee Convention they will be forced to accept these asylum seekers if they make it onto UK shores (Stone, 2020).

Technology Transfers

Both the UK and France are known to be transferring technology to foreign countries for the purpose of border security. In 2012, the Libyan government was discussing a multi-billion-Euro land border security system with the UK, France, and Italy, which resulted in arms companies such as Thales and BAE (a British arms company) bidding to supply radars, drones, helicopters, and ground vehicles. Besides Libya, Thales is also known to be supplying technologies used in border security to nations such as Egypt and Morocco, while their acquisitions such as Gemalto have supplied biometrics technology for border use to Uganda, Algeria, Côte d'Ivoire, Lebanon, Moldova, Nigeria and Turkey (Akkerman, 2018).

Broader Application of Border Technology

Besides their usage at the border, technologies such as CCTV, thermal cameras, and biometrics such as fingerprinting and facial recognition have seen degrees of implementation domestically within both countries. CCTV is commonly used to surveil public areas and provide security footage of crimes and unrest. It has been estimated that there is one CCTV camera per 11 people in the UK (Davidovic, 2019). The onset of COVID-19 pushed governments such as the UK to adapt technology such as thermal imaging to help detect and prevent the spread of the virus (Thales Group, 2020). Finally, biometrics such as fingerprinting and facial recognition have been used by both the French and the UK domestically, albeit for different purposes. In 2019 the French created a national ID program called Alicem, which adapted facial recognition to

create a national ID for citizens (Fouquet, 2019). The UK has implemented facial recognition to combat crime more effectively, a system that has been in test since June 2017 and resulted in far more false positives than correct matches (Burgess, 2018). UK law enforcement also employs IDENT1, the UK's central database for storage of fingerprints associated with criminal activities developed by Northrop Grumman, to identify suspects and detainees (Omanovic, 2021). Facial recognition might also be employed in "quarantine hotels" in the UK to make sure that people entering the country are remaining in isolation (Wolfe-Robinson, 2021).

Recommendations

Currently, there is a lack of regulation as well as unenforced regulations regarding border security technology at the national level and at the EU level. However, the usage of some border technologies domestically and their consequences such as facial recognition and mass surveillance have proven a need to strengthen as well as begin enforcing regulation of these technologies implemented on the UK-France border. In addition, human rights concerns that are being exacerbated by an increased securitization of the border such as migrant deaths and violations of data privacy must be addressed through the formation of new policies. In light of these concerns, we recommend that UKBF, and by extension the UK government, take the following actions:

1. Ban usage of facial recognition indefinitely due to issues of accuracy.
2. Regulate the use of mass surveillance at the border in respect for international human rights laws.
3. Define terms used in Counter-Terrorism Act of 2019 more clearly to avoid exploitation of detainees and revoke the right of authorities to search a detainee's electronic device data before adequate proof of guilt.
4. Measure the human impacts caused by border securitization to identify the most dangerous covert routes being taken by unauthorized border crossers and take action to prevent the loss of lives.
5. Reinforce cooperation and information sharing between UK and French border authorities to restrict and track terrorist movements and to avoid further necessity of physical securitization of the border.

The Italian Maritime Border

Introduction

Asylum seekers and refugees are the main groups crossing the maritime border into Italy, from North African countries such as Algeria, Tunisia, Libya, and Egypt. This route, also known as the Central Mediterranean route, has been used by migrants from Eritrea and Syria as well. Migrants from North Africa and the Middle East also arrive in Italy by way of Malta, Turkey, and Greece, or the Eastern Mediterranean route. Authorities at the Italian maritime border also monitor drug trafficking and the movement of contraband goods, in addition to human smuggling networks. In order to manage the open waters that make up this border, the Italian government has employed a variety of technologies on their land and sea borders. These technologies include integrated satellites, sensors, and radar technology, drones, and biometrics, among others. The use of these technologies has presented concerns regarding personal data protection, information sharing, and human rights, which should be addressed by creating an independent, national authority to monitor the use of border technology, and developing stronger national regulations regarding the use of these technologies.

Table 5: Summary of Findings

Border Profile			
Level of Border Technology	High (6)	**Technology**	Cooperative Data Sharing; Biometrics; Drones; Thermal Imaging; Surveillance Radars; Satellite Imagery; Hydrophones; Vessel Traffic Management Systems; Naval Optronics; Geofencing
Level of Biometric Data Collection	Highly Invasive (10)	**Legislation for Biometric Data**	Yes
Automated Border Control	Yes, but they are not used at this particular border	**Border Technology Exporter**	Yes
Private Companies Involved	Leonardo; Telespazio; E-Geos; Thales Group; Airbus; Israel Aerospace Industries; Elbit Systems; PWC	**Concerns Regarding the Use of Technology**	Data privacy; Data control

Background

The border between the Italian Republic and the North African countries, primarily Algeria, Tunisia, Libya, and Egypt, is a maritime one. The borderline was determined in the 1971 Italy-Tunisia Delimitation Agreement, which created a boundary around the islands Pantelleria, Lampione, Lampedusa, and Limosa (*Agreement between the Government of the Republic of Tunisia and the Government of the Italian Republic*, 1971). In 2020, Italy and Greece renewed a 1977 agreement to establish their maritime boundaries for economic purposes (Tugwell, 2020). This deal was also supported by Libya, which is also separated from Greece by a maritime border ("Libya's Parliament Backs Maritime Border Deal Between Greece and Italy," 2020).

A major event impacting this border was the "North African Emergency" in 2011. The Arab Spring that led to regimes collapsing in Libya and Tunisia resulted in an increased number of migrants and asylum seekers seeking refuge in Italy. In 2011, there were 37,000 applications for asylum, which jumped to 45,000 in 2014 (Scotto, 2017). These numbers stand in contrast to around 12,000 applications in 2010 and 19,000 in 2009, the years immediately preceding the Arab Spring (Dipartimento per le libertà civile e l'immigrazione, 2021).

Since 2015, Italy has experienced a significant crisis along its southern maritime border. Political and economic turmoil resulted in an influx of asylum seekers via the Mediterranean Sea: 154,000 in 2015, 181,000 in 2016 (Scotto, 2017), and around 119,000 in 2017 (UNHCR, 2020). While there were also migrants from the Middle East, Asia, and Eastern Europe, this period was marked by increasing numbers of arrivals from sub-Saharan Africa. As Italy is a major external border country of the European Union, it is a key destination for determining migrant flows into Europe. 2015 was particularly difficult as Italy experienced an overwhelming number of arrivals compared to the rest of the EU countries. In addition, EU regulations require migrants to submit an asylum request in the first EU state they reach. However, many migrants avoided doing so in Italy until they reached their desired destination country. As many countries in northern Europe eventually strengthened their borders within the EU in response, this resulted in Italy being forced to manage larger numbers of migrants as the member states came to an agreement regarding redistribution (Scotto, 2017). In 2021, the main challenges include managing the movement of asylum seekers and refugees and providing for their needs, and dealing with the new arrivals, who have to be quarantined in facilities due to COVID-19 (UNHCR, 2020).

Current Border Issues

At the Italy-North Africa border, the main migration flows moving into Italy are in the form of human smuggling and asylum seekers rescued by non-governmental organizations (NGOs). The increase in human smuggling is caused by significant poverty and war, leading many people to become displaced and in search of economic opportunity (Furlanetto, 2019). Although border security technology does not address the root causes of migration, it is used to

control irregular migration, human smuggling, and organized crime.

Human Smuggling

Human smugglers and criminal groups take advantage of asylum seekers trying to enter the EU by organizing and profiting off their transport. Most recently, in December 2020, local police arrested people in connection with a migrant smuggling ring after a two-year investigation (Calarco, 2020). Authorities discovered that the mobile units operated all across Italy and transported migrants through certain routes, such as from Greece and Turkey to Italy, in order for migrants to advance to northern Europe.

The current response of the Italian government has been to mobilize the European Union border patrol known as Frontex, as well as national entities such as the Italian Border and Customs Agency, the Italian Coast Guard, and the Italian Navy. The EU Council Directive of 2002 and the Framework Decision outline the steps to deal with migrant smugglers and how sanctions should be imposed (European Commission, 2015a). NGOs, which play a big role in migrant rescue in the Mediterranean, were also viewed by some Italian officials as encouraging migrants to pursue risky travel with the help of smugglers. This led the Italian government to enforce an NGO code of conduct (*Codice Di Condotta per Le ONG*, 2017). These rules prohibit NGOs from communicating with smugglers in rescue operations, entering certain territorial waters, and transferring migrants onto other vessels, which is criticized by human rights groups (*Amnesty chiede all'Italia di ritirare il codice di condotta per le ong in mare*, 2020).

Organized Crime

Drug trafficking, especially cocaine and heroin smuggling, as well as contraband trade is also a serious problem at the Italian border, which is conducted by criminal organizations (Associated Press, 2020; Donadio, 2020). These criminal networks are also concerning because they are global in nature, coordinating groups from other countries in Europe and the Middle East (Del Porto & Foschini, 2020). The Italian government has reaffirmed its commitment to tackling organized crime in a unified manner, especially as it relates to migrant trafficking and transport of illegal military arms (Lamorgese, 2020). Additionally, officials emphasize the importance of being equipped with the latest technologies and advancing efforts to coordinate information sharing in order to combat illegal activities.

Border Technology

The technology implemented at the Italian maritime border spans a variety of communication networks and integrated security systems. Collectively known as maritime domain awareness technologies, these solutions include thermal imaging, multi-sensor naval surveillance systems, radar technology, and the IT infrastructure to manage data flows from

borders to intelligence centers (*Integrated Border Security*, n.d.). Artificial intelligence is also used in many of these solutions. Border technologies implemented at the land border include geo-fencing and biometrics. Other major technologies include satellites and drones. The following is a comprehensive list of technology that has been deployed at the Italy-North Africa border for border security.

Cooperative Data Sharing

The Visa Information System (VIS) and European Travel Information and Authorisation System (ETIAS) are travel authorization systems that process visa data, verification, and security through biometric technology. The systems also serve to provide law enforcement with evidence for irregular migration risks, as well as terrorism and crime prevention. Both the VIS and ETIAS allow for visa and travel information to be shared among states included in the Schengen Zone. The ECRIS-TCN system is a decentralized system that consolidates criminal records to inform screening processes (*Eu-LISA – Working Together for a Successful 2020*, 2019). Systems in development include EES (Entry/Exit System), which manage migration flows by electronically tracking the entry and exit of foreign nationals. The project to install these databases started in 2013, and the majority of it concluded in 2020.

Biometrics

The SIS II system supports information sharing among the Schengen Area members, such as through Automated Fingerprint Identification Systems (*Eu-LISA - SIS II*, 2021). The EURODAC system manages asylum applications and stores digital fingerprint data of asylum seekers and migrants. The system also serves to detect migrants who are in the EU without authorization based on biometric data (*Eu-LISA - Eurodac*, 2021). According to EU law, migrants must stay in the first country they arrive, determined by which country collects their fingerprints. This has led to protests among migrants who refuse to give their fingerprints and remain in Italian refugee camps (Scherer, 2015).

These biometrics systems went live in 2020 in order to manage migrants and refugees. The professional services firm PwC was also involved in the pilot of this system, as well as systems for fingerprinting, iris-scanning, and facial recognition (Nazer et al., n.d.). In 2015, the European Agency for the operational management of large-scale IT systems in the area of freedom, security, and justice (eu-LISA) concluded their “Smart Borders Pilot” project that started in 2013 (*Testing the Borders of the Future*, 2015).The aim of the project was to assess the potential of emerging technologies for more efficient and effective border management in the EU. The results showed that many travelers did not view the biometric technologies negatively, nor did they feel that facial recognition and fingerprint collection infringed upon their privacy, except for iris-scans. The majority of respondents, however, did express concern

regarding the reliability of these systems, and how easily potential mistakes could be corrected (*Testing the Borders of the Future*, 2015).

There are programs in place to continuously assess border crossing technologies such as the EU's PERSONA Project, which establishes metrics for assessing data protection capabilities, privacy, and citizens' acceptance of such services (*No-Gate Border Crossing Point Solutions*, n.d.). According to a study that evaluated PERSONA's assessment frameworks, the project is innovative as it takes into consideration the social acceptance of the technologies, giving the public a role in informing researchers about the impacts of border controls (Binder et al., 2020).

Drones

Drones are also used, and are connected to other border technologies, in order to allow for continuous monitoring (*Aeronautical Solutions*, n.d.). National defense companies, such Leonardo, were awarded a $73.7 million contract in 2017 to develop drones for maritime security (Gifford, 2020). According to a press release by Leonardo, the new "manned and unmanned" drones allow for increased situational awareness by integrating with communication and satellite networks (*OCEAN2020*, n.d.).

In 2020, Frontex established contracts totaling 100 million euros with Airbus Italia S.p.A, Israel Aerospace Industries and Israel-based Elbit Systems to operate drones that can surveil the Mediterranean and intercept migrants (*Sorveglianza alle frontiere, droni e militarizzazione del Mediterraneo*, 2020). The operations, which are set to begin in 2021, will utilize unmanned drones such as the Heron, which have previously been used in Crete and Israeli military operations (Chemla, 2020).

Thermal Imaging

Thermal imaging cameras and detectors are used in land, sea, and air surveillance operations to improve visibility for object detection and classification. This technology is primarily used in conjunction with maritime domain awareness solutions (European Commission, 2015b; European Commission, 2020).

Surveillance Radars

Air and surface surveillance radars are used for simultaneous multiple objects tracking in order to allow for maritime domain awareness, such as ship detection (*Coastal Surveillance Systems*, n.d.; European Commission, 2015b; European Commission, 2015c).

Satellite Imagery

Satellites are employed for land and sea surveillance. The company Thales Alenia Space Italia is mainly involved in developing early-warning systems to integrate data from ground-based radars and satellites for and detection of boats used in irregular immigration. (European Commission, 2017a).

Hydrophones

Hydrophones are also used in maritime surveillance systems for underwater acoustic detection, allowing for detection of suspicious vessels, and helping authorities formulate effective and timely responses to rescue or inception operations (European Commission, 2019).

Vessel Traffic Management Systems

Vessel traffic management systems are also employed, which automatically identify vessels in real time and monitor remote sensors (*Vessel Traffic Management System*, 2017). The DOLPHIN project (2011-13), coordinated by Italy's E-Geos S.p.A, focused on developing technologies to monitor European maritime borders, detecting unauthorized immigration, reducing the number of migrant deaths, and preventing border crimes. The outcomes of this project also included enhanced vessel detection and data collection from sensors (European Commission, 2015b).

Naval Optronics

Naval surveillance optronics are also used, which employ infrared search and track for long-range passive surveillance (*Naval Optronics*, n.d.). These are also used in maritime surveillance systems.

Geofencing

The EEZ (Exclusive Economic Zone) virtual fence technology (*Military Systems for Border, Territory & Maritime Control*, n.d.) integrates sensor surveillance technologies with mobile systems and unmanned aircrafts, in order to tackle various tasks simultaneously, such as detecting, recording, and responding to events such as illegal transit, smuggling, and sea accidents by fusing data from multiple sensors (*EEZ Security & Protection Systems*, 2017). It also encompasses a range of products that emphasize open technology architecture and integration across various data channels. The land-based EEZ protection system overcomes limitations of traditional systems such as land-based radars, naval patrol vessels, and drones, which are constrained by weather patterns.

Regulations for Use of Border Technology

Since many of the border technologies, such as biometric systems, collect personal data, data privacy is an important legal consideration. In Italy, the *Codice in Materia di Protezione dei Dati Personali* of 2003 deals with subjects' data rights, regulations for maintaining the security of the data collected, as well as the grounds on which personal data can be collected (*DECRETO LEGISLATIVO 30 giugno 2003, n.196*, 2003). There are no other regulations in Italy that specifically address the use of border technology.

Data privacy regulations at the EU level include the EU Directive 2016/1148 concerning cybersecurity of EU-wide information systems. This is important because these networks and information systems are central to border security technology and data transactions. The directive requires each member state to establish a national contact center for cybersecurity to ensure cross-border cooperation (Directive (EU) 2016/1148, 2016).

Another major data privacy regulation is the EU's General Data Protection Regulation (GDPR), which establish guidelines for data usage and security to ensure the safety and security of citizens and foreign nationals. The GDPR applies to all companies processing the personal data, and/or offering "goods and services" to EU data subjects, defined as individuals who are physically in the EU (Wolford, 2018), meaning that the GDPR applies to EU and non-EU citizens, tourists, refugees, and stateless individuals who are residing in an EU member state (Artzt, 2018).

The EUROSUR regulations of 2013 address the use of border technology for all EU member states. The regulations allow for increased cooperation and information exchange among all entities in charge of border security in the member states, such as law enforcement, border officials, and coastguard agencies, as well as Frontex. Generally, the technology that is implemented should allow stakeholders to react to "changing situations in a flexible and structured manner," but it does not specify the types of technology. The regulations state that national authorities in charge of border surveillance must conduct a risk analysis to determine which resources should be deployed for "tracking, identification, and interception," based on the impact level of the event (Regulation (EU) No 1052/2013 (Eurosur), 2013). This was updated with EU Regulation 2019/1896, which expands internal surveillance capabilities, integrating data from a variety of national surveillance systems (European Parliament, 2020).

The EURODAC Regulation establishes guidelines for the use of biometrics for asylum seekers, particularly fingerprint data. Amendments to the regulation include the storage of other personal data to facilitate identification of individuals, for purposes beyond migration, such as detection of criminal or terrorist acts (*Common European Asylum System*, 2016).

International Involvement

This section discusses how the Italy-North Africa border region has been involved in international cooperation on border security technology. The primary legal frameworks involve

systems to document and manage migration flow, information sharing for maritime authorities, and technology transfer agreements with EU- and non-EU countries on border technologies.

EU Migration Policy

The main legal framework in the EU regarding immigration is the Common European Asylum System, which seeks to standardize the EU's migration policies. There are five main laws that oversee this system, the Asylum Procedures Directive, the Reception Conditions Directive, the Qualification Directive, the Dublin Regulation, and the EURODAC Regulation (*Common European Asylum System*, 2016). Other regulations include the Return Directive, which oversees the process of granting unauthorized migrants legal status (*Return & Readmission*, 2016), as well as the Schengen Borders Code, which governs border-crossing for EU and non-EU nationals (*Schengen, Borders and Visa*, 2016).

Other frameworks have been introduced in recent years, such as the 2002 directive on migrant smuggling, which distinguishes between activities that are conducted for humanitarian needs and criminal purposes (European Parliament, 2002). Most recently, the New Pact on Migration and Asylum was enacted in September 2020, which sets the principles for migration management among the EU member states (Debnarova, 2020). Proposals on the table include a new resettlement framework, regulations for asylum procedure, updating the fingerprinting database to add facial images and expand its scope, and creating an independent monitoring body to ensure that human rights are upheld (European Council, 2021).

EU Integrated Maritime Policy

This policy addresses maritime surveillance for border control and security and provides a framework for information sharing (European Commission, 2016). The EUCISE 2020 project is led by the Italian Space Agency, and attempts to create a common information-sharing environment for all maritime authorities (*EUCISE 2020 Project*, 2015). Related projects that Italian non-state actors have participated in for maritime surveillance information sharing include OPERAMAR from 2008-09 (European Commission, 2017b).

Horizon 2020

The Horizon 2020 project is the most recent and relevant multilateral agreement between EU member states, including Italy, that promotes research and technology transfer (*Commission Welcomes Political Agreement on Horizon Europe*, 2020). The Horizon 2020 research projects related to border security technology research and development included SEABILLA (Sea Border Surveillance), coordinated by Italy (European Commission, 2017a).

Non-EU Technology Transfer

The French and Italian governments are also working with the Tunisian government on implementing new maritime border controls, such as aircrafts that can warn the Tunisian government of vessel departures (*Migranti, Italia e Francia presentano*, 2020; Ziniti, 2020).

Broader Application of Border Technology

Biometrics are also used in Italian airports. Applications include facial recognition, which is used to identify passengers and expedite their check-in process (*Biometric Access Control*, n.d.). This is part of the ePassport Gate solution, a self-service check-in gate located in certain immigration checkpoints and managed by the Italian Border and Customs Agency. Concerns associated with facial recognition technologies include personal data privacy, however in Italian airports, the data is immediately eliminated after the passenger's departure (*Biometric Access Control*, n.d.). Though not used at the maritime border, closed-circuit television (CCTV) is used for public safety purposes in various municipalities in Italy. In late 2020, 17 million euros were spent on installing CCTV in 250+ municipalities (*Videosorveglianza*, 2021). Some municipalities are also working with private industry actors to use facial recognition in conjunction with video surveillance, such as the case of Como and Huawei (Carrer et al., 2020). Facial recognition is also used by Italian law enforcement, such as the SARI system, which was acquired in 2017, and will most likely be implemented on the border in addition to urban areas in 2021 (Coluccini, 2021). A study by Wired Italy revealed that the facial recognition system may present discrimination concerns (Angius & Coluccini, 2019). Legally, the situation is complex as some of these systems can be considered to violate the guidelines of the Italian Data Protection Authority (*Garante della Privacy*) (Coluccini, 2020; Scarfò, 2019).

Recommendations

Currently, there is a lack of border security technology regulation at the national level in Italy and at the EU level. However, the past research and development projects and current technologies that have been implemented demonstrate the pressing need for a policy response. As various technologies from drones, surveillance systems, biometrics, and AI, among other emerging technologies are being used to track, identify, and collect information about migrants, refugees, and asylum seekers, the policies need to keep up with these developments in order to minimize their harm and potential risk. In addition, as new projects within the EU move towards interoperability and increased information sharing among different public and private entities, there is a need for more robust and transparent technology regulations regarding the use and security of migration and border-related data and systems. In light of these concerns, we recommend that policy-making bodies at the EU- and Italian-level take the following actions:

1. Ensure the reliability and security of cooperative data sharing and predictive analytics systems to prevent and quickly address malfunctions.
2. Establish transparent technology risk analysis processes.
3. Create an external advisory board to monitor the use of border security technologies in compliance with human rights.
4. Establish guidelines for private company involvement in the development and deployment of border technologies, in order to maintain transparency and understand potential human consequences of the technologies.

Chapter 2: Middle East

The Israel-West Bank Border

Introduction

Activity at the Israel-West Bank border region is dominated by migration that is mainly migrant workers. Authorities at this border also monitor the movement of terrorist groups and undocumented laborers. In order to surveil this heavily militarized and active border, a number of technologies have been employed, primarily on the Israeli side. These technologies include facial recognition technology, sensor technology, and biometric identification cards, among others. The use of these technologies have presented numerous concerns regarding human rights and data privacy, which should be addressed by encouraging Israeli authorities to develop stronger national regulations surrounding the use of border technology, drafting decisive legal frameworks on the national level to protect the basic human rights of those who cross the border, as well as creating an independent international authority to monitor the use of border technology to ensure security and safety for all.

Table 6: Summary of Findings

Border Profile			
Level of Border Technology	High (7)	**Technology**	Biometrics; Biometric Identification Cards; Vehicle Identification; Sensor Technology; Unmanned Ground Vehicles
Current Issues	Terrorism; Human Smuggling	**Primary Forms of Human Migration**	Migrant workers; Business travelers
Automated Border Control	Under Development	**Border Technology Exporter**	Yes
Private Companies Involved	AnyVision; Microsoft; HP Enterprise; Elbit Systems; Israel Aerospace Industries (IAI); TSG IT Advanced Systems; SensoGuard	**Concerns Regarding the Use of Technology**	Data privacy; Data control; Illicit use of technology; Lack of regulation; Lack of transparency; Violations of international law; Violations of corporate ethics

Background

The barrier between the Occupied Palestinian Territory (OPT) of the West Bank and Israel, largely referred to as a "security fence" by the Israeli government, stands approximately 708 kilometers long. While still under construction, about 61.8% of the barrier is complete, consisting of fences, ditches, razor wire, a technological monitoring system, sand paths and a buffer zone. In urban areas such as Jerusalem, Bethlehem, Qalqiliya, and Tulkarm, an 8–9-meter concrete wall exists (OCHA, 2011).

The ongoing conflict between the State of Israel and the State of Palestine began in the mid-20th century and has lasted into the present day. The United Nations adopted Resolution 181, also known as the Partition Plan, in 1947, ultimately setting out to divide the British Mandate of Palestine into separate Arab and Jewish states. In 1948, the State of Israel was created, causing the onset of the first Arab-Israeli War. The issuing of the Israeli Declaration of Independence sparked Arab invasions of territory in the former Palestinian Mandate that had been declared as Israeli land. The war ended in 1949 with Israel's victory, ultimately resulting in the division of the territory into three parts, the State of Israel, the West Bank, and the Gaza Strip. The war also displaced 750,000 Palestinians. Tensions continued to rise between Israel and its neighbors, eventually culminating in another violent conflict known as the Six Day War of 1967. Upon the conclusion of the war, Israel gained territorial control over areas formerly under Egyptian, Jordanian, and Syrian control, including the Sinai Peninsula, Gaza Strip, the West Bank, and the Golan Heights. Palestinians in the Gaza Strip and West Bank have now been under Israeli military occupation for over 50 years (Baylouny, 2010).

In addition to military occupation, the West Bank has also been occupied with over 130 government-sanctioned Israeli settlements and about 100 unofficial settlements, in which approximately 400,000 Israelis live among nearly 2.6 million Palestinians. These settlements, which the International Criminal Court has deemed illegal, are another source of conflict and high tension between the two states. Many Israelis residing in the settlements identify with an ideological nationalist stance, vehemently maintaining that the West Bank territory rightfully belongs to them due to its biblical significance. In addition, many Israelis are attracted to the settlements due to the inexpensive, quality housing they offer. These settlements are illegal under international law. Palestinians strongly oppose the settlements, viewing them as illegal and as a primary obstacle to resolving the conflict, citing that the settlements are built on land stolen from Palestinian families (Krauss, 2020). Moreover, these settlements and the barriers, fences, and buffer zones that come with them meant to guard Israeli settlers, have made daily activities extremely difficult for Palestinians living in the West Bank, largely restricting Palestinian mobility and commerce (Levingston, 2020).

Although a long-term peace process between Israel and Palestine has continued intermittently since the 1970s, Israelis and Palestinians have failed to reach a final agreement, and question of a Palestinian state remains unresolved. Instead, a number of uprisings have

occurred over the years against the military occupation of the West Bank, as well as Israel's general mistreatment of Palestinians. In response to the Second Intifada of 2002, the Israeli government began the construction of a barrier wall around the West Bank, of which 15% lies within Israel, and 85% within the West Bank, isolating approximately 9.4% of West Bank territory and about 25,000 Palestinians from the rest of the West Bank. The construction of this wall was opposed by the International Court of Justice and the International Criminal Court on the grounds that Israel's claims of self-defense or of a "state of necessity" was insufficient to "preclude the wrongfulness of the construction of the wall" (Council on Foreign Relations, 2020).

Violence incited by both states, including terror attacks carried out by Hamas, a designated foreign terrorist organization, as well as Israeli settlers residing within the West Bank, are major obstacles in continuing peace negotiations. Confrontation between actors have resulted in the deaths and injuries of both Palestinian and Israeli civilians.

Current Border Issues

Immigration into Israel is open and accessible to anyone of Jewish descent, but is extremely difficult for non-Jews. One of the most notable pieces of immigration legislation in Israel is the Law of Return of 1950. This law is known for creating the framework granting Israeli citizenship to Jews across the world as well as their children and other family members immediately upon immigrating to Israel. Immigrants who are non-Jews, with no familial relations to a person of Jewish descent, are unlikely to be legally allowed immigration into Israel (Pex, n.d.). Residency in Israel is forbidden without a labor permit, with an extremely stringent deportation policy, allowing for the arrest and removal of undocumented migrants at any time. An extensive immigration enforcement campaign and an increased number in deportations resulted in the reduction in the number of undocumented migrants from 95,000 in 2011 to 56,000 in 2019 (Raijman, 2020). Many Palestinians have obtained non-Israeli labor permits so that they can work in Israel; however, the Israeli government sets quotas for these labor permits in the agriculture and construction sectors (Raijman, 2020). Although border control technology cannot address the root causes of migration, it can have a hand in controlling issues such as the threat of terrorism and violence, as well as migrant worker smuggling.

Terrorism

Israeli concerns for border security differ greatly from Palestinian positions on the matter. The Israeli government has publicly defended the border by citing the political violence sparked by the Second Intifada in 2000, and Israel's right to self-defense against "terrorism" as a reason for its necessity (Cohen, 2006). The Israeli government also publicly states how effective the border has been in reducing the number of deaths from terrorist attacks carried out from the West Bank, from 452 in 2002, to 9 in 2010. Furthermore, from the beginning of

the Second Intifada, 73 Palestinian suicide bombings were carried out from the West Bank, killing 293 Israelis and injuring over 1,900, but through the end of 2006, only 12 attacks originated from the West Bank, killing 64 Israelis and injuring 445 (Israel Security Agency, 2010). Although the physical barrier was initially presented as a temporary security measure during a time of heightened tensions between the two states, Israel has shown no indication of halting the remainder of the border construction. Israelis overwhelmingly support the notion of a physical barrier between Israel and Palestinian territories including the West Bank for protection against terrorist attacks, which remains the main concern for the West Bank border (Rothem, 2011).

The threat of terrorism toward Israelis is still perceived to be high, despite heavy Israeli security presence at the border, as organized Palestinian militant groups such as Hamas have continued to carry out terror attacks from the West Bank such as stabbings, bombings, shootings, and rocket attacks largely directed toward Israel Defense Forces officers (GardaWorld, 2020). While Palestinian violence is what the Israeli government primarily sensationalizes and focuses on, violence by Israeli settlers in West Bank settlements against the surrounding Palestinian civilians and their property is also an extremely prevalent issue to which the Israeli government largely turns a blind eye, prosecuting only about 9% of cases where Israelis are accused of inciting violence and applying only civil Israeli law procedures. When Palestinians are accused of such violence, 95% of cases are prosecuted and Israeli military law applies (Levingston, 2020). The UN Office for the Coordination of Humanitarian Affairs has reported 630 settler-related incidents resulting in Palestinian deaths and injuries, and 1,344 settler-related incidents resulting in Palestinian property damage from 2006 through 2013 (Office of the United Nations High Commissioner for Human Rights (OHCHR), 2013).

Human Smuggling

Human smuggling in the West Bank has become a thriving industry. In the early mornings, between 30-60,000 work-seeking Palestinians sneak through holes cut in the metal security fence meant to keep them out of Israel, usually working in the construction, agriculture, or food service industries (Glanz & Nazzal, 2016). These illegal laborers risk poor working conditions, exploitation, and imprisonment for a chance at employment in Israel (El Batsh, 2019). By working across the border in Israel, Palestinian laborers can earn significantly higher wages than they can in the West Bank, Israeli business owners can pay less for unauthorized labor than for Palestinians with permits, and smugglers make a cut for their services as well. Human smuggling poses a security risk in Israel's sophisticated system for regulating Palestinians' access to work in Israel. Israel's internal security agency, the Shin Bet, reported that between October and February of 2015, 21 Palestinians who attacked Israelis entered the country illegally. Israel's Defense Ministry stated that they would instill a more

effective form of the barrier to the West Bank border areas that are hot spots for smuggling laborers (Glanz & Nazzal, 2016).

Border Technology

The West Bank border, as well as other borders between Israel and Palestine, have undergone many recent technological upgrades, especially with biometric systems and advanced tactical surveillance software. As noted above, many international technology companies have contracted with the Israeli government to develop these technologies. The following is a comprehensive list of technology that has been or will soon be installed at the Israel-West Bank border for the purpose of border security.

Biometrics

West Bank military border checkpoints are currently being upgraded with facial recognition technology developed by AnyVision Interactive Technologies, a high-profile facial recognition technology (FRT) start-up headquartered in Israel and with offices in the US, UK, and Singapore (Solon, 2019). The software system developed by the company is called BetterTomorrow, and provides "advanced tactical surveillance," allowing users to identify individuals and objects in a live camera feed, such as a security camera or on a smartphone, and then track targets as they move between different feeds. The company states that this software has a 99.9 percent identification rate (Estrin, 2019). This technology is being used to monitor and verify the identities of the thousands of West Bank Palestinian laborers that pass through the border every day on their way to work in Israel. The product allows Israeli officials to quickly identify whether the person passing through has an Israeli work permit, significantly shortening wait times for Palestinian day laborers, and increasing efficiency in general at the border (7amleh, 2020).

The introduction of this technology, and its use beyond the border, brought significant privacy and human rights concerns regarding the surveillance of West Bank Palestinians. Despite AnyVision's continued denials that its facial recognition software has been developed with the Israeli government and used to surveil West Bank Palestinians, one of the company's technology demonstrations shows that the software has been used to track suspects in occupied East Jerusalem (7amleh, 2020). The combination of thousands of cameras and other monitoring devices installed by the Israeli army throughout the West Bank used to track the movements of Palestinians in efforts to prevent terror attacks, with facial recognition technology, transforms passive camera surveillance into a much more powerful tool, now with the ability to identify individuals in camera footage with names on a suspect list (Solon, 2019).

Palestinian activists and human rights and civil liberties groups such as the ACLU, have spoken out against this technology. Facial recognition technology is banned in several US cities due to its ability to "facilitate mass surveillance, exacerbate human bias in policing and infringe

on people's civil liberties" (Solon, 2019). Issues of accuracy with facial recognition technology can produce misattribution and thus be extremely dangerous for Palestinians that are already highly criminalized and treated as a threat by the Israeli government.

Microsoft also faced backlash for its 2019 decision to invest in AnyVision. Human rights activists and civil liberties organizations have criticized the company, declaring that its investment in AnyVision was incompatible with Microsoft's public statements and established standards for the ethical use of facial recognition technology that the company had published just one year prior. In these public statements, 7amleh, a non-profit organization advocating for Palestinian digital rights, reports that Microsoft President Brad Smith "noted that facial recognition technology raises issues that go to the heart of fundamental human rights protections like privacy and freedom of expression and that these issues heighten responsibility for tech companies that create these products" (7amleh, 2020). In addition to a public relations campaign centered around the ethical nature of their own facial recognition technology, Microsoft also formally published six ethical principles to guide its work with facial recognition technology, including fairness, transparency, accountability, nondiscrimination, notice and consent, and lawful surveillance. Public outcry about the company's investment was largely directed toward this perceived contradiction of its ethical principles, specifically the sixth principle specifically states that "we will advocate for safeguards for people's democratic freedoms in law enforcement surveillance scenarios and will not deploy facial recognition technology in scenarios that we believe will put these freedoms at risk" (7amleh, 2020). A report by the AI Now Institute stated that AnyVision's use of FRT "directly contradicts Microsoft's declared principles of 'lawful surveillance' and 'non-discrimination', along with the company's promise not to 'deploy facial recognition technology in scenarios that we believe will put freedoms at risk'" (Crawford et al., n.d.).

Biometric Identification Cards

All Palestinians with a West Bank ID wishing to enter Israel need a magnetic biometric ID card issued by the Israeli District Coordination Office (DCO), as well as all Israeli citizens. These ID cards are only granted to individuals not listed as a DCO-recognized security threat, or who have no misdemeanors listed on their own record or on the records of their immediate family members (Rijke & Minca, 2019). Each ID card contains a microchip that stores biometric, personal, and security information that is collected and stored in a government-controlled database, including fingerprint, iris, and facial imaging data as per the scanners at the various checkpoints (American Friends Service Committee, n.d.). As reported by the Jerusalem Post, the original purpose of issuing the biometric ID cards was to combat the increasing number of forged ID cards issued by the Palestinian Authority, as well as increasing the efficiency of border checkpoints and shortening wait times (Katz, 2007). The American Friends Service Committee reports that Israel has accumulated this data over the years into a nation-wide population

registry containing biometric information about every Palestinian residing in occupied Palestinian territories over the age of 16 (American Friends Service Committee (AFSC), n.d.).

Hewlett Packard (HP) is the original producer of the Basel System, the biometric ID system previously used at major checkpoints inside the West Bank and at its border with Israel. The Basel System functioned as a biometric access control system of which HP was the original system integrator, system developer, and authority of installation at checkpoints and system maintenance (American Friends Service Committee (AFSC), 2020). Since 2016, however, the Basel System is no longer being used by the Israeli military and has been replaced with an upgraded system developed in-house (Who Profits, 2017).

Many criticisms and human rights concerns have been brought up regarding HP's former work with the Israeli Ministry of Defense, as well as Israel's use of the biometric ID system in general. The AFSC criticizes the technology as yet another means to track and control the mobility of Palestinians, claiming that the IDs are "similar in nature to the passbooks produced by Polaroid during the Apartheid era and used by the Apartheid government to control the movement of Black South Africans." The AFSC further asserts that Israeli authorities use this information to discriminate between Jews and non-Jews, especially among individuals seeking to cross the border into Israel (American Friends Service Committee (AFSC), 2020).

Elbit Systems, an Israeli defense company, is also reported to be a contractor for biometric identification systems used at many borders in Israel, including military checkpoints in the West Bank. Issues of accuracy with biometric technologies can produce misattribution and thus be extremely dangerous for Palestinians that are already highly criminalized and treated as a threat by the Israeli government (Welty, 2019).

Sensor Technology

As of November 2018, the Israeli Defense Forces began using SensoGuard's SG-CAM Kit to detect intruders crossing the border through roadside culverts through an "unattended ground sensor, a wireless covert camera, and a command and control alarm management user interface" (SensoGuard, 2019). If movement is detected by the underground sensor, the wireless camera is immediately activated, and a border patrol unit receives the alarm signal and can then start viewing images from the camera. Border patrol officials can then pursue the intruders. The technology is extremely tactical, battery-efficient, and covert. The technology was reportedly put in place at the request of a border patrol commander for a solution to illegal border crossings via roadside culverts (SensoGuard, 2019).

Elbit Systems has also developed Long Range Reconnaissance and Observation System devices for surveillance at the border. These sensors integrate day and nighttime cameras with a laser rangefinder for the purposes of target recognition and identification along the barrier wall at the border. Data from these sensors flows to a command and control system called

Torch, also developed by Elbit Systems and used by the Israeli military (American Friends Service Committee (AFSC), 2019).

X-Ray Scanners

West Bank Palestinians are required to also pass through metal detectors and x-ray machines in order for Israeli border officials to detect any suspect items being carried into Israel in baggage or on one's person, without any direct contact between Palestinians crossing over and Israeli officials. At Checkpoint 300, one of the major West Bank border checkpoints, the officials give commands to Palestinians walking through the machines on a loudspeaker, but have no technology installed to hear responses, making communication between the person walking through and the Israeli official operating the machines extremely difficult. The decision to subject someone to a more thorough search is made solely by the sensor technology, and in a research report on Occupied Palestinian Territory (OPT) checkpoint technology, Rijke et. al state that "the indirect interaction reliant on sensory technology is described by the Israeli army officials as being more humane, since a commuter can be alerted by 'the machine' that s/he is carrying something with her/him, and in this way avoid being touched by anyone" (Rijke & Minca, 2019). Rijke et. al go on to further emphasize the extremely minimal direct interaction between Palestinians and Israeli border officials throughout this process.

Border Protector Unmanned Ground Vehicles (UGVs)

Since 2009, the Israeli military has employed armed autonomous vehicles with 360-degree surveillance cameras to patrol and surveil the Israel-Gaza border, and it is reported that these vehicles have also been used at the West Bank border since December 2015 (Welty, 2019). Elbit Systems and Israel Aerospace Industries (IAI) developed this technology in a joint venture (IMEMC News, 2016).

Regulations for Use of Border Technology

Although surveillance methods and technologies continue to grow in Israel, especially with the advancement of biometric databases and ID cards, Israel lacks a legal framework that regulates these technologies for non-Israeli citizens. Instead, Israel has continued to make legal arguments defending their use of these technologies to surveil Israelis and Palestinians alike (Stevens, 2011). There is currently no specific legislation regulating the use of the technology used at the West Bank border, but Israel often boasts its plethora of domestic data privacy and protection laws, considered by the European Commission to be sufficient. The most notable legislation includes Section 7 of the Basic Law on Human Dignity and Freedom, the Protection of Privacy Law, the Registrar of Databases, the Credit Data Service Law, the Secret Monitoring Law of 1979, the Computer Law of 1995, the Genetic Information Law, and the Freedom of

Information Law (Ali, 2020). Additionally, the National Biometric Database Authority (BDMA) was established to "protect the identity of Israeli citizens" by protecting and securing their biometric information that is stored in the national database, and the law provides Israeli citizens with the option to decide whether their fingerprints will be stored in the database in addition to their facial images (Israeli government, 2020). However, there is no evidence that this protection applies to the biometric data collection of Palestinians crossing the border into Israel. These laws largely encompass key principles that apply to the privacy and protection of personal data of Israeli citizens, such as the transparency of purpose and use of personal data, the lawful basis for purpose limitation and data minimization (Ben-Israel & Artzi, n.d.).

International Involvement

Very few international agreements have been made regarding this border and the use of technology used at the border, as the international community largely opposes the border due to its violation of international law. According to Al Jazeera, "on July 9, 2004, the International Court of Justice ruled that construction of the wall was 'contrary to international law' because it involves the destruction and confiscation of Palestinian property and imposes severe restrictions on Palestinian movement" (Al Jazeera, n.d.). However, Israel does have agreements with its ally, the US.

1998 Wye River Memorandum

The Wye River Memorandum was a peace agreement between Israel and the Palestinian Authority signed at the White House and led through negotiations by President Bill Clinton, largely concerning security issues between the two states and a commitment to combatting terrorism and violence on both sides. The US financed the contracts to develop the biometric technology used by Israel at the borders as a result of this agreement (American Friends Service Committee (AFSC), 2020).

US-Israel Foreign Aid

The majority of aid distributed to Israel by the US is in the form of military assistance, used primarily for the purposes of advancing Israel's military technology and expanding its domestic defense industry, resulting in the transformation of Israel's military into one of the most technologically advanced militaries in the world. Many private Israeli companies, such as Elbit Systems, the developer of surveillance technology used by the Israeli government, has numerous ventures and contracts with various US military contractors such as General Dynamics and United Technologies Corporation. Elbit's major contracts with the US military have also allowed for them to receive a portion of US foreign aid to Israel. The company is seen as a world leader in border surveillance and has several contracts to supply the US Department

of Homeland Security with border surveillance technology similar to the technology used at the borders of Occupied Palestinian Territories for the US-Mexico border.

Additionally, many Israeli defense companies that benefit from military aid provided by the US are major global exporters of their products, including cybersecurity products, drones, and radar and electronic communication systems, to countries such as the US, India, Vietnam, South Korea, Philippines, Australia, France, Germany, Italy, Greece, and Brazil (Sharp, 2020).

Israel-US Binational Industrial Research and Development (BIRD) Foundation Funding Award

In January of 2021, the BIRD Foundation announced that it would be awarding $1.5 million in funding to projects between Israeli and US companies to develop technologies for homeland security, especially for border protection and the prevention of crime and violence (NoCamels Team, 2021).

Broader Application of Border Technology

Although AnyVision publicly defends its software as only being used at border checkpoints, it has been reported that its facial recognition software is being deployed throughout the West Bank in a separate, secret military surveillance program to track potential Palestinian assailants and suspects (Solon, 2019). While formally denying any partnership with the Israeli military, the start-up does have clear ties to Israeli security and defense institutions, being led by two former personnel at Israeli intelligence and defense organizations, as well as having received Israel's top defense prize in 2018 (TheNewArab, 2019).

Recommendations

Currently, there is a lack of regulation regarding border security technology at the national level. This lack of regulation, largely facilitating Israel's use of surveillance technology in areas beyond the border, has sparked criticism from international actors such as civil society groups like ACLU and many Palestinian rights activist groups, as well as several legal bodies of the United Nations. In order to address the human rights concerns associated with technology that is being used to surveil Palestinian civilians without their consent or due process, and that has been recognized and condemned by multinational tech corporations as well, it is necessary for Israel to develop laws to regulate the use of this technology both at the border and in other areas within Israel and the Occupied Palestinian Territories. In light of these concerns, we recommend that the international community take the following actions:

1. Continue to encourage international actors, especially key allies and foreign aid providers such as the US, to aid the Israeli government in the development of regulations for border security technology and hold them accountable as such.

2. Encourage international technology companies to investigate if their products are being used to violate human rights, and further encourage them to terminate contracts with governments committing these abuses.

The Turkey-Syria Border

Introduction

Refugees and asylum seekers are the main groups crossing the border from Syria into Turkey. Authorities at this border must also monitor the movement of terrorist groups like ISIS and the movements of the Kurds. In order to surveil this highly militarized border, a number of technologies have been employed primarily on the Turkish side of the border. These technologies include biometrics, drones, and cooperative databases, among others. The use of these technologies at the Turkey-Syria border has presented numerous human rights concerns, which should be addressed by creating an independent international authority to monitor the use of border technology and by drafting decisive legal frameworks on the international level to protect the basic human rights of those who cross the border.

Table 7: Summary of Findings

Border Profile			
Level of Border Technology	High (6)	**Technology**	Cooperative Data Sharing; Biometrics; Drones; Closed-Circuit Television; Thermal Imaging; Balloon Surveillance
Level of Biometric Data Collection	Moderately Invasive (11)	**Legislation for Biometric Data**	No
Automated Border Control	Yes, but they are not used at this particular border	**Border Technology Exporter**	Yes
Private Companies Involved	Aselan; Thales Group	**Concerns Regarding the Use of Technology**	Lack of regulation; Lack of transparency

Background

The Republic of Turkey and the Syrian Arab Republic had soft borders until the Syrian Nationalists gained independence in 1946 and the Hatay province became part of Turkey. With the onset of the Syrian civil war in 2011, the Turkish border became militarized while Syrians fled to Turkey in an effort to enter the European Union (Vingal, 2017).

Turkey and Syria share a 909 kilometer land border (*Geography of Turkey*, n.d.). Part of the Turkey-Syria border is a wall that includes razor wire on top to deter people (Şente & Arsu, 2018). To further enforce the security of the border, the wall was recently sealed along the provinces of Şanlıurfa, Gaziantep, Kilis, Hatay, Mardin, and Şırnak ("Turkey Improves Border Security with Smart System," 2019).

The war in Syria led to increased emigration and Syrian citizens seeking safety in neighboring countries such as Turkey, Lebanon, and Jordan ("The Current Situation in Syria," 2020). In an effort to stop emigration, Syrian authorities stationed at the border shoot at civilians trying to escape (Oztig, 2019). At the start of the war Turkey and many EU members had an "open door" policy for many of the asylum seekers. However, Turkey's border closed in 2020 as a result of the COVID-19 pandemic.

In 2019, Turkish president Tayyip Erdogan started to act on his idea to create a "Safe Zone" or "Peace Corridor'' along the Syria-Turkey border which, once completed, would house two million Syrian refugees. The Safe Zone is an effort to stop the Kurds in Syria, who have gained territories along the Turkish border. Erdogan sees the Kurds as a threat because of the Kurdish separatist group in Turkey called the PKK which has demanded more autonomy for Kurds for the past several decades. The internal fight within Turkey between the PKK and the Turkish government has left tens of thousands of people dead over the past 29 years. Due to the conflict between the PKK in Turkey, President Erdogan believes that Kurds within Syria have aligned forces and will act as an inspiration for the PKK in Turkey (Ellis & Parvaneh, 2019).

Current Border Issues

At the Turkish-Syrian border, migration is primarily made up of asylum seekers and refugees. Turkey is the traditional symbolic land bridge between Asia and Europe. The Syrian civil war led many to leave their livelihood behind in Syria and flee to Turkey to start a new, better life (Karasapan, 2019). The civil war also resulted in the formation of different terror groups. The Turkish border struggles with the issues of terrorism and the threat of militarized attacks. Although border security technology cannot address the root causes of migration, it can have a hand in controlling issues such as terrorism and human smuggling.

Terrorism

Turkey is labeled as a hub and transit point for foreign fighters and terrorist groups. The Turkish government has considered the Kurdistan Workers' Party (PKK) to be a prominent terrorist threat for decades due to their opposition to the Turkish government, demanding Kurdish autonomy. The PKK and the Kurds who exist outside of the Turkish Borders are two different entities, but in the eyes of the Turkish government any Kurd is a threat. The Turkish government fears that Kurds and the PKK will join together and sneak through its borders and

commit terrorist attacks. To combat these fears, the Turkish government utilizes a militarized counter-terrorism strategy (Ellis & Parvaneh, 2019).

Turkey launched the "Kapan-7 Garissa" counter-terrorism operation in the Siirt province, which borders Syria and Iran, in March 2020. The operation deployed 500 personnel to monitor the PKK threats. Turkey has also launched operations such as the "Operation Peace Spring" campaign in October 2019 which promoted strong offensive and cross-border attacks into Syria. The operation utilized "airstrikes, artillery bombardments, and a ground invasion against Kurdish forces" (*Turkey: Extremism & Counter-Extremism*, n.d.).

The Kurds received support from the US military until 2019, when US troops pulled out of Syria and Turkey invaded, claiming most of the territory along the Turkey-Syria border (Ellis & Parvaneh, 2019). However, due to the Turkish invasion, the Islamist terror group ISIS was able to regain footing. ISIS is slowly consolidating on Turkey's borders with Syria and Iraq and have played a role in recruiting and facilitating foreign fighters from Turkey. Utilizing Turkey as a home-base, the ISIS cell Dokumacilar has recruited young Kurdish Turks to perform attacks against Turkey or join extremist groups in Syria. ISIS might not be as big a threat as the Kurds to the Turkish Government, but Turkey still monitors their movements (*Turkey: Extremism & Counter-Extremism*, n.d.).

To counter the overall risk of terrorism within the country, Turkey developed programs such as the Turkish National Police "to prevent radicalization in at-risk communities," and the Directorate of Religious Affairs to oversee Turkey's 85,000 mosques and promote a moderate adequation of Islam. Turkey also has created a reward system for encouraging citizens to report terrorist and terrorist-related activities (*Turkey: Extremism & Counter-Extremism*, n.d.).

Human Smuggling

Many Syrian asylum seekers who cannot find a legal means of entering Turkey turn to human smugglers to cross the border (Edwards, 2019). Many of the smugglers are originally Syrian refugees who could not find work and started building networks that smuggle refugees through the Syria-Turkey border and then through the Turkey-Greece border. In using smugglers, asylum seekers are often scammed or tricked out of their money (al-Asward, 2020).

Refugees do not only need to fear being extorted by the smugglers, but also must fear the dangers of crossing the Turkish border. The Human Rights Watch reports that Turkish border guards shoot at any Syrian who is attempting to cross into Turkey to seek asylum. When asylum seekers are caught crossing the border utilizing human smuggling means, border guards reportedly beat and detain these migrants and deny them medical assistance. Syrians are met with "bullets and abuse" to stop them from successfully entering Turkey at the border. By November of 2017, at least 330 people had died crossing the border (*Exposes Asylum Seekers to Further Risk, Abuse*, 2018). To stop human smuggling, Turkey fortified its border by creating a 911-kilometer concrete wall. Turkey uses the Turkish Armed Forces to monitor its land borders.

In the less fortified border areas, the Turkish government set up gendarmerie stations with border guards (*Exposes Asylum Seekers to Further Risk, Abuse*, 2018)*.*

Border Technology

Due to the threats of terrorism that have erupted from the Syrian civil war, Turkey has invested its finances and utilized funds from the EU to create a more robust and weaponized border front. The following is a comprehensive list of technology that has been or will soon be installed at the Turkish-Syrian border for border security.

Cooperative Data Sharing

Turkey is a part of the Schengen Cooperation Network, which the EU Visa Code upholds. Though not a member state of the EU, Turkey participates in the Visa Information System data-sharing network, which produces a robust, collaborative set of information (*Visa Information System (VIS)*, n.d.). The VIS makes it easier to streamline visa applications at borders in Schengen areas. Applicants provide biometric data, such as fingerprints and a digital photograph which will be inputted into the database, which the EU assures is protected with the highest data standards (*Rollout of the Schengen Visa Information System in Turkey*, 2014)*.*

Biometrics

Turkey has set up facial recognition systems along the Turkey-Syria border to identify foreign fighters ("PKK Members Identified with Facial Recognition," 2014). In 2011, Turkey implemented biometric passports, developed by Thales Group, for its citizens, which are passports that include extensive data about the user's facial features and fingerprints (*Turkey: Biometric Passports*, 2014).

Drones

Due to the armed conflict at Turkey's border, many of its border security technologies are also used for military purposes. Turkey utilizes drones for both border surveillance and cross-border attacks (Pamuk, 2017). Drones have reportedly killed dozens of Syrian troops and destroyed hundreds of tanks in Idlib in short periods ("Turkey's Drones Provide Crucial Edge in Syria," n.d.). Turkey's kamikaze drones use facial recognition to identify targets (Pascu, 2019).

Closed-Circuit Television (CCTV)

Some wall additions along the Turkish-Syrian border will include CCTV cameras equipped with sensors. When a person, or what the government labels as a "border violation," triggers the sensors, the camera will be turned towards the area of the violation. The camera

will then send the violator's coordinates to the operations center and police station ("Turkey Improves Border Security with Smart System," 2019).

Thermal Imaging

Thermal imaging cameras are utilized on top of 3.05-meter towers and are being used to spot infiltrators at night. These cameras are always monitored (Pamuk, 2017). Cobra patrol vehicles equipped with "enhanced sensitive thermal imaging periscopes" are stationed along the border to motor possible border crossings (Şente & Arsu, 2018).

Balloon Surveillance

In Turkey, the Southern Hatay province along the Syrian border has implemented balloon surveillance. Aselsan, one of Turkey's defense companies, developed this surveillance method which the Turkish Armed Forces then bought and used to monitor the border. The balloon is 17 meters long and can operate at altitudes of 500 meters. The balloon is used "to carry out surveillance missions, gather intelligence and be used for its early warning capabilities to protect military bases and critical facilities" and has "electro-optic cameras and 360-degrees stabilized observation capabilities" (Genco & Zorlu, 2020).

Regulations for the use of Border Technology

Turkey has weak regulations regarding the use of border technology. The first law was developed in 2016 and was called the "Data Protection Law," which highlights that data may not be processed without the consent of the individual (*Biometrics in Turkey*, n.d.).

International Involvement

The influx of Syrian refugees and asylum seekers into Turkey claims the global community's attention, and the European Union in particular is affected. The following section highlights the most relevant example of how international cooperation acts have influenced the Turkey-Syria border.

EU-Turkey Migration Deal

In March of 2016, the EU and Turkish government created an agreement to control the flow of migrants who travel through Turkey to the Greek islands. The EU has given the Turkish government €3 billion to stop Syrian refugees and asylum seekers arriving in Greece and send those who arrived in the Greek islands back to Turkey (*The EU-Turkey Deal: Explained*, 2018).

Broader Application of Border Technology

Due to the path of immigrants hoping to enter other EU countries, other borders are heavily equipped with technology. Along the Turkey-Greece border, Aselsan has sent military-grade vehicles that are weatherproofed and armed with sensors and ATES geothermal technology systems (Ergocun, 2020).

The Schengen Information System influences the development of biometric passports which all Turkish people have. These passports allow Turkey to implement ePassport gates in places like airports or less-militarized border crossings (*Rollout of the Schengen Visa Information System in Turkey*, 2014).

Recommendations

Currently, the Turkish border encounters large numbers of refugees, asylum seekers, and migrants fleeing the political unrest that has erupted throughout Syria since 2011. The Turkish Armed Forces have militarized the Turkish-Syrian border, utilizing drones and other security measures that often infringe on human rights and put the lives of refugees, asylum seekers, and migrants at risk. In light of these concerns, we recommend that the Turkish government take the following actions:

1. Encourage tactics that ensure the safety of asylum seekers, rather than an aggression-first mentality.
2. Reinforce and respect the rights that all asylum seekers, refugees, and migrants have.
3. Improve immigration database processing systems to create faster immigration receiving procedures, ensuring that migrants have access to information in their native language and other access to institutions such as healthcare and educational programs.
4. Ensure that asylum seekers, refugees, and migrants are not met with violence at the border via drones, warfare, and shooting which is fueled by the growing xenophobic attitudes towards immigrants.

Chapter 3: Sub-Saharan Africa

The Nigeria Border

Introduction

Activity at the Nigeria border is dominated by human migration in the forms of asylum seekers, migrant workers, and business-related activities. Authorities at this border must also monitor the movement of contraband goods, contraband market participants, as well as the terrorist group Boko Haram and their insurgents. In order to survey Nigeria's incredibly porous and frequented borders, a number of technologies have been employed by the Nigerian government on the land borders with Niger and Cameroon, as well as the land and water barrier with Chad. These technologies include drones, biometric systems, and ePassport registration. The use of these technologies along Nigeria's borders have presented numerous concerns regarding human rights and data privacy, which should be addressed to create a safe and welcoming environment to migrants, asylum seekers, and daily travelers, as well as a Nigeria without Boko Haram's presence.

Figure 8: Summary of Findings

Border Profile			
Level of Border Technology	Low (3)	**Technology**	Cooperative Data Sharing; Biometrics; Drones
Level of Biometric Data Collection	Moderately Invasive (11)	**Legislation for Biometric Data**	Yes
Automated Border Control	No	**Border Technology Exporter**	No
Private Companies Involved	Elbit Systems; Aviation Industry Corporation of China; Adcom System; Amadale Global Systems; Emirati UAVS	**Concerns Regarding the Use of Technology**	Lack of effectivity; Illicit use of technology

Background

The Federal Republic of Nigeria shares borders with the Republic of Benin, Republic of Cameroon, Republic of Chad, and the Republic of Niger. They are 809 kilometers, 1975 kilometers, 85 kilometers, and 1608 kilometers, respectively. Additionally, to the south, the Nigerian coast extends 853 kilometers along the Gulf of Guinea (*Nigeria - The World Factbook*, n.d.). Nigeria's borders with Benin and Niger exist on land with a variety of plateaus and lowlands. Nigeria and Chad were originally bordered by Lake Chad, which has since dried substantially and so now land, swamp and water are the border conglomerate. To the east, Nigeria and Cameroon share various rivers, mountains, plateaus, and lowlands (*Nigeria - The World Factbook*).

European colonialism in Africa brought about extensive and irreparable damages. One of such was the dividing up of territory and demarcation of indigenous territories, through what is known as the Scramble for Africa, culminating in the Berlin Conference of 1884. The European-drawn demarcations and borders did not properly account for indigenous identities of the communities and individuals that were colonized. Hardly surprising, present-day borders have separated communities as Nigeria has at least 250 different ethnic groups which speak hundreds of languages among their 220 million citizens (*Nigeria - The World Factbook*, n.d.). On both sides of the borders Nigeria shares, people of common language, culture, and ethnicity exist. This leads to thousands of bush trails and markets that people use daily that neglect official border lines (Pahimi, 2017).

The Nigeria-Benin border came into existence in the late 19th century when colonial powers France and England established a rough border. Once Benin gained its independence in 1958 and Nigeria in 1960, the official and current border was drawn. The Nigeria-Chad border was established in the late 19th century as well. The original border lines still stand from colonial times, and both Chad and Nigeria followed the colonial border line once they both declared independence in 1960. As Lake Chad began to dry up however, 1983 saw a deadly conflict between Nigerian and Chadian troops over a contested border dispute. Seventy-five Chadian and nine Nigerian soldiers died. While some disputes remain as the Lake continues to dissipate, the original borders are adhered to (Baye, 2010). Boko Haram's insurgency has led to an influx of refugees into Chad from northeast Nigeria.

The Nigeria-Niger border was formally established once Niger won its independence from France in 1960. Similar to Chad, the Boko Haram insurgency in northeast Nigeria brought about a sense of lawlessness along the border of Nigeria and Niger. The late 19th early 20th century saw many changes to the Nigeria-Cameroon border, with England, France, and Germany each occupying Cameroon at different times before its independence in 1960. Once independence brought about an official border, the discovery of oil reserves on the Bakassi Peninsula on the Gulf of Guinea nearly brought Cameroon and Nigeria to war in the 1990s. The

deadly conflict ended in a resolution by the International Court of Justice in 2006, which ruled that Cameroon was the rightful owner of the oil-rich Peninsula (Baye, 2010). Following the ruling, Nigeria officially pulled out its military from the Peninsula, granting autonomy to Cameroon's government.

In August of 2019, President Buhari ordered the immediate closure of all Nigerian land borders with Benin, Niger, and Cameroon in an attempt to stop the smuggling of food items which the administration claimed were undermining domestic agriculture business. Goods like rice were particularly targeted as smuggling had become rampant amidst the spikes in prices of agricultural goods. The border closure led to the commission of Operation Swift Response (OSR) to crackdown on illegal activity and smuggling along all borders (Bolashodun, 2020). As of January 5th, 2021, the OSR-turned-Nigerian Joint Border Patrol Team (JBPT) seized $33 million worth of items. The JBPT is a Tripartite Operation which comprises neighboring Benin, Niger, and Nigeria (Ukpe, 2021). December 31, 2020 saw the reopening of land borders, but operation forces like JBPT still remain in action, and are present at all major border checkpoints along Nigerian borders (Onuah, 2020).

Current Border Issues

At the Nigerian borders, the main forms of migration occurring are voluntary migration as well as forced migration which includes asylum seekers and human trafficking. Nigeria is the most populous country in Africa, and one of the economic hubs in west Africa. Many Economic Community of West African States (ECOWAS) hopefuls come to Nigeria, as well as other Africans who are looking for economic opportunities. Daily commuters look to have access to markets on either side of Nigerian borders like Seme and Mfum, as well as those who need to smuggle their goods across the border into market. Boko Haram's prevalence and Nigeria's war against their insurgency has led to mass displacement, as well as human smuggling and trafficking from insurgents. Although border control technology cannot address the root causes of migration, it can have a hand in controlling issues such as terrorism, smuggling, and reducing porosity.

Porous Borders

Nigerian Immigration Service (NIS) data reports that more than 1,400 illegal routes into Nigeria currently exist, while only 84 approved border control posts exist. Additionally, porous border security by design and by regional geography has led to extensible issues for the NIS ("Nigeria's Porous Borders," 2014). Along all of Nigeria's borders, which range in topography from lowlands to semi-arid plateaus and mountain ranges, there are official border checkpoints, as well as the unofficial, regularly trafficked points of crossing. A main concern with border porosity is the inability of the Nigerian government to know exactly who and what enters into the country. Border porosity is the main factor that allows the proliferation of illegal

arms and insurgencies within Nigeria (Babatola, 2015). The emergency closure of the border in August 2019 was a direct response to Nigeria's inability to effectively police and monitor the influx of smuggled contraband, traffickers, and undocumented migrants. Many neighboring governments as well as the African Continental Free Trade Area (AfCFTA), a newly ratified organization designed to bring millions of Africans out of poverty and create long-term economic growth through free trade in Africa, have spoken out against Nigeria's border closure. Nigeria's actions are in opposition to the newly ratified AfCFTA which went into effect in Nigeria on January 1, 2021 (Kazeem, n.d.). The border shutdown forced smugglers into a more precarious position, while also affecting legitimate business-owning Nigerians (Munshi, 2019).

Terrorism

Nigeria repeatedly made international headlines in the 2010s for the rise of Boko Haram, the Islamic terrorist Insurgency that finds its home in West Africa. Boko Haram has been lethal to Nigerian safety, security, and prosperity. Those who are not ECOWAS citizens try to find refuge and economic opportunity in this country, which has caused it to become the epicenter for kidnappings, killings, and war. #Bringbackourgirls became an internet-wide hashtag after 276 schoolgirls were captured in Chibok, Nigeria by Boko Haram in 2014. This singular event engrossed the other thousands of girls who were captured following this incident who have been labeled the "Forgotten Girls." The kidnapping of schoolgirls, the rise of insurgencies and the trafficking of people have all been disastrous to Nigeria. As of today, Boko Haram has killed nearly 30,000 people, displaced nearly three million, and forced over 200,000 Nigerians to migrate to neighboring countries including Chad, Cameroon, and Niger (Kindzeka, 2021). Nigeria launched a war against Boko Haram in 2013, calling in support from other regional allies as well as the United States. Though Boko Haram has lost much of their territory, it still remains violently active, and 2021 saw the Nigerian Army launch their new operation TUKA TAKAIBANO to tackle the insurgency (Joel, 2021). Similar to the Nigerian government, international human rights groups have spoken out and condemned the violence and brutal rape and atrocities committed by Boko Haram. Border states like Borno and Yobe have been forever compromised as millions have been displaced and lack proper resources to live a life free of Boko Haram's terror.

Human Trafficking

Promises of a better economic future lure hundreds of thousands of Nigerians towards Libya and into Europe. At least 36 nations have found Nigerians to have been victims of trafficking in four world regions (*2020 Trafficking in Persons Report*). Of the unknown number of sex trafficking victims destined for Europe, over 90% hail from the southern Nigerian state of Edo (*Nigeria: Human Trafficking Factsheet*, 2020). The Nigerian government founded the

National Agency for the Prohibition of Trafficking in Persons (NAPTIP) in 2003 in their effort to stop Nigerian human trafficking. Amnesty International has accused the Nigerian government on multiple occasions of failing to respond to kidnappings of schoolgirls and trafficking violations (Searcey & Akinwotu, 2018). The human rights abuses that occur amongst the trafficked victims are egregious and rampant. Nigeria's inability to effectively police and perturb human trafficking is incredibly important to address in order to cut down on human trafficking.

Corruption

Nigerian borders are a hotbed for corruption. In order to escape the taxation of goods or bureaucratic procedures required to cross the border, individuals or smugglers pay bribes or small fees to border officials to get past. This informal economy, while each individual transaction is small, leads to an economy of corruption where insurgencies and smugglers can thrive. Boko Haram has gathered sums and recruited actors into their insurgency through corrupt and illegal markets along Nigerian borders (Hahonou, 2016). If border security agents are present, they are poorly equipped, paid, and trained, as well as susceptible recruitment from insurgents (Babatola, 2015). Nigeria, in response, developed more border checkpoints along the Niger-Benin-Nigeria border in an attempt to wrangle control of the corruption situation. However, the addition in checkpoint prevalence through increased numbers have not led to a decrease in bribes or corruption (Hahonou, 2016).

Border Technology

In an attempt to secure Nigeria's land borders, Nigeria has installed more checkpoints at major border crossings among its borders with Benin, Chad, Cameroon, and Niger. Nigeria lacks efficient border security technology, but it has expressed interest in ramping up security, especially as smuggling and trafficking are rampant. To do so, Nigeria has looked to centralize passport and biometric technology to manage and document who crosses in and out of Nigeria's borders daily. The following is a comprehensive list of technology that has been installed at Nigerian borders for the purpose of border security.

Cooperative Data Sharing

In 2007, once the ePassport was introduced to combat passport and identity theft cases, Nigeria did not stop their quest to curb illegal activity, undocumented immigration, and Boko Haram's insurgency. In 2020, Nigeria partnered with the U.S. Department of Justice and INTERPOL to dramatically improve Nigeria's border security screening capacity. Nigeria became the first African country to implement an automated system used for uploading stolen and lost passport documents into the INTERPOL database that can be utilized by all 194 INTERPOL member countries. The intention of this database is to cut down on Foreign Terrorist Fighter

movements by identifying and interdicting these fighters as well as other transnational criminals that use stolen and lost documents such as passports, visas, and other identity documents (*United States Assists Improved Border Control in Nigeria*, 2020). The technology with the ePassports would not infringe on the movement of everyday citizens, as the NIS is specifically looking to find foreign terrorist fighters that move through Nigerian border checkpoints.

Biometrics

Nigeria was one of the first African nations to start implementing and relying on biometric data for wide-scale utilization. Additionally, fingerprint biometrics have been used to create a national ID database. This NIS database is used to link individuals to their bank accounts, creating card-free systems of withdrawal and payment, etc. (Macdonald, 2021). These biometrics have now been implemented in border security. Migrants coming into Nigerian checkpoints will have biometrics taken to provide data and enable Nigerian authorities to monitor their movements. Foreigners who overstay visas will have their fingerprints taken as well for the national database. NIS is looking to account for every individual they can who sets foot on Nigerian soil (Mayhew & Mayhew, 2018). These databases are available at border checkpoints along Nigerian borders.

An ECOWAS database consisting of the National Biometric Identity Card for intra-ECOWAS travel (NBIC) exists in Nigeria. Nigeria's northern neighbors Benin and Niger are both member states of ECOWAS, which allow the free movement of people and goods between member states. The NBIC card was implemented in December 2014 to replace the former out-of-date ECOWAS Travel Certificate (*The NBIC – REG Nigeria Project – Nigeria Immigration Service*, n.d.). The NBIC is used to better manage data flow and border security by curbing illegal migration between ECOWAS member states (*ECOWAS Begins Advocacy*, 2019). Biometric card readers are installed at major border checkpoints.

Drones

Drones are used by the Nigerian Armed Forces (NAF) primarily to track and locate Boko Haram insurgents. The drones used, both armed and unarmed, provide real-life imagery of ground activities to the NAF. Offensively, the NAF carries out airstrikes against Boko Haram insurgents (Searcey, 2019). The drones used are bought from the Chinese state-owned arms firm Aviation Industry Corporation of China and Emirati UAVS from the United Arab Emirates (Xuanzun, 2020); Guy, 2021). Both sets of drones are used for intel gathering (Guy, 2021). Drones will fly over the northeastern states of Nigeria, and along the border, where Boko Haram is centralized.

Regulations for the Use of Border Technology

The lack of border security technology means that there is little legislation to regulate or monitor its use. Nigeria has national legislation regarding data security and data privacy, but it is not relevant on the border.

International Involvement

The following section illuminates how Nigerian borders have been influenced through acts of international involvement. Nigeria has had a few instances of international involvement on the borders, notably with INTERPOL and US military intervention. Moving forward, Nigeria is looking towards free trade.

African Union and the African Continental Free Trade Area (AfCFTA)

The AfCFTA agreement establishes the entirety of the African continent as a designated free trade area. The international agreement looks to usher in deep and necessary reforms to establish and permanently enhance economic growth within the African continent. A continental free market, if taken seriously, will start to dramatically shift the feasibility of protectionist policies such as emergency border closures and import bans (Olagunju, 2021).

Multinational Joint Task Force

Originally founded in 1994, the Multinational Joint Task Force (MNJTF) was established as a Nigerian task force to monitor high banditry among other cross-border crimes due to Nigeria's porous borders (Kerry, 2021). The MNJTF grew to expand the other neighboring west African nations of Benin, Cameroon, Chad, and Niger and has since expanded its operations to include the fight against the Boko Haram insurgency.

Broader Application of Border Technology

Nigeria has been able to use biometric technology which is utilized on its borders in everyday life for its citizens. The biometric technology that is currently used on the border is being implemented into Nigerian international airports. The NIS opened its Migration Information and Data Analysis System (MIDAS) at the Nnamdi Azikiwe International Airport in Abuja in November of 2019. Abuja's airport is the second busiest in all of Nigeria, with nearly five million individuals served annually. MIDAS strengthens the NIS' ability to facilitate and manage cross-border movement, as well as ensures that those crossing Nigerian borders by air do not pose threats to Nigerian national and international security (*Nigeria Immigration Service, IOM Launch Border Management Information System at Largest Airport to Date*, 2019).

A more invasive form of monitoring was installed under former President Goodluck Jonathan in 2015. The Israeli aerospace and defense company Elbit Systems was awarded a $40

million contract to intercept all internet activity (Emmanuel, 2013). This was not advertised as such by Jonathan to his people – instead Jonathan told Nigerian citizens it was for fighting against Boko Haram. Nigerian citizens are paying a steep price for the previous and current administration to protect their national security. The original intent to utilize internet surveillance technology to prevent the spread of terrorism and human trafficking has increasingly become civilian-oriented and dangerous for Nigerian privacy.

Policy Recommendations

Currently there is a lack of effective, wide-spread, and quality regulations regarding border security technology at the national level. Nigeria has been a hotbed for insurgency, trafficking, and domestic instability. Porous borders, an ongoing war with Boko Haram, and a stagnant economy present a future with much to tackle for President Buhari's administration and future administrations. In light of these concerns, we recommend that Nigeria take the following actions:

1. Identify Nigeria as a leader in AfCFTA and pursue an Africa based on free trade, and more universal markets that enable countries to succeed as Nigeria succeeds.
2. Pursue a cooperative strategy with neighboring Benin, Cameroon, Chad, and Niger to crack down on smuggling through the promotion of legal and fairly priced markets, domestically, as well as internationally.
3. Invest in smart border security technology that can detect smuggling, trafficking and insurgents through surveillance technology.

The Ethiopia-Kenya Border

Introduction

Migrant workers, asylum seekers, and refugees are the main groups crossing the border from Ethiopia into Kenya. Authorities at this border must also monitor the movement of contraband goods, cattle raiders and human smuggling. In order to surveil this porous border, two-way high frequency radios have previously been employed along the Ethiopia-Kenya border in the city of Moyale. The lack of adequate application of border technology at the Ethiopia-Kenya border presents numerous security concerns, which should be addressed by increasing investment in security technology and infrastructure development along the Ethiopia-Kenya border to ensure security and safety for all.

Table 9: Summary of Findings

Border Profile			
Level of Border Technology	Low (2)	**Technology**	Two-Way High Frequency Radios
Level of Biometric Data Collection	Highly Invasive (9)	**Legislation for Biometric Data**	Yes
Automated Border Control	No	**Border Technology Exporter**	No
Private Companies Involved	N/a	**Concerns Regarding the Use of Technology**	Lack of regulation

Background

Long suffering from annual droughts, the nearly 800 km, porous border between the Federal Democratic Republic of Ethiopia and the Republic of Kenya is characterized by erratic precipitation, lowland grasslands, flat plains and savannas. Initially defined in 1907 though the East African Protectorate, the border was further clarified after World War II in 1947 before being formally set in the early 1950s (*Ministry of Foreign Affairs - MoFA*, n.d.). Beginning with the defeat of the military regime that ruled Ethiopia from 1974 to 1987 and the rise of the

Tigray People's Liberation Front (TPLF) and the Ethiopian People's Revolutionary Democratic Front (EPRDF), Ethiopia's political culture began to radically change. After the adoption of the 1994 Constitution of the Federal Democratic Republic of Ethiopia, the political structure in Ethiopia was remapped, making ethnic identity politics even more important than before by overlapping ethnic and administrative borders and solidifying ethno-territoriality, changing ethnicity from a taboo topic to one that divided the country into nine punitively autonomous ethnic-based regional states and two multiethnic city-states (Adugna, 2010, 47).

Because Ethiopia is so heavily divided into districts based on ethnic background, conflicts are common in shared spaces and the borderlines of clan territories. One of the most notable areas of contention is Moyale, a border town nestled near the middle of the Ethiopia-Kenya border and halfway between the two country's capitals. This small market town is both a district in Kenya as well as the administrative center for both the Somali Region and the Oromia Region in Ethiopia. In addition, Moyale houses three distinct and separate ethnic communities within its town; the Borana, the Garri, and the Gabra. The Borana, the largest community in the borderlands, inhibits the southern rangelands that straddle the Ethiopia-Kenya border and can be found from the Borana and part of the Guji Zones of the Oromia National Regional State in Ethiopia, to the Kenyan districts of Moyale, Isolo, and Marsabit. Meanwhile the Garri, the second largest group, is spread throughout Ethiopia, Kenya and Somalia with high concentrations being located in the Moyale and Hudet districts of the Somali National Regional State in Ethiopia, and the Mandera district of Northern Kenya. The third community, despite being a minority in the area, can be further divided into two sub-groups based on location, the Gabra Miigo inhabiting the Oromia Regional State of Southern Ethiopia, and the Gabra Malbe living within Southern Ethiopia and Northern Kenya, but more specifically the Marsabit district (Adugna, 2010, 45-47).

The duality of the town often leads to ethnic clashes that are frequent and run deeper than just the inhabitants of the town. One Garri informant of Fekadu Adugna, the author of *Making use of Kin beyond the International Border: Inter-Ethnic Relations along the Ethio-Kenyan Border,* details how conflicts go beyond the individuals involved in the conflict to engage all of the community regardless of where the ethnic members may live (Adugna, 2010, 50). Such conflicts often end in bloodshed, as in July 2012 when a long-standing land dispute between the Borran and Garre communities of Moyale ended in the death of at least 18 people and the movement of more than 20,000 people across the border into Kenya over the course of four days (*Ethiopia: 20,000 Flee Moyale Clashes - Red Cross - BBC News*, n.d.).

Current Border Issues

At the Ethiopia-Kenya border, migration is primarily moving into Kenya in the forms of migrant workers, asylum seekers, and refugees. Over the past few decades Ethiopia has experienced political insecurity and conflict that has only served to heighten the overall

insecurity of the area. According to the International Organization for Migration, severe droughts and conflicts over water sources have been a major contributing factor to the high percentage of migration out of Ethiopia, as migrants look for stability and greater opportunities for work (IOM, 2019). Although border control technology cannot address the root causes of migration, it can have a hand in controlling issues such as contraband trade, voter fraud, human smuggling, corruption, and cattle raiding.

Contraband Trade

From cosmetics to food to a variety of manufactured goods, cartels make use of their kin relationships to smuggle goods across the Ethiopia-Kenya border. An anonymous security source even revealed "that the cartels were so organised that they paid civilian informants used by the police to spy on the security officials and avoid arrest" (Gumba & Turi, 2020). However, the strict deterrence methods of Ethiopian authorities, which include the burning of confiscated imports, has led traders to redirect the majority of their trade from outside of Ethiopia into Kenya. Due to the proximity of Ethiopian farmlands to the border in comparison to farmlands in Kenya, staple crops such as rice, beans, and cereal are key contraband goods from Ethiopia to Kenya during the dry seasons (Gumba & Turi, 2020).

Voter Fraud

The use of familial ties spread wide throughout the Southern portion of Ethiopia and the northern part of Kenya makes policing the border even more difficult than just handling ethnic conflict in the border town. One of the biggest conflicts for both Ethiopia and Kenya beyond Moyale is the use of kin by these three communities during election campaigns in both countries. Since 1990, high ranking officials in Kenya including members of parliament have distributed Kenyan identity cards to inhabitants of the Ethiopian part of Moyale in order to increase the number of their supporters. Ethiopia's government has even been complicit in these acts of voter fraud on some occasions, using the elections as opportunities to interfere with the selection of Kenyan government officials (Adugna, 2010, 46).

Porous Border

The porous nature of the border also facilitates the movement of migrants from Ethiopia to Kenya, aided by familial ties and the corruption of governmental officials, in addition to smuggling networks. However, criminal networks have not responded positively to past attempts to curb irregular migration, instead responding with organized border violence, including most recently when "a local Garre ethnic militia from the Ethiopian side of Moyale...attacked workers contracted to dig trenches to deter the use of unofficial [trade] routes" (Gumba & Turi, 2020).

Human Smuggling

With the demand for "cheap unskilled" labor increasing over the years, the number of irregular migrants crossing the Ethiopia-Kenya border has increased in turn. According to interviews conducted in Wajir County and Marsabit County in a 2017 report on migrant smuggling and human trafficking, prospective employers were large contributors to informal migrant crossing, often asking migrants currently in the country to recommend family members "back home" and offering to pay that family member transport and smuggling fees if they agreed to work (*Kenya Country Statement Addressing Migrant Smuggling and Human Trafficking*, 2017, 8-9).

Due to the Free Movement Protocol adopted by Kenya in 2016, Ethiopian citizens do not require a visa to enter the country; however, they do still need various official documents such as passports which many Ethiopians may or may not own. Furthermore, even those with the necessary documentation still experience issues with border officials and police as they cross, and according to most of them can expect to pay a bribe before crossing. Thus, many Ethiopians often turn to smuggling services. Per informant interviews done in the 2017 Kenya Country Statement report, those wishing to cross the border could expect to pay around $500-$600 USD for transport, documents and a Kenyan immigration stamp, while the less expensive smuggling services include only unguaranteed transport at around $50-$100 USD (*Kenya Country Statement Addressing Migrant Smuggling and Human Trafficking*, 2017, 8-9).

Corruption

According to a 2009 study by the International Organization for Migration, alleged corruption and complicity are some of the driving factors behind the success of the smuggling industry in the region, with the lack of regulations on the activity only serving to encourage state and public officials to abuse their power for private profit. It was also noted that in certain cases, smugglers have been documented tipping off police to the migrants they are smuggling, something the study deemed "too coincidental and frequent to not have been orchestrated" (IOM, 2009, 41).

The high consensus on the topic by those interviewed for the study suggested that the issue as a whole was a chronic one with many of the officials colluding with smugglers rather than them "succumbing to the occasional bribe" (IOM, 2009, 9), something that was echoed by key informant interviews conducted in northern Kenya for the Kenya Country Statement in 2016 which revealed that some members of the local police, border officials, and administrators may be helping to facilitate smuggling operations. These allegations were further corroborated by the residents of Moyale themselves who have criticized Kenyan security officials in regard to their corruption and lax attitudes towards smuggling and

contraband (Gumba & Turi, 2020). Furthermore, in 2016 three Kenyan officers were arrested in connection with the smuggling of 23 Ethiopians in Marsabit county, a ton near the Ethiopia-Kenya border (*DailyNation*, n.d.).

Cattle Raiding

Cattle raiding is another large issue at the border. Since the increased output of sophisticated automatic rifles beginning in the 1990s, there has been a large shift from what used to be the redistributive raiding of cattle to instead the commercialized predatory raiding of cattle. Residents living near the border say the stolen livestock is used to obtain more weapons from neighboring war-affected countries, like Somalia, in order to perform more cattle raids. However, this only further escalates the issues as victims seek to arm themselves creating a whole other criminal gun market as a by-product. One of the most recent conflicts occurred in November 2019, with around 500 heads of cattle and 1000 goats being stolen. Local police working in the area are also often under-equipped to deal with large scale conflicts, as pastoralist and agro-pastoralist raiders and victims alike often having more advanced weaponry (Cross-Border Arms Trafficking Inflames Northern Kenya's Conflict - Kenya, 2019; Greiner, 2013).

Border Technology

The Ethiopia-Kenya border has largely been neglected as it is located on the geographical fringes of both countries. It also does not have the degree of heightened conflict that warrants immediate attention like other outlying borders might, such as the shared border with Somalia. The following details technology that has been installed at the Ethiopia-Kenya border for the purpose of border security.

Two-Way High Frequency Radios

Two-way high frequency radios, colloquially called "walkie talkies", function as wireless communication tools using a designated frequency. Two-way frequency radios were introduced by the Conflict Early Warning and Response Mechanism (CEWARN) during the ICT4Peace pilot project in order to resolve the issue of limited telecommunication coverage along the Ethiopia-Kenya border and assist with early warning response of conflicts. However, an inadequate supply of base radios, mistrust among the local communities, bias among field monitors, and outdated technology ultimately led to the project's failure. As of 2013 only two radios remained operational, but are rarely used (Mancini, 2013, 50; *Technology to Encourage Stability in Volatile East African Regions | USAID Impact*, 2011).

Regulations for Use of Border Technology

The only technology currently found at the Ethiopia-Kenya border are two-way frequency radios, which are highly outdated. This in addition to the isolated nature of the borderlands surrounding the Ethiopia-Kenya border and the inconsistent use of the radios has led to no regulations for this type of technology in either Ethiopia or Kenya.

International Involvement

Much of Ethiopia and Kenya's attention has been centered around promoting trade with a special focus on making Moyale "the Dubai of the eastern Africa." Nonetheless, both Ethiopia and Kenya recognize the impact that smuggling and conflicts along the Ethiopia-Kenya border have on trade, resulting in steps to mitigate these issues with the help of international actors. The following section highlights the most relevant examples of how the Ethiopia-Kenya border has been influenced by acts of international involvement.

United States Agency for International Development and the Intergovernmental Authority on Development

The East African division of the United States Agency for International Development (USAID) and the Intergovernmental Authority on Development (IGAD) played an integral role in securing border technology for the Ethiopia-Kenya border in the past despite that technology currently being underutilized today. When the two-way high frequency radios were first implemented, USAID also trained provincial officials and peace monitors on the radios' use and functionality through a two day workshop (Mancini, 2013; *Technology to Encourage Stability in Volatile East African Regions | USAID Impact*, 2011).

Protocol to The Treaty Establishing the African Economic Community Relating to Free Movement of Persons, Right of Residence and Right of Establishment (Free Movement Protocol)

Drafted by the African Union, this treaty permits citizens of member states to travel into other member states without the need for a visa, instead using an African passport. Kenya adopted the idea early allowing the citizens of several African Union member states to enter Kenya without a visa, even though the treaty has not yet been ratified by all states who signed (*Progress Report on the Free Movement of Persons in Africa*, 2019).

African Union Horn of Africa Initiative

The African Union Horn of Africa Initiative involves "core" Horn of Africa countries and their neighbors, like Ethiopia and Kenya, and invites them to promote a regular dialogue in aims to enhance cooperation and understanding with regard to smuggling in their regions. In

addition, there is a focus on enhancing border management practices as a means to solve aforementioned issues (*AU Horn of Africa Initiative - Khartoum Process*, 2016).

Broader Application of Border Technology

There are no instances of technology meant for security on the Ethiopia-Kenya border being applied to other parts of these countries. Because Ethiopia and Kenya have more important borders than the shared border between them, very little investment has gone into the security infrastructure and development of technology for the Ethiopia-Kenya border. There are, however, instances of border technology found predominantly at other borders, outside of this case study, being used in a broader application.

Recommendations

Currently, there is a lack of regulation regarding border security technology at the national level for this particular border. This is due to the extremely outdated and low level of technology overall at this border. In light of these findings, we recommend that the international community, and the governments of both Ethiopia and Kenya, take the following actions:

1. Continue to support peacemaking and conflict resolution actions within the borderlands and with the cooperation of non-state actors such as USAID and IGAD.
2. Ensure effective trans-boundary cooperation and coordination of cross-border initiatives, making sure to involve pastoralists and agro-pastoralists, in the decision-making process with regard to border security infrastructure and technology implementation.
3. Improve the capacity of local governments to monitor the border by funding the expansion and modernization of currently utilized border technology.

Chapter 4: Asia and Oceania

The India-Bangladesh Border

Introduction

Migrant workers and asylum seekers represent the main groups crossing the border from Bangladesh to India. Authorities at this border must also monitor the movement of goods, terrorist groups, and other transnational criminal organizations. In order to surveil this entrenched border, a number of technologies have been employed primarily on the Indian side of the border, along India's coasts. These technologies include drones, closed-circuit television, and night vision devices, among others. The use of these technologies at the India-Bangladesh border have presented numerous human rights concerns, which should be addressed by developing stronger national regulations surrounding the use of these technologies and by creating an independent international authority to monitor the use of border technology to ensure security and safety for all.

Table 10: Summary of Findings

Border Profile			
Level of Border Technology	Low (3)	**Technology**	Drones; Closed-Circuit Television; Night Vision Devices; Thermal Imaging; Surveillance Radars; Satellite Imagery; Underground and Underwater Sensors; Radio Trunk System; Radio Frequency Identification
Level of Biometric Data Collection	Moderately Invasive (11)	**Legislation for Biometric Data**	Yes
Automated Border Control	No	**Border Technology Exporter**	Yes
Private Companies Involved	DRDO; Hindustan Aeronautics Limited; Bharat Electronics Limited; SpearUAV; Paras Aerospace; Israel Aerospace Industries (IAI)	**Concerns Regarding the Use of Technology**	Lack of regulation; Lack of transparency

Background

The border that lies between the Republic of India and the People's Republic of Bangladesh consists of topographies that are difficult to control, including flat plains, riverine, swamps, hilly jungle areas, as well as densely populated areas on the border (Saddiki, 2016). The two countries share a border which is about 4,097 kilometers, the fifth longest border in the world.

After the partition of India in 1947 which broke the British India into two separate states of India and Pakistan, demarcation of boundaries between the two states became an important issue. The long border line, called Radcliffe Line, between India and East Pakistan was determined at the Radcliffe Award of 1947 followed by numerous border disputes. To settle the boundary disputes, a series of agreements and negotiations came across including the Bagge Awards of 1950 and the Nehru-Noon Agreement of 1958. The year of 1971 was an especially memorable year since East Pakistan successfully seceded from Pakistan, officially becoming an independent state called the People's Republic of Bangladesh. After three years, in 1974, the two countries again attempted to solve issues of border disputes through the India-Bangladesh Land Border Agreement 1974 (LBA). Despite these efforts, some borders remained disputed and continued to have over a hundred enclaves. In 2015, India and Bangladesh signed the 2015 LBA to solve remaining disputes that were discussed in 2011 protocol (Anant, 2017a; Jamwal, 2004).

Current Border Issues

At the India-Bangladesh border, the main forms of migration occurring are voluntary migration as well as forced migration which includes asylum seekers and trafficked humans. Migration from Bangladesh to India takes place due to political, social, economic, and even environmental reasons. More specifically, voluntary migration from Bangladesh to India is often taking place because people want to lift themselves out of poverty and be better off economically, which is nearly impossible in Bangladesh where economic stagnation continues (Das, 2016). On the other hand, some people are forced to move to India due to any threats of their lives such as observing a different religion and also because of human trafficking. Although border control technology cannot address the root causes of migration, it can have a hand in controlling issues such as smuggling and trafficking, terrorism, and corruption.

Smuggling and Human Trafficking

The border's topography that goes through populated villages and rivers helps smugglers as well as traffickers to do their businesses with ease. Smuggling of items such as livestock, food, and drugs takes place at enclaves and other disputed land. Particularly, enclaves are often conveniently used to smuggle a variety of items. There are over 100 Indian enclaves in

Bangladesh and about 50 Bangladeshi enclaves in India (Anant, 2017b), that some people from India and Bangladesh go through to avoid customs and other requirements (Jamwal, 2004). Human and cattle trafficking is also a problem at the border. Traffickers advertise jobs to lure women and children but then sell them for other uses, such as prostitution, which especially happens frequently in West Bengal state (Nagaraj, 2017).

To the problem of smuggling, the Indian government hoped for a resolution through the Customs Act, 1962. The act tries to oversee the movement of goods and it allows officers to seize and confiscate any smuggled goods. The government of Bangladesh also enacted the Special Power Act 1974. The law strongly prohibits smuggling and states if one is found guilty, they "shall be punishable with death, or with imprisonment for life, or with rigorous imprisonment for a term...and shall also be liable to fine" (*The Special Powers Act, 1974 | 25B. Penalty for Smuggling*, n.d.). Both the Indian and Bangladesh governments have also responded toward the problem of trafficking. India's Immoral Traffic Prevention Act, 1956, as well as other legislations that are relevant to trafficking such as Indian Penal Code, 1860 prohibits trafficking and traffickers will face imprisonment or fines. According to the review written by the United Nations Office on Drugs and Crime, "Bangladesh has had laws specifically on trafficking right from 1933" (UNODC, 2011). The Women and Children Repression Prevention Act, 2000 forbids human trafficking of women and children and can face punishment of death or life imprisonment if found guilty.

Despite their effort to address these issues, there still are remaining concerns. This is partly because of the continuing existence of many enclaves which make trafficking easier. Often women and children become victims of human trafficking in the process of finding jobs. Moreover, the law in India does not clearly distinguish between trafficking and prostitution. Clearer definitions should be stated in the Indian law to reinforce their rights even further.

Terrorism

The India-Bangladesh border is not only a political border but also an important religious boundary. While India is a largely Hindu-populated country, Bangladesh is predominantly Muslim. India perceives Bangladesh as threatening because they believe India is becoming a new hub for many terrorists and fundamentalist groups. Terrorist activities in India have been carried out by Muslim groups including Banga Sena and Harkat-ul-Jihad-al-islami, and Islamic State of Iraq-supported terrorist groups that are centered in Bangladesh. The possibility of terror and fundamentalist movements pose a great concern for India (Anant, 2017b).

The government of India especially has been concerned about terrorism and came up with legal framework to prevent it. The National Security Act, 1980 uses preventive detention to stop any possible terror that might take place. The Unlawful Activities (Prevention) Act, 1967 states that if one is found to be involved in any terrorist activities or organizations, they can be imprisoned. If a person has caused the death of someone, the government of India can punish

the person with death or imprisonment for life (Ministry of Home Affairs, 1967). The Bangladesh government also reacts harshly to terrorism-related matters. After the terror attack in 2016 in Dhaka, their anti-terrorism court punished seven people with the death penalty (*Terrorism in South Asia*, 2020). However, unending terrors in India and Bangladesh in the 2010s greatly threatens many lives in both countries.

Corruption and Lack of Transparency

While some undocumented immigrants are caught and put into jail, some people are not due to their personal connections. According to one defense lawyer, "the level of corruption in the networks between organized border businesses in cattle, drugs, the Border Security Force, and the politicians is massive" (Ghosh, 2019). Although the government of India is largely opposed to corruption, there seems to be little or no regulation at the border regarding corruption. The lack of transparency around corruption and lack of regulation to prevent it indicates that there lies the problem of unequal risk distribution and exploitation of vulnerable migrants that needs to be acknowledged and resolved.

Border Technology

To secure the India-Bangladesh border, India has been building barbed wire fences around the borders since 1986, over the extent of Phase I, II, and III which are the stages of a wire fencing at the border. However, many found building fences, their central border management strategy, as ineffective and, recently, the government of India has started to implement a variety of high-tech border management technologies such as the Comprehensive Integrated Border Management System (CIBMS) (*Ministry of Defence*, n.d.). CIBMS is an electronic security and surveillance system which the government of India initiated in 2018 for the border management. It is the "smart border" of India which aims to cover those areas where physical fences cannot be built, and to oversee the border to achieve the D4R2 (deter, detect, discriminate, delay, response, recover) principle along the border. The following is a comprehensive list of technology that has been installed at the India-Bangladesh border for the purpose of border security (FICCI & EY, 2019).

Drones

Israeli tethered drones, Israeli Searcher, and Heron drones are some of the technologies that are implemented at the India-Bangladesh border under the CIBMS. India turned to Israel for help with implementing new methods for its border security and for preventing any kinds of transnational crimes. The Border Security Force is actively using Israel-made tether drones which "uses a permanent physical link, in the form of a flexible wire or cable, to provide power and communications to a UAV" ("Tethered Drones, Tethered UAV Stations, Tethered Drone

Manufacturers," n.d.) and come with cameras that can take images during both day and night, within a scope of 2 kilometers from a height as high as 150 meters (Hasnat, 2019). India's Economic Times also states that 10 Heron TP-armed drones were bought in 2015, worth $400 million (Pubby & Bureau, 2018). Israeli Aerospace Industries-made drones were first introduced in 1999 at the Kargil War between India and Pakistan. Since then, Israeli drones have been used by India in its C4ISTAR roles (command, control, communications, computers, information/intelligence, surveillance, target acquisition, and reconnaissance) (FICCI & EY, 2019). These drones are an especially effective tool for India since they help people who monitor the border to get less disturbed by weather conditions such as wind and rain. This helps with the area that is hard to surveil due to its particular topography of the border area. Another important reason that drones are regularly being used is that smugglers and traffickers can see the tether drones which let them know that they are being watched and therefore pressures them to not do such things (Karmakar, 2019).

A Indian-made drone called Rustom 2 UAV is "a medium-altitude long-endurance unmanned aerial vehicle that can carry different combinations of payloads like synthetic aperture radar, electronic intelligence systems, and situational awareness payloads" (*Ministry of Defence*, n.d.). Rustom 2 UAV was successfully tested in 2018.

Closed-Circuit Television (CCTV)

CCTV is one of the technologies being employed at the border under the CIBMS, initiated in 2018. It helps to detect people who are crossing the border more easily, without getting interrupted by topography that is challenging to surveil.

Night Vision Devices (NVDs)

NVDs are also under CIBMS. Night Vision Devices "form the second layer in the security architecture frame" and they help to view the border at night which is hard to see due to lack of light (FICCI & PwC India, 2016).

Thermal Imaging

Along with the NVDs, thermal imaging is one of the technologies on the second layer of CIBMS. It detects people without being interrupted by the lack of lights or by the weather conditions (FICCI & PwC India, 2016).

Surveillance Radars

Surveillance radars form the third layer of the system. They are used to observe long distances. Specifically, "these tracks will be capable of tracking any suspicious movement up to

40 km" (FICCI & PwC India, 2016) and send 120 degree views of the border to the control room or command center and alert those who are trying to detect any infiltration (Jotheeswaran et al., 2018). When they get information about any possible infiltration, cameras automatically capture images. According to the Smart Border Management report, these radars are unique because they "cover both sides of the border which will help in detecting [criminals] who support infiltration from Indian soil" (FICCI & PwC India, 2016).

Underground and Underwater Monitoring Sensors

Underground and underwater monitoring sensors form the fifth layer of CIBMS, using sonar cameras and electro-optic sensors to detect any movement of animals and people whether it is through land or water (Bhardwaj, 2018). Underground and underwater monitoring sensors detect any movements by "detect[ing] vibration and heat from the human body" which will "raise an alarm with the security personnel for their action" (FICCI & PwC India, 2016). Data collected through these devices is shared with intelligence and security forces.

Satellite Imagery

Satellite imagery helps border security teams to get a good sense of the topography around the border, providing information that is essential for planning operations (*Isro: ISRO to Launch Exclusive Satellite to Help MHA in Securing Pak, Bangladesh Borders - The Economic Times*, 2019).

Radio Trunk System

The Radio Trunk System is a wireless two-way communication system that is improving communication systems for border management. It is used to increase efficiency for surveillance as well as for communication at the border (FICCI & EY, 2019).

Radio Frequency Identification (RFID)

Radio frequency identification is the system that involves two parts which are tags and its readers. It is used to "track the movement of their containers through Logistic Databank Portal and a mobile application named NICDC-LDB." It is currently implemented at the Integrated Check-Points at the Agartala and Petrapole India-Bangladesh borders (*NICDC Logistics Data Services Extends Its Services to Nepal and Bangladesh*, 2020).

Regulations for Use of Border Technology

As drones are increasingly becoming popular not only for border security but for civilian uses, the Indian Ministry of Civil Aviation (MoCA) came up with a series of regulations regarding

the use of drones. For example, to use drones, one has to obtain a Unique Identification Number (UIN) from the Ministry of Home Affairs and keep away drones from the "No Drone Zones" such as areas around international borders and airports (*Government Announces Regulations for Drones*, n.d.). New rules in 2020 have noted that the MoCA "has been given the power to exempt any [unmanned aerial system] or...any person..., either wholly or partially, subject to such conditions, if any, as may be specified by the Central Government in a written general or special order" (Prakhar et al., 2020). The Indian government has also banned the use of satellite imagery unless they are approved by the Indian government ("India to Ban Unofficial Maps and Satellite Photos," 2016). However, other than regulations regarding drones and satellite imagery, there are no regulations in place in India and Bangladesh regarding the use of technologies utilized at border crossings.

International Involvement

Instances of international cooperation for border security have been significantly expanding in India. The following section highlights the most relevant examples of how the India-Bangladesh border has been influenced by acts of international involvement.

Association of Southeast Asian Nations (ASEAN)

ASEAN Ministerial Meeting on Transnational Crime (AMMTC), established in 1997, is the international convention specifically against trafficking in persons and terrorism. To discuss such problems and ways to solve them, the member states, including India, meet annually (*ASEAN Ministerial Meeting on Transnational Crime (AMMTC)*, n.d.).

Bali Process

Bali process is the international forum among 45 member states and four international organizations (including the UNHCR) that aims to deal with the problem of human smuggling, trafficking, and other transnational crimes. The meetings exclusively talk about the policies, information sharing, and other possible cooperation options to prevent transnational crimes (*Bali Process*, n.d.).

Memorandum of Understanding between Israel Aerospace Industries (IAI) and Indian companies

On February 5th, 2020, Israel Aerospace Industries (IAI) and Indian companies Hindustan Aeronautics (HAL) and Dynametic Technologies, signed a memorandum of understanding (MoU) regarding the production of drones (Waldron, 2020). Israel company SpearUAV and Indian company Paras Aerospace signed a MoU to start the implementation of Ninox 40 drone system (Press Trust of India, 2021). In addition to that, IAI also signed a MoU with another Indian company, Bharat Electronics Limited, "for technical and maintenance

support for India's air defense systems'' (Frantzman, 2020). India has been the main buyer of Israel's defense technologies and the bilateral relationship between two countries is getting stronger.

Basic Exchange and Cooperation Agreement (BECA) between India and the US

In October 2020, the U.S. National Geospatial-Intelligence Agency and Indian Ministry of Defense decided to cooperate to improve their security systems. With this agreement, they "will now share high-end military technology, geospatial maps and classified satellite data between their militaries," sharing not only technologies but also information (Siddiqui, 2020).

Broader Application of Border Technology

In India, some of the border technologies are being used in other areas as well. The Radio Trunk System is used for many government entities including police and fire departments. Its advantages in increasing communication efficiency have caused it to be used for many other entities that require quick communication. Drones are becoming increasingly accessible to civilians and corporations. Civilians started to use drones built for recreational purposes, and corporations seek to use drones for developmental purposes. Drones help various corporations such as ports and powerplants through aerial mapping and by monitoring infrastructures. Because drones make surveillance and monitoring processes much quicker and collect data easily, they are seen as a method that gives many advantages to organizations (Krishna, 2018). Although drones help to improve border security, there are concerns of them being used by criminals. According to the report written by FICCI, "malicious entities can use drones to survey and conduct reconnaissance of sensitive installations along [the] border." The report also testifies some instances where they have seen hostile drones flying around the border. At worst, drones can possibly be used to attack people and infrastructure in the border region. Another concern regarding the drone usage is that they are being used for smuggling items such as drugs and weapons as well as "dropping prohibited items in sensitive areas," which did happen recently according to the report (FICCI & EY, 2019). Lastly, drones also have triggered privacy concerns as using them "presents a far more complicated issue considering that advancements in both sound recording and data capture enable a drone to be used for far more invasive snooping," as they are small and can easily record sound of normal conversations (Rajagopalan & Krishna, 2018).

Recommendations

Currently, there is a lack of regulation regarding border security technology at the national level**.** The concerns and risks associated with the current border enforcement strategy, especially shoot-on-sight policy and drones, illustrates the pressing need for a policy response.

In light of these concerns, we recommend that the government of India to take the following actions:

1. Increase transparency with the process of deportation to prevent corruption as well as any possible discrimination against a specific group of people.
2. Increase transparency with India's use of border technologies and its regulations.
3. Join the Convention Relating to the Status of Refugees and draft a national refugee law.

The Hong Kong-China Border

Introduction

Migrant workers, leisure and business travelers, and permanent re-settlers are the main groups crossing the border from Mainland China into Hong Kong. Authorities at this border must also monitor the movement of parallel trading and children of non-citizens. In order to surveil one of the busiest borders in the world, a number of technologies have been employed by both governments. These technologies include biometrics, closed-circuit television, and the automated passenger clearance system, among others. The use of these technologies in the Hong Kong-China border region have presented numerous concerns regarding human rights and the erosion of democratic values, which should be addressed by drafting decisive legal frameworks on the international level to protect the basic human rights of those who cross the border and establishing an international security standard for border security technologies to ensure security and safety for all.

Table 11: Summary of Findings

Border Profile			
Level of Border Technology	High (6)	**Technology**	Cooperative Data Sharing; Biometrics; Automated Border Controls; Closed-Circuit Television; Geofencing; Single E-lock Scheme
Level of Biometric Data Collection	Highly Invasive (2)	**Legislation for Biometric Data**	Hong Kong: Yes China: No
Automated Border Control	Yes	**Border Technology Exporter**	Yes
Private Companies Involved	Intellifusion; Megvii (Face++); Shenzhen CIMC; iOmniscient	**Concerns Regarding the Use of Technology**	Data privacy; Data control; Illicit use of technology; Lack of regulation; Lack of transparency

Background

The Hong Kong Special Administrative Region (Hong Kong SAR) of the People's Republic of China (PRC) is commonly recognized as one of the world's financial centers. Hong Kong has not only served as China's connection to the international world, but it has also acted as a landing point for many Western companies. Unlike Mainland China's single-party state, Hong Kong has a democratic political system that includes a high degree of autonomy from the Chinese government. This One Country, Two Systems model has been in place since 1997, and should remain unchanged for the next 50 years, as promised by the Chinese Communist Party, when it was returned to China from the United Kingdom. Hong Kong and Mainland China are now separated by a border of mountains, hills, and rivers that is around 107 kilometers long (Zhou, 2010).

Hong Kong was ceded to the British Empire from the Qing Empire after their defeat in the First and Second Opium Wars. After all three regions of Hong Kong, including Hong Kong Island, Kowloon Peninsula, and New Territories, were taken over by the British Empire in 1983, both sides agreed upon a lease for 99 years over Hong Kong (Sham, n.d.). This dramatically deviated Hong Kong's path compared to other areas of China as the British developed Hong Kong as a port and connection between its different colonies.

Today, the border between Mainland China and Hong Kong is still regulated and administered by different authorities and travelers need to pass through immigration controls. Chinese citizens from the Mainland do not have the right to abode in Hong Kong, and they are subject to obtaining a work permit and visa similar to foreign citizens. Chinese citizens and Hong Kong citizens do not use their regular passports when crossing the Hong Kong-Mainland China border, instead, the Exit-Entry Permit for Traveling to and from Hong Kong and Macao and the Mainland Travel Permit for Hong Kong and Macao Residents are the required identifications.

The border between Hong Kong and Mainland China experienced several waves of unauthorized immigration during British rule, and due to the special status that Hong Kong holds, special measures have been put in place post-1997, such as prohibiting the development of areas close to the border, including the Frontier Closed Area. After 1997, the number of border crossings have rapidly increased, with more roads and bridges constructed to close the gap between the two areas. Today, there are a total of 15 crossings that are available to public uses, including railroads, roads, and airport control points. However, there are more than 24 road connections between the two areas at this point, while some are limited from civilians.

Current Border Issues

At the Hong Kong-Mainland China border, the main forms of migration occurring are for travel, business, and permanent relocation. Hong Kong is one of the financial centers and trade hubs in the world, favored by investors due to its low taxes and stable currency. After being

returned to China in 1997, Hong Kong has become more interconnected with Mainland China, leading to more travelers moving between the two areas, making it one of the busiest borders in the world. Although border control technology cannot address the root causes of migration, it can have a hand in controlling issues such as parallel trading, increasing numbers of children of non-citizens, and mainlandization projects.

Parallel Trading

Due to the fact that Hong Kong operates as a free port, many of the taxes and duties that are present in Mainland China do not apply in Hong Kong. This makes the prices of goods and products sold in Hong Kong attractive to Chinese consumers from the Mainland, while products made or imported from Hong Kong are viewed as better quality compared to the large number of counterfeit products in Mainland China. Visitors from Mainland China often acquire entry permits and attempt to make a profit by illegally importing goods from Hong Kong in the name of personal use. However, this has led to instability in the local market in Hong Kong, as goods demanded by the Chinese consumers are often bought and exported, leaving the local residents with a shortage of certain goods, such as infant milk powders. According to local media, this has also led to the increase in the cost of living in Hong Kong, through inflation and the increase in rents for businesses (A. Shen, 2018). The increase in parallel trades has also crowded many border crossings which has led to more border inspections of traveler's luggage and operations that are targeting parallel traders.

Children of Non-Citizens

Hong Kong's education, social welfare, and medical system are usually considered better than the system in Mainland China, and many from Mainland China aspire to the number of opportunities that are available in Hong Kong. However, citizens from Mainland China do not have the right of abode in Hong Kong, and this has led to many parents attempting to give birth in Hong Kong. By giving birth to their children in Hong Kong, the children are entitled to the right of abode and gain access to Hong Kong's education and medical system. Although there are yearly quotas that are open for reservations for pregnant women to give birth in Hong Kong, as it is very competitive, it has led to more attempts to give birth without authorization. Many of the pregnant travelers choose to hide their pregnancy when passing through immigration control, and this has led to the shortage of medical resources across Hong Kong (Tseng, 2016).

Mainlandization and Integration Projects

In recent years, security measures have been continuously strengthened at the Hong Kong-China border, many of which were in the name of national security but were made with

political motivations. Although Hong Kong's government holds a certain degree of autonomy, the Chinese Communist Party's influence has reached an unprecedented level. The Chinese government has been trying to reduce the percentage of the population that upholds the Hong Kong identity, which aligns more strongly with Western and democratic values. Measures have been taken across different areas of life, such as the increasing number of pro-China media (Torode, 2020), increasing control over education (Wu, 2020), modification to the judicial system (Hernández, 2020), and control over business investors.

According to statistics from the Hong Kong Government, 63,000 people from Mainland China settle in Hong Kong every year by acquiring permanent resident rights through the "One-Way Permit Scheme'' that was supposed to be used for family unification, but the Hong Kong government has no control over who acquires such documents (Kong, 2017). An individual can become a Hong Kong citizen after seven years. Over time these new citizens may tilt election outcomes to favor pro-China or pro-Unification political candidates.

There has also been an increase in large-scale infrastructure projects along the borders of Hong Kong and China. The Hong Kong-Macau-Zhuhai bridge and the express rail link that connects Hong Kong railways to the Mainland are two examples. These transportation links are intended to close the gap between the two areas, as the railway linkage would also allow Mainland immigration authorities to operate in the station that is in Hong Kong. The transportation and development projects could be interpreted as contributing to the Chinese government's effort to slowly turn Hong Kong into one of its cities.

Additionally, Chinese authorities have been illegally operating in Hong Kong, capturing and abducting dissidents, activists, protesters from Hong Kong and secretly transferring them over the border (Siu et al., 2016). Buildings that belong to Chinese authorities and the Chinese army have been illegally occupying areas within Hong Kong, such as the illegal occupation of 20,000 square meters of land in Sha Tau Kok by the Chinese Border Defense Force, now known as China Immigration Inspection (Xian, 2018).

Border Technology

With the vast number of travelers passing through the border between Hong Kong and Mainland China, technology has been installed in order for authorities to process and control the border crossing. The following is a comprehensive list of technology that has been implemented at the Hong Kong-Mainland China border for security purposes.

Cooperative Data Sharing

The Hong Kong Immigration Department uses database systems in storing and processing data and information collected through border control, including the Entry / Exit Processing and Records System (EXPRESS), Application and Investigation Easy System (APPLIES), Electronic Records Programme (ERP), and iPermit for Taiwan Residents. China uses the Skynet

and the Social Credit System in collecting and processing the vast amount of data collected in enhancing its border security and conducting mass surveillance in China (X. Shen, 2018).

Biometrics

Facial recognition technology (FRT) is commonly used at border checkpoints to control the flow and movement of people. Authorities have implemented FRT in both Hong Kong and China, which enables them to cross-check data across different databases and watch lists (*Chinese Authorities Implement Face Scanning at Hong Kong Border*, 2018). It has been argued that even if you do not voluntarily register and use the automated immigration system, facial recognition software could be continuously searching and acquiring data. For example, drivers between Hong Kong and China through a highway would receive a warning through the central command if the facial recognition system detects they are yawning (T. Li, 2018). In other cases, citizens may be forced to give up their biometric data in exchange for the right to travel. This is seen in the newly built Hong Kong-Zhuhai-Macau bridge, where authorities are testing a system provided by Intellifusion that uses a combination of fingerprints, facial recognition, and thermal imaging. In the future, it is attempting to eliminate the need for travelers to carry a permit and identification with them. However, this would require drivers to pre-register their information and biometric data with the Chinese authorities.

Automated Border Controls

Most travelers crossing between Hong Kong and Mainland China hold a card version of permits, allowing travelers to enter and leave Hong Kong by using the Automated Passenger Clearance System (e-Channel). This requires biometric data to be collected, including facial images, fingerprints, and basic personal information. The Hong Kong International Airport, which is responsible for operating most of the e-Channels, claims that the directly identifiable data is deleted after seven days, while other data is retained for statistical, analytical, and research purposes, and may be transferred to the Hong Kong government as well as necessary third parties (*E-Security Gates and e-Boarding Gates Collection of Personal Data*, n.d.).

Closed-Circuit Television (CCTV)

For facial recognition systems to operate smoothly, large-scale CCTV is installed throughout China, as well as at the borders with Hong Kong. There has been an increased number of CCTV being installed in Hong Kong during recent years. However, having large amounts of CCTV installed across the city may be an increasing threat to citizen's privacy. According to a press report, more than 1,000 cameras are installed at border control points by the Hong Kong Immigration Department, and this number excludes cameras installed by other authorities such as the Customs and Excise Department, and the Hong Kong Police Force. It is

expected that the number of CCTVs placed by Chinese authorities at border checkpoints would be easily beyond this number (Lam, 2014). In 2009 the Guangdong Border Defense Force installed electronic monitoring systems and infrared alarm equipment and reached an agreement with Hong Kong's government in co-sharing the monitoring cameras set up by the Hong Kong Immigration Department at the border (N. Li, 2008).

Health Declaration Systems and Geofencing

In 2020, the world was severely affected by the outbreak of COVID-19, and Hong Kong was not excluded from the global pandemic. For Hong Kong to preserve an operational medical system, an overall increase and escalation of border security measures was required. However, Hong Kong and China are economically and socially interconnected, making it impossible for a complete border closure. For travel to resume as soon as possible, the Hong Kong government and Chinese authorities introduced a Health QR Code system to remove the travel barriers. The Health QR Code system operates by combining information from the users as well as big data from the government's databases in measuring if you have been exposed or in contact with someone carrying the virus (Hsu, 2020). This system has been implemented in most areas within Mainland China, so by launching a Hong Kong version it would be able to connect itself with the rest of the system. However, many Hong Kong citizens are concerned that their private data and information be transferred to Chinese authorities, and they would need to surrender their privacy in exchange for a "green code" that allows them to pass through control points.

The Hong Kong government also started mandating a 14-day quarantine for people returning from overseas and Mainland China. To enforce the quarantine period, they extended border technologies into private houses by creating improved versions of geofencing systems. Geofencing systems use location-based data such as GPS, RFID, Wi-Fi, and cell phone signals in setting up a virtual boundary that monitors if a specific device, item, or phone number is within that geographic area (White, 2017). Travelers are required to download a smartphone application that tracks their GPS location and wear a Bluetooth-enabled wristband to ensure that they remain in their shelter for 14 days (Liu & Bennett, 2020). If either the phone is turned off, away from the wristband, or the wristband is taken off, authorities are notified right away.

Single E-lock Scheme (SELS)

Hong Kong is an important port for China, where goods are frequently imported and exported between the two areas. In order to prevent tax evasion, under-the-table markets, and safeguard traded products, the Hong Kong Customs and Excise Department launched the Single E-lock Scheme (SELS) in 2016 to reduce the time needed for cargo shipments to clear customs. This enables cargo goods to be directly imported and exported from Mainland China through the Port of Hong Kong, or goods can simply travel through Hong Kong to be only checked once

at the beginning point and the ending point. The electronic lock records the GPS activity of the cargo and any irregularities, and if no irregularity is found it automatically opens at the exit point. In short, this prevents goods being smuggled in or out of Hong Kong.

Regulations for Use of Border Technology

There are no specific laws that regulate technology being used at the border for Hong Kong and China. While China's surveillance technology has rapidly increased in recent years, it does not have laws in regulating the use of such technologies, enabling cameras to be placed anywhere by authorities (Moranto, 2020). In most cases, the usage of such technologies is directly embedded or amended within the border security and immigration control laws.

International Involvement

The following section highlights the most relevant examples of how the Hong Kong-Mainland China border has been influenced by acts of international involvement.

Framework Agreement on Hong Kong/Guangdong Cooperation

This framework facilitates the cooperation between authorities in Guangdong Province, China, and Hong Kong. Although topics covered by this framework range from socio-economic development, financial services, industries development, and environmental protection, it eventually leads to the development of the Great Bay Area for cities in the Pearl River Delta. In this framework, there is a special task force on facilitating movement of people, goods, information and capital between the two areas. This ranges from building international aviation, shipping, and logistics hubs, to improving immigration control and strengthening border security. Examples include the sharing of CCTV feeds and establishing direct communication channels at border crossings (*Hong Kong and Guangdong Implement 2020 Work Plan of Framework Co-Operation Agreement*, n.d.).

Belt and Road Initiative (BRI)

The Belt and Road initiative is a program launched by China in connecting Asia, Africa and Europe via land and sea routes, which aims to improve regional integration, increase trade, and countries economic growth. Most of the projects are funded through governmental loans from China, making China a creditor for many of the developing countries that are unable to afford large scale infrastructure projects, and surveillance technology (Mozur et al., 2019). China has been using the Digital Silk Road under the BRI as an opportunity in exporting its technology for artificial intelligence and surveillance, particularly from Huawei, Hikvision, Dahua, and ZTE. Many experts have raised concern in the data collected by such technologies, as it may be transferred back to China (Kharpal, 2019). Today, more than 36 countries out of

the 138 participating countries in the BRI have installed surveillance systems made by Chinese companies including, Zimbabwe, Uzbekistan, Pakistan, Kenya, the United Arab Emirates, and Germany.

Broader Application of Border Technology

Hong Kong Police Force has been equipped with facial recognition technology at least since 2015, and although it claims that this technology is only used for matching facial images with criminal databases, it is often debated if it has been used in targeting pro-democracy protesters (Schmidt, 2019). In fact, FRT has been increasingly used in different industries, areas, and services across Hong Kong. For example, banks in Hong Kong have collected customers' facial images when opening an account, enabling customers to use ATMs without having to carry their bank cards. In addition to facial recognition being used for commercial transactions and purposes, the Hong Kong government has also been planning to introduce a new electronic identity system that aims to increase the efficiency of public services. However, this would require the Hong Kong government to collect vast amounts of personal biometric data, while its citizens are concerned about having their data being turned over to the Chinese government. At the same time, the Hong Kong government has also been increasing its installation of CCTV across the city, and especially at governmental buildings and service centers. In fact, concerns have also been raised by citizens over other city infrastructure being installed, such as the Smart Lamp Post, afraid of its ability to track individuals across the city with facial recognition technology (Doffman, 2019). Up until this point, the Hong Kong government has only clarified that the Smart Lamp Post does not embed facial recognition technology but has not provided responses towards the usage of facial recognition in the overall government.

On the other hand, China is well known for its mass surveillance program over its country and citizens, and in recent years the Chinese government is attempting to enforce a full-scale social credit system that would either award or punish each citizen based on their actions in their daily life. This would require a large amount of CCTV surveillance as well as facial recognition systems that would be able to capture facial images and identify individuals. For example, in Shenzhen, local police would display the faces of people jaywalking on large LED screens on roads, and even send text messages to their cell phones warning them of their presence (Xu & Xiao, 2018). Police in first-tier cities like Beijing are starting to equip the first 360-degree body camera that has facial recognition technology embedded.

In fact, Chinese border authorities have been accused of secretly installing applications onto traveler’s phones when crossing specific borders, such as the Irkeshtam border between Kyrgyzstan and the Xinjiang region, which is one of the most surveilled borders where Muslim groups have been closely monitored and controlled by the Chinese governments in the name of national security. However, it has been reported that Chinese border authorities have illegally installed applications onto traveler’s phones without telling them, and this enables them to

track their movements, read messages and information sent to the phone, and intercept calls (Luana Pascu, 2019). Chinese border authorities have plans to prioritize its 5G infrastructure at its borders, especially the checkpoint at Yunfeng Reservoir that separates it from North Korea. The 5G infrastructure is aiming to provide the use of virtual reality and augmented reality glasses for border security troops, with a better ability to update information, drone images, night vision, and track potential movements along the border (Chan, 2019).

Recommendations

Currently, there is a lack of regulation regarding border security technology at the national level in both China and Hong Kong, and at the international level, and this may pose a significant risk in how the technology is designed, produced, and deployed. At the same time, the data that is collected by such technologies is threatened. By regulating border security technologies, it would minimize the potential harm and risk that they may pose to citizens. In addition, the lack of legal structure and support may also create potential opportunities for authorities to over-step their jurisdictions. In light of these concerns, we recommend that authorities in China and Hong Kong, along with the international community, should take the following actions:

1. Urge the international community to establish a security standard for facial recognition technology, artificial intelligence, and the use of IoT devices, in order to ensure a level of security and safety all.
2. Encourage nation states to use collected data appropriately and respect the privacy of all travelers passing through.
3. Draw attention to related issues and offer alternative technologies that would protect the users.
4. Condemn nation states that are unwilling to disclose the collection and use of private information.
5. Reaffirm the international community in supporting democratic values and principles.

The Indonesia-Malaysia Border

Introduction

Migrant workers, wholesalers, and local villagers are the main groups crossing the border between Indonesia and Malaysia. Authorities at this border must also monitor contraband goods and the expansion of palm oil plantations. For authorities to surveil the Borneo border that is characterized by extreme natural topography, both governments have employed a number of technologies. These technologies include automated border controls, drone surveillance, and geospatial imaging. The use of these technologies in the Indonesia-Malaysia border has presented concerns regarding humanitarian, legal framework, and human resources, which should be addressed by developing stronger national regulations surrounding the use of these technologies and promoting increased information sharing between Indonesia and Malaysia border authorities to ensure security and safety.

Table 12: Summary of Findings

Border Profile			
Level of Border Technology	Medium (5)	**Technology**	Automated Border Controls; Drones; Geospatial Imaging
Level of Biometric Data Collection	Highly Invasive (7)	**Legislation for Biometric Data**	No
Automated Border Control	Yes	**Border Technology Exporter**	No
Private Companies Involved	Societe Internationale de Telecommunications Aeronautiqiues (SITA); Boeing Company; Dirgantara Corporation	**Concerns Regarding the Use of Technology**	Data privacy; Lack of regulation

Background

From the Cape of Sebatik in the west, through the inland plateaus, and to the Sulawesi Sea in the east, the 2,019-kilometer international border splits the island of Borneo. The history of a nation-state border between the Republic of Indonesia and the Federation of Malaysia can be traced back to Western colonialism starting in the 15th century through the end of World

War II. European nations in Southeast Asia scrambled to establish hegemony over what was known as the Nusantara archipelago. In the Anglo-Dutch Treaties of 1824, the British and the Dutch agreed to chart a territorial division in the region, with the British East India Company occupying the Malay Peninsula, while Dutch East India Company ruled over Indonesia archipelago (Hall, 2016). It was not until the end of World War II when both countries gained their sovereignty, with the 1945 Indonesia's Independence Proclamation and British acknowledgment of Malaya Federation in 1957 (Adas et al., 2009).

In 1998, the infamous territorial dispute between Indonesia and Malaysia came before the International Court of Justice. In the proceedings, both parties contested the territorial claim of Sipadan and Ligitan Islands, two small islands on the Southeastern coast of Borneo. The case's significance lies in the usage of *no man's land* or *terra nullius*—the legal doctrine that provides that some territorial area has no initial owner; thus, the justification of claims in such land status may be acquired by occupation (*Case concerning sovereignty over Pulau Ligitan and Pulau Sipadan (Indonesia/Malaysia)*, 2002). Additionally, Borneo island is characterized by deep forests and tall mountains, a natural topography that further jeopardizes border security. The absence of robust surveillance strips the capability of countries to exert their jurisdiction. Without law enforcement, transnational criminal activities began to prosper (Passas, 2017).

Current Border Issues

At the Indonesia-Malaysia border, migration can be divided into two types; the influx of human migration moving into Malaysia; and the influx of goods moving into Indonesia. Many villages are located in the two countries' cross-sections, and trespassing borderline has become a daily routine for locals living near the border. Although border security technology cannot address the root causes of migration, it can have a hand in controlling issues such as contraband smuggling and trade.

Porous Border

In a report published by the Malaysian Immigration Authority, there are approximately 2.5-3 million unauthorized foreign workers from Indonesia in Malaysia. A significant portion of the unauthorized worker population enters through unauthorized crossing points on the Borneo border (Canlas, 2020). In a private interview, Robert Simbolon, an Indonesian Border Administration officer, stated that in 2020 alone, a joint mission with the Indonesian armed force uncovered 29 unauthorized crossing points along the Western Borneo (R. Simbolon, personal communication, February 2, 2021). Indonesian Minister of Home Affairs Tito Karnavian acknowledges the issue of the ill-defined border, stating that "there has never been a clear and lawful borderline in that [Borneo] Island" (Nugraheny, 2020). Field research by the University of Gajah Mada found that throughout the vast borderline, the only existing border markers are objects like rocks, signboards, and wooden planks that were built in the 1970s.

Since then, the border markers have never been restored nor fixed, with field researchers describing the physical condition of these signs as "vulnerable to damages" and "easily moved by any irresponsible parties" (Rizki & Merdekawati, 2018). Locals still rely heavily on physical borders such as stakes, fences, and rivers as defining points to understand their areas.

In addition, the constant proliferation of palm oil fields has generated grey areas regarding territorial division along the borderline (Henley, 2011). In an anonymous interview, a plantation owner admitted that he deliberately expanded his ownership area by planting crops outside his property year by year (*Palm Oil Plantation in Borneo Island*, February 5, 2021). Furthermore, corrupt officials have been accepting bribes to "rewrite" land certificates and expand plantation property areas. Plantations' illegal expansion pass through the already ill-defined borderline, making it seem that one country has annexed the other's territory.

Human Trafficking

With lack of surveillance, the ambiguous rule of law, and corruptible officers, traffickers can easily use fake identities to traffic people between countries - whether to sell them for prostitution or to establish an illegal worker market. According to an annual database owned by the Malaysian State Department, human trafficking has experienced an exponential growth trend, with a spike from 121 cases in 2011 to 429 in 2017 (Naim, 2011). These statistics are still widely disputed by think tanks, as they only incorporate official cases. Sydney Jones, the Director of Human Rights Resources Center, claims that her organization has evidence of up to 5,000 undetected human trafficking cases occurring on the border each year (Jones, 2007).

Contraband Trade

The poorly regulated border transforms into a gateway of contraband trade to both countries. Experts have estimated that the value of drug trade between the two countries has reached approximately $5 million. The condition is facilitated with syndicates of drug dealers across both countries that cover the distribution and supply chain of drugs. Drug dealers try to circumvent border checkpoints and instead embark on an "adventure" by climbing hills and digging tunnels. In early 2020, the Indonesian National Narcotics Agencies seized 70 kilograms of crystal meth, which was about to be distributed across the border. In many cases, drugs are packaged as a regular commodity, such as tea boxes and coffee beans, and then stored in villager's houses to prevent suspicion from authority (R. Simbolon, February 2, 2021). Smugglers have also tried to use these unauthorized crossing stations to evade customs taxes. Border patrol has seized commodities such as lumber, medicines, household supplies, and even protected species of animals and plants. Gak Mulyadi, the Chief of Tembawang Village in West Borneo, Indonesia, also explains how people use Malaysian ringgit currency in market transactions. Holding onto ringgit is considerably more convenient because Indonesian locals

often transact with Malaysian wholesalers. While the purchases are supposed to be accounted for as international transactions, neither the villagers nor foreign wholesalers pay any customs taxes due to lack of supervision (G. Mulyadi, March 2, 2021).

Border Technology

Experts have been proposing the use of technology in the Borneo border as an "unlocked potential" to tackle the border problems (Das et al., 2016). The following is a comprehensive list of technology that has been installed at the Indonesia- Malaysia border.

Automated Border Controls

In 2007, the Indonesian Directorate General of Immigration signed a joint agreement with the *Societe Internationale de Telecommunications Aeronautiqiues* (SITA) to engineer an automated border control that can be used across entry ports and customs (Gold, 2010). They called the innovation Autogates—a smart gate system used to perform immigration checks in the border area. The system is made up of the Internet of Things (IoT) devices, in which biometric identification is collected of a subject who arrives and departs the country and is integrated with existing information databases such as the Department of Immigration's SIMKIM (Immigration Information System and Management) and the INTERPOL's missing and wanted list. Autogates also verify scanned travel-essential papers and cross-examine them with the reported list of stolen and lost documents (Putra & Arifin, 2020). Data synchronization plays a pivotal role here by pulling out information about potential individuals who may threaten both countries.

Autogates review the immigration clearance process based on their predetermined algorithm. The technology itself minimizes interaction between immigration officers and the subject. Since the technology reduces human influences in the law-enforcement process, deals like bribery and corruption can further be curtailed. It is much harder for unlawful passengers with criminal track records to waltz their way through the border in a digitalized scenario. On a trial basis, a joint task force in September 2019 led by INTERPOL carried out more than 266,000 checks against their criminal databases. The system has identified another 30 people related to human and commodity smuggling; all of which were further investigated by law enforcement (Interpol, 2019). However, without proper data synchronization, the Autogates system is prone to make inaccurate decisions and the governance of sharing information between countries has not gone well. In many cases, both the government of Indonesia, Malaysia, and international organizations refuse to be transparent due to concerns over national security and distrust. Data sharing is still seen as a zero-sum game in which releasing information is perceived by the other party as exposing their weakness and secrets (Salzberg, 2020).

Drones

The geographical challenges of the border have resulted in efforts to use drones for surveillance. In a 2018 MoU, Indonesia and Malaysia agreed to use ScanEagle drones to perform border patrol, focusing on areas where human surveillance is not possible. Boeing-produced ScanEagle drones enhance remote sensing by using GPS and infrared sensors to blast through rough terrains. The drone works by capturing images and sensing any movement of the land beneath it. They then send live footage to border patrol officers in main posts and notify nearby field officers of any shady activities (*Boeing: Autonomous Systems - ScanEagle*, 2020). According to data posted by the Indonesian National Narcotics Agency and Border Patrol, the drones have delivered a remarkable result in their debut year, tanking schemes to smuggle an aggregate of 15 kilograms of crystal meth across the Indonesia-Malaysia border.

In the long run, Indonesia's state-owned aviation company, Dirgantara Corp., has sought to explore the drone markets. The brand new BlackEagle drone prototype was launched in 2020, equipped with synthetic aperture radar (SAR), enabling it to navigate bad weather and detect movements. In a private interview, Elfien Goentoro, CEO of Dirgantara Corp, explained that drones promote safer and more efficient surveillance modes, minimizing casualties during operations and apprehensions (E. Goentoro, February 2, 2021). Meanwhile, in an interview with Nikkei Asia, Surina Shukri, CEO of the Malaysia Digital Economic Corporation, presented the concept of "drone-hub" as a long-term objective for the country to boost investments, expand testing, and draft regulations for the technology adoption (Kumar, 2019).

Regardless, University of Indonesia International Law Professor Hikmahanto Juwana explains that most of the evidence obtained from drones are actually inadmissible in courts under the Indonesian and Malaysian legal systems. The problem generates concern regarding the legitimacy of drones' operation. While lawyers can certainly argue to dismiss the case due to the lack of legal standing of drones, materials from the drone can still be used by prosecutors to pressure suspects into incriminating themselves. Professor Juwana emphasizes the need for criminal justice reform to accommodate the technological framework (Welle, 2019).

Geospatial Imaging

Scientists emphasize geospatial imaging as the primary tool to refine inaccurate field data. Both countries' State Departments possess a Geographical Information System (GIS), a computer-based framework that aggregates data from mapping and surveying. The GIS database provides users with sophisticated imagery of the landscape they wish to examine. GIS relies heavily on the mapping and surveying profession, in which field workers strenuously work to collect as much data as possible (Wegen, 2021). The problem emerges because the dense forests and tall mountains of the border create a treacherous terrain to work in.

Engineers from Bandung Agricultural University have created a prototype of autonomous robot monitoring stations inside the Borneo jungle. The idea behind the scheme is to send rovers and robots to dangerous areas and program them to snap images and gather information. The trial research exposed geospatial imaging as a highly plausible method to chart exact borderlines. The satellite collection of images can help verify landscape transformations and enrich the GIS databases. Therefore, the future problem of land disputes and accusations of annexations can be contained with verifiable and accurate evidence.

Unfortunately, Chief Mulyadi exclaimed how "technologizing" the border dehumanizes local lives. In a private interview, he said that most of his people feel the diminishing rights to privacy and increasing sense of objectification as these technologies enter their life. Both the government officials and scientists have done minimum effort to educate the locals regarding the technologies and their usages. Villagers see machinery enter and exit their villages without actually knowing how it affects their lives. Even when geospatial imaging has been successful in producing accurate charts and maps, Chief Mulyadi says that his villagers would never be able to use that data if not given proper introduction (G. Mulyadi, March 2, 2021).

International Involvement

Cross-national diplomacy and cooperation efforts have produced several agreements regarding the facilitation and regulation of surveillance technology in the Indonesia-Malaysia Border. The following section highlights the most relevant examples of how the Indonesia-Malaysia border has been influenced by acts of international involvements.

United States Department of Defense Maritime Security Initiative 2016

Following Congressional approval, the United States Department of Defense in 2016 launched the Maritime Security Initiative (Department of Defense, 2015). The policy aims to consolidate US allies in addressing maritime challenges, particularly those posed by China. The initiative sees $425 million worth of funding to Southeast Asian countries, including weaponry enhancements, technical advisories, and defense investments.

The 1967 Border Crossing Agreement (BCA) and Border Trade Agreement (BTA)

Based on the 1967 convention, cross-border activities are limited to family visits, leisure, religious purpose, business-trade, and government delegations. The Border Crossing Agreement also lists the three authorized crossing points across the Northwest Borneo border. Cross-border travel outside the specified area and defined purposes will be considered a violation pursuant to the Border Crossing Agreement. At the same time, the Border Trade Agreement regulates the issuance of border passes to villagers who wish to conduct trade

across the border. It requires any goods to pass through customs services and be taxed in accordance with the law.

Indonesia-Malaysia Memorandum of Understanding (MoU) in 2018

In 2018, Former Malaysia Home Affairs Minister, Tan Sri Muhyiddin Yassin, became the first of the few who endorsed cybersecurity in the border surveillance effort (*NST Leader*, 2021). A bilateral MoU regarding international boundary issues was ratified in 2020 following intense diplomatic negotiations. Written in the statute is a series of articles that elaborates on the usage of technologies to control border surveillance further.

Broader Application of Border Technology

The security technologies are mostly adopted and modified from the existing systems that have been used domestically and abroad. Autogates were first used in Soekarno-Hatta Airport, Jakarta, and Ngurah RaiAirport, Bali to aid the surveillance in two of the busiest passenger traffic airports in Indonesia (Putra & Arifin, 2020). In addition, drones have long been used to patrol maritime activity in Southeast Asia, with the Armed Forces of Indonesia and Malaysia heavily invested in their drone assets. The deployment of the drones for border patrol is just utilization of the military capital already owned (Muhaimin, 2019).

Policy Recommendations

Currently, the legal discourse regarding border security technology at the national and regional level has been abysmal. The risks associated with privacy rights, societal integrations, and justice systems that emerge within the new technological framework illustrates the pressing need for a policy response. The tools discussed above are just the beginning of endless possibilities that technology and science will continually propose. Nevertheless, the needs of supplementary assessment and cultural revolution are essential for the changes to occur effectively. In light of these concerns, we recommend that international communities take the following actions:

1. Renew border agreements and territorial divisions, especially in cases where the borderlines are ill-defined.
2. Legislate legal frameworks that can ensure the utilization of the technology in the criminal justice system.
3. Improve data governance in sharing and reinforcing informational databases in order to support the algorithm which the technologies possess.
4. Increase effort to introduce locals on the usage of technology and provide legal counseling to understand their rights and responsibilities within the new technological framework.

The Australian Border

Introduction

Asylum seekers and leisure and business travelers are the main groups crossing the Australian border. Authorities at this border also monitor the movement of asylum seekers arriving by boat, unauthorized fishing vessels, international travel in airports, and the movement of traded goods. In order to surveil this highly active border, a number of technologies have been employed by the Australian Department of Home Affairs and the Australian Border Force. The use of these technologies at the Australian maritime border and international airports have presented numerous human rights and data privacy concerns, which should be addressed by encouraging Australian authorities to develop stronger national regulations surrounding the use of border technology to ensure security and safety for all.

Table 13: Summary of Findings

Border Profile			
Level of Border Technology	High (6)	**Technology**	Predictive Analytics; Biometrics; Automated Border Controls; Closed-Circuit Television; Hydrophones; Artificial Intelligence
Level of Biometric Data Collection	Moderately Invasive (11)	**Legislation for Biometric Data**	Yes
Automated Border Control	Yes	**Border Technology Exporter**	No
Private Companies Involved	IDEMIA; Clearview AI; Nuctech	**Concerns Regarding the Use of Technology**	Data privacy; Illicit use of technology; Lack of regulation

Background

The Commonwealth of Australia's border is made up of only maritime components as the mainland and its island state, Tasmania, are islands. Australia was born from the British colonization of Australia which included genocidal campaigns against the indigenous population that resulted in the decimation of that population by 1788. The six self-governing British

colonies were all granted independence by the British parliament in 1900 and Australian independence was formally proclaimed on January 1, 1901.

The newly minted Commonwealth of Australia passed the White Australia policy, formerly known as the Immigration Restriction Act of 1901, that prevented non-Europeans from immigrating into Australia. Restrictive immigration legislation like this was passed before 1901, however. In the 1860s, the white Australian colonizers wanted to stop Chinese, Japanese, South Asians, and South Pacific Islanders from immigrating to Australia. This was enforced by providing entrance exams in European languages only, strategically excluding non-white ethnic groups. This immigration restriction was repealed in 1950, but the orientation towards strict immigration regulations remains (Britannica, 2020). Although Australia has a large immigrant population, the largest group is still of European descent.

In 2001, the Pacific Solution was implemented as Australia faced an uptick in the arrival of asylum seekers and refugees from Afghanistan, China, Iran, Iraq, and Vietnam. Asylum seekers are intercepted and moved from mainland Australia to an offshore processing detention center in places such as Nauru, Papua New Guinea, and Christmas Island. After numerous human rights concerns were raised, the offshore detention center in Papua New Guinea formally closed in October 2017 and in Nauru closed in March 2019. However, asylum seekers remain detained to this day.

Current Border Issues

At the Australian Border, migration primarily moves into Australia in the form of maritime migration and air arrivals. Australia receives asylum seekers and refugees arriving by boat and plane, but those arriving by boat are stuck in offshore detention centers that face human rights violations. As Australia's border is closed in response to COVID-19, the remaining asylum seekers are stuck in offshore detention (Spinks, 2020). Australia also has a growing number of undocumented immigrants with expired visas that the Department of Home Affairs is struggling to identify and track. Although border security technology cannot address the root causes of migration, it can have a hand in controlling issues such as transparency, accountability, and access to resources in detention centers; and tracking and identifying undocumented immigrants with expired visas.

Offshore Detention Centers

Under the Migration Act of 1958, asylum seekers without a valid visa must be held in a detention center until they are granted a visa or removed from Australia (Australian Human Rights Commission, n.d.). This legislation combined agreements with Nauru and Papua New Guinea has allowed Australia to move its immigration detention centers offshore. Known as the Pacific Solution, this means that there are no detention centers in mainland Australia, and instead, undocumented immigrants arriving by boat are sent offshore outside of Australia's

borders (Commonwealth Parliament, 2013). This detention period can be indefinite as there is no law or policy in place to limit the time an asylum seeker is detained. Humanitarian organizations are concerned that holding undocumented immigrants indefinitely requires access to mental health care. Self-harm and suicide remain a frequent problem at detention centers with 12 immigrants dying on Manus Island and Nauru since 2013 (Amnesty International, 2019).

The Australian Defense Force has played a significant role in preventing asylum seekers arriving by boat from reaching mainland Australia. The Australian government introduced Operation Sovereign Borders (OSB) in September 2013, which is a military operation to turn back vessels carrying undocumented immigrants that are hoping to reach Australia to seek asylum (University of New South Wales Sydney, 2019). OSB is still in active operation to stop boats from arriving by sea to Australia and instead redirect them to Australia's offshore immigrant detention processing centers. However, Australia's actions toward asylum seekers is in violation of international law (Doherty, 2017).

The Australia Border Force Act 2015 was passed to prevent information about the offshore detention centers from leaking to the public. Any staff member in these detention centers who "makes an unauthorized disclosure – that is, speaks publicly about conditions inside the camps" (Doherty, 2016) will face imprisonment for two years (Australian Government, 2016). Along with asylum seekers having their mobile phones confiscated and communications monitored, most of the information regarding offshore detention centers is kept hidden from the public eye.

A bill was recently introduced to increase the powers granted by the Australian Border Force to be similar to the Australian Federal Police. The amendment, if passed, would ban immigration detainees suspected of illegal activity from having mobile phones (Jenkins, 2020). Currently, only Australian Federal Police officers can search and seize material inside the detention centers. A similar bill rejected in 2017 raised concerns about mobile phones allowing asylum seekers access to lawyers and support networks. The proposed bill, with decreased powers from the previously rejected one, would allow the government to determine and veto prohibited items in the detention centers and search dogs to be used instead of officers. This bill was proposed in light of some illegal activities happening in these detention centers, such as gas cans and tennis balls containing methamphetamine, pornography, extremist material, child abuse material, improvised weapons, illegal drugs, and drug paraphernalia (Galloway, 2020).

Overstayed Visas

People overstaying expired visas is a growing problem in Australia. More than 64,000 people are in Australia without documentation after overstaying visas, as last reported by the Department of Home Affairs in 2018. This number has remained constant over the years as most of these overstayed immigrants have been able to remain working without

documentation with more than 12,000 overstaying for more than 20 years, more than 6,600 overstaying for 15-20 years, and 11,000 overstaying for two to five years (McIlroy, 2017). Contrary to popular Australian media that portrays most undocumented immigrants as European or American backpackers, Malaysian and Chinese immigrants actually make up the majority of overstayed visas. From 2016 to 2017, 10,000 Malaysians overstayed their visas, 6,500 were from China, and over 5,000 were from the US (Blakkarly, 2018). Last reported in 2018, the majority of overstayed visas have been visitors and students with more than 47,000 overstayed visitor visas and 8,680 overstayed student visas (Middleton, 2019). Australia has been struggling to prevent and track down overstayed immigrants. In 2016 and 2017, only 15,885 overstayed immigrants have been tracked down by the Department of Home Affairs (Blakkarly, 2018), which is small compared to the estimated 86,940 people who breached their visa conditions in 2017-2018 (Coyne, 2019b). The Australian Border Force has been struggling to identify overstayed immigrants, especially those with unauthorized jobs. In fact, 73% of undocumented overstayed immigrants in 2017-2018 were found only because they voluntarily turned themselves in to resolve their immigration status (Coyne, 2019b). The Department of Home Affairs plans on addressing this issue through the use of biometric technology (Coyne, 2019a) and a risk-based framework for processing overseas arrivals that is mostly automated (Coyne, 2019b).

Border Technology

Australia's border technology consists of biometrics, automated border controls, and hydrophones. The following is a comprehensive list of technology that has been installed at the Australian border for the purpose of border security.

Predictive Analytics

Australia recently upgraded its biometric facial recognition system for detecting travelers entering Australia that are classified as criminals and persons of national interest. In 2019, Australia registered 9.5 million visitors in its facial recognition system. Australia's Department of Home Affairs predicts an increase in the number of applications, which will be sped up by the new Enterprise Biometric Identification Services (EBIS) with future plans of creating identities with this data (Launa Pascu, 2020). The EBIS allows for the predictive risk analysis of travelers going through SmartGates.

Biometrics

Australia has deployed its upgraded biometric tracking technology, EBIS, based on IDEMIA's Unisys Stealth (identity) platform with its face, finger, iris, and voice recognition. The Department of Home Affairs' newly upgraded EBIS system allows for more than 100,000

transactions of traveler biometrics daily and matching them to more than 100 million records, which can be scaled up to over 1 billion records of identities (IDEMIA, 2020). Furthermore, "EBIS will be used…to match the facial images and fingerprints of people including those wishing to travel to Australia such as visa applicants and the facial images for citizenship applicants" (Launa Pascu, 2020).

ePassports used by Australia and other participating countries are embedded with a chip containing the information that includes biometrics and compares the information on the passport with databases from the EBIS system and the picture taken at a SmartGate. This technology is aimed to assist the identity verification process of travelers (Ewing, 2015). The EBIS database system will process travelers using facial recognition while collecting their facial biometrics to support visa application processing in the future for the next decade. Future implementations of the EBIS will allow for the ability to quickly flag people crossing the border suspected of fraudulent identities. (Jenkins, 2020).

Plans for extending this technology to a national facial recognition database, which includes Australian citizens, have been rejected. The Australian Parliament's intelligence and security committee has rejected plans for such a database as it granted the Department of Home Affairs too much surveillance power over Australian citizens (Martin, 2019).

Automated Border Controls

Australia has recently been implementing SmartGates technology, an automated gate system used for processing inbound and outbound migration, in international airports and seaports. Launched in 2014, SmartGates was introduced to speed up the efficiency of international airport gates while maintaining strict border security standards. AI systems use biometric information to assess every traveler's risk and assign them to a risk level; higher-risk travelers are more closely looked at by officers. This allows trusted Australian and international ePassport holders to go through immigration more quickly with automated security checks (*Australian Border Force 2020*, 2020, p. 34-35).

Closed-Circuit Television (CCTV)

SmartGates use CCTV and artificial intelligence for computer vision and human monitoring of international airports. CCTV is placed throughout the airport, especially at various gates, and plays an integral part in the automation of SmartGates. It is also used for the collection and identification of data for facial recognition, as the person's current appearance is compared to the ePassport photo biometrics and databases from the EBIS. Cameras are used to automatically and manually confirm the identity of persons (Ewing, 2015).

Hydrophones

Hydrophones, which are underwater microphones that can be used to detect vessels, have been deployed along the Torres Strait to combat illegal activity in the region, primarily illegal foreign fishers (Australian Border Force, 2020). Although the initial and primary intention of the hydrophones is to combat illegal fishing, the language used to describe "illegal activity" can be extended to intercepting boats of undocumented immigrants seeking asylum. Unlike SmartGates, which are powered by a private company, these hydrophones were built by the Commonwealth Scientific and Industrial Research Organizations (CSIRO), an Australian government agency (Kikken, 2020).

Regulations for Use of Border Technology

Schedule 5 of the Counter-Terrorism Legislation Amendment Act authorizes the use of SmartGates in Australian airports and the collection of Australian citizens' biometric data for national security purposes (Australian Government, 2019).

International Involvement

The Australian government has been a contributor and user of biometric database sharing on immigrants amongst its allied countries, particularly those in the Five Eyes alliance. Australia also has contracts with Papua New Guinea and Nauru for its offshore detention centers.

The Five Eyes

The Five Eyes (FVEY) is an intelligence alliance between Australia, Canada, New Zealand, the United Kingdom, and the United States. The FVEY countries exchange information for counter-terrorism intelligence. This includes, but is not limited to, signal intelligence, such as electronic communications; defense intelligence, such as information gathered by the country's military; human intelligence, such as interpersonal communications; and geospatial intelligence, such as satellite and geographic imagery (Burt, 2019). Along with that, Australia is looking into sharing their biometric information, such as facial images and fingerprints, from those who apply for an Australian visa to one of the Five Eyes (Caldwell, 2017).

Nuctech and International Technology Imports

Privacy and security concerns regarding Nuctech, a border security technology vendor based in China, have been raised. In late 2020, concerns about Australia buying border security technology from Nuctech, a China-based company, were brought into question. Nuctech is a "subsidiary of a Chinese defense conglomerate nicknamed 'the Huawei of airport security'

[that] is increasingly dominant in border-control and security-screening technologies globally" (Kelsey Munro & Li, 2020). Nuctech and two other Chinese subsidiaries are on the US banned list after a confidential government report was internally released in 2014. This issue has also been raised in the Canadian Parliament, European parliamentarians, the U.S. Senate Committee on Foreign Relations, and the U.S. National Security Council. The concern is that the data collected from Nuctech's products and other Chinese subsidiaries could be transmitted to Chinese state actors. Under China's national intelligence laws, all Chinese companies, such as Nuctech, are required to provide data to Chinese security agencies upon their request. The Chinese government has system-wide access to private-sector data, which includes data servers (Kelsey Munro & Li, 2020). Nuctech's global market dominance on security technology is more concerning as they provide equipment, systems, and services to over 170 countries, overseas embassies, and diplomatic missions.

Broader Application of Border Technology

Documents have revealed that Clearview AI, a facial recognition technology used by law enforcement in the US, has been used by the Australian federal police, Queensland Police, and Victoria Police (Taylor, 2020b). The machine learning algorithms that power facial recognition tend to discriminate based on intersectional identities like gender and race. There have been proven disparities between varying skin-tones and gender, and worse error rates among people of color (Buolamwini & Gebru, 2018). This error rate can be exacerbated by poor lighting conditions and image quality. There is also a potential for misuse by agencies as this technology can eventually be available to the public as raised by ClearView AI. Another issue raised by ClearView AI is that the larger the database, the larger the risk for doppelgangers with no data to suggest the facial recognition tool is accurate (Hill, 2021). In the US, two recent cases of false accusation and imprisonment due to facial recognition show that facial recognition struggles to distinguish Black people with devastating consequences (Paris, 2020). Professor Bennett Moses argues that because predictive policing targets "usual suspects" the method reinforces historical bias (Knight, 2020).

Recommendations

Currently, there is a lack of regulation regarding border security technology at the national level. The use of facial recognition, especially for law enforcement use, illustrates the pressing need for a policy response. Furthermore, the lack of technology in the offshore detention centers, especially personal mobile phones, requires a revision of future offshore detention center agreements with transparency, accountability, and ethical care in mind. In light of these concerns, we recommend that the Australian Border Force and the Australian Defence Force take the following actions:

1. Improve the conditions and treatment of refugees in detention centers by reconsidering the confiscation of phones, improving accessibility and quality of mental health care, and increasing the transparency of detention centers.
2. Revise future “Pacific Solutions” to improve the efficiency and speed for processing refugees and asylum seekers, which includes being able to provide a time estimate for processing time and imposing term limits on how long these groups can stay in detention centers.
3. Pursue careful regulation of facial technology, as no regulations or limits on facial recognition technology exist so far.

Chapter 5: The Americas

The Colombia-Venezuela Border

Introduction

Asylum seekers are the main group crossing the border from Venezuela into Colombia. Authorities at this border must also monitor the movement of drug traffickers and multiple terrorist groups. In order to accurately surveil this rural and rugged border, a number of technologies have been deployed primarily on Colombia's side of the border. These technologies include piloted surveillance drones, thermal imaging, and stingray towers, among others. The lack of adequate application of border technology at the Colombia-Venezuela border presents numerous human rights and security concerns, which should be addressed by increasing investment in security technology as well as databases to ensure security and safety for all.

Table 14: Summary of Findings

Border Profile			
Level of Border Technology	Low (3)	**Technology**	Biometrics; Drones; Thermal Imaging; Sensor Technology; Surveillance Radars; Stingray Towers
Level of Biometric Data Collection	Highly Invasive (9)	**Legislation for Biometric Data**	Yes
Automated Border Control	Yes	**Border Technology Exporter**	No
Private Companies Involved	The Boeing Company; Leonardo; CODALTEC; Thales	**Concerns Regarding the Use of Technology**	Data privacy; Lack of effectivity; Lack of Transparency

Background

The border between the Republic of Colombia and the Bolivarian Republic of Venezuela is a land border that stretches 2,219 kilometers over the Cordillera Oriental branch of the

Andes mountain range in the north as well as savannah grasslands in the center and the beginnings of the Amazon jungle in the south. It follows the curves of several rivers, a few of which are the Río Negro, Río Arabapo, and Río Orinoco (*BORDERS OF COLOMBIA - Land Borders: Border with Venezuela*, n.d.). After the dissolution of Gran Colombia in 1831, the two new republics of New Granada and Venezuela were formed. New Granada went through another series of revolutions until in 1886, when the Republic of Colombia was founded (*Gran Colombia | Historical Republic, South America | Britannica*, n.d.). In 1903 Colombia lost control of present-day Panama and the country began to resemble its present shape. The modern land border between the two countries was established in 1941 after a Common Rivers and Navigation treaty and has remained the same since (*Por la cual se aprueba*, 1941).

Most problems on the border in the 20th and 21st century have come from the illegal drug trade and actions of paramilitary groups on the political left and right. Both the Revolutionary Armed Forces of Colombia and the National Liberation Army were involved in skirmishes with Colombian authorities who could not pursue them into Venezuela. In 2018, things took a hostile turn with a bombing in Caracas that Venezuelan President Nicolas Maduro blamed on Colombia (Cardenas, 2019). Colombia's Ivan Duque responded by refusing to recognize the Maduro administration. In 2019, relations deteriorated even further with Maduro cutting off all diplomatic ties to Colombia. Most recently, Colombia produced a report for the UN General Assembly accusing Venezuela of actively working with forces like the National Liberation Army to destabilize Colombia.

Another compounding issue has been the economic collapse of Venezuela. Hyperinflation and lack of basic goods has left some five million Venezuelans seeking a better life abroad. Two million of these migrants have ended up in Colombia with more projected to come once the borders reopen following the COVID-19 pandemic (Watson, 2020).

The massive migration of Venezuelans without proper documentation has left many vulnerable people without legal protection. These migrants do not have access to healthcare, the workforce, and are often taken advantage of by criminal organizations or are forced to find ways to make money outside of the traditional economy. As a response, in February 2021 a landmark decision by Colombian president Ivan Duque was made in which all Venezuelans in Colombia were granted legal status, regardless of legality of crossing (Rueda, 2021). This was promoted by the United Nations High Commission for Refugees Chief Filippo Grandi who oversaw the decision in person in Bogota (Treisman, 2021).

Current Border Issues

Migration at the Colombia-Venezuela border is primarily Venezuelans coming into Colombia on foot both with and without authorization. The reason behind this is primarily the declining opportunity and quality of life in Venezuela caused by the hyperinflation that started

in 2018. Although border control technology cannot address the root causes of migration, it can have a hand in controlling issues such as drug trafficking and terrorism.

Terrorism

Two terrorist groups exist in the Colombian border regions. Both adhering to the philosophy of Marxist-Leninist Revolution, they are the Ejército de Liberación Nacional (ELN) and the splinters of the Fuerzas Armadas Revolucionarias de Colombia (FARC). FARC officially signed a peace treaty in 2017 but still has faction members operating (Press, 2019). The ELN has never signed any treaty and is still active. Both of these organizations received support from Maduro's Venezuela by way of weapons, funding and other goods (Cardenas, 2019). The military of Colombia is committed to seeing the end of these groups by continuing to patrol for hideouts and attack armed combatants. There are concerns, however, that innocents often get caught in the crossfire of these conflicts.

Drug Trafficking

Colombia is the third largest cocoa leaf grower in the world behind Peru and Bolivia and is also the largest manufacturer and distributor of cocaine in the world. Much of the cocaine production is done in the mountainous climate of the border region. The Colombian government is committed to rooting out these camps and has drone pilots surveying the area as well as planes dumping pesticides to kill the cocoa plants (Lustig, 2013).

Border Technology

For a long time, the Colombia-Venezuela border has been a periphery for both Bogota and Caracas. This rural area has seen more time under the control of non-state actors, in this case, terrorist groups, than any formal government in modern history (*Disorder on the Border*, 2020). With Venezuela in a state of collapse, Colombia knows it must step up its technological level to bring law and order to its border. With early success coming from its domestic use of drones and Stingray towers, as well as a crucial partnership with Leonardo, modernity is coming quickly with all new levels of surveillance and response.

Biometrics

Colombia has employed the use of Thales BIOMIG scanners at its largest airport in Bogota, which is also the third busiest airport in South America. It allows Colombian travelers to submit an iris scan that can be referenced for return from international flights, allowing quicker trips through customs in the future (*Gemalto's Biometric Authentication Technology*, n.d.)

Drones

The Colombian military has access to both Boeing ScanEagle drones as well as the RQ-11B Raven. CODALTEC, a corporate branch of the Ministry of Defense that promotes domestically developed technological capabilities, makes training software simulating flight scenarios which trains Colombian forces to use these drones to search for hidden drug operations or follow specific peoples of interest on the border (US Air Force, 2018).

Thermal Imaging

The drones used on this border are capable of carrying thermal imaging camera payloads as well as thermal cameras mounted on a variety of vehicles and handheld devices. These are used on the border to locate people and places of interest (US Air Force, 2018).

Sensor Technology and Surveillance Radars

According to CODALTEC's mission statement, their Radar and Sensors team makes a variety of sensors custom built to each scenario based on the client's needs. The most common sensor made is a radar made to detect aircraft movement, particularly small aircrafts like drones possibly used by cartels at the border. Their radars are made to be mobile, durable, and low-battery consuming (*THE RADAR AND SENSORS TEAM*, n.d.).

Stingray Towers

The Colombian government purchases Stingray systems and uses them to monitor cell phone activity. Through cell tapping and monitoring on the border region, the Colombian government has seen great success in locating and arresting terrorists and cartel members (Privacy International, 2015). This tapping will continue on the border to possibly validate dates of asylum seekers' arrival as well as to track security threats.

Regulations for the Use of Border Technology

The most recent and relevant law for border technology is the 2017 Right to Privacy in Colombia law. This law outlines that citizens have a right to privacy and against censorship. Surveillance and censorship can only be justified when they are prescribed by law, necessary to achieve a legitimate aim, and proportionate to the aim pursued. However, broad applications of this terminology have caused fear that all Colombians are constantly under surveillance (Fundacion Karisma Dejustica, 2017).

International Involvement

The following section highlights the most relevant examples of how the Colombia-Venezuela border has been influenced by acts of international involvement. Colombia has always been an importer of advanced technology and buys much of its technology from the US as well as other American allies like Israel and France.

NATO Partnership

Since 2018 Colombia has been a NATO "Partner Across the Globe." This has opened the door for cooperation between NATO and Colombia in defense. Colombia imports much of its technology from NATO members. Given the rise of tension with Venezuela it is possible for NATO to be drawn into a conflict on Colombia's borders with Venezuelan proxies (NATO, 2020).

Homeland Security Investigations Agreement

The Homeland Security Investigations, the investigative arm of U.S. Immigration and Customs Enforcement (ICE), has entered a data-sharing partnership with Colombian Customs to help analyze and catch money laundering, fraud, and drug smuggling on Colombian border. Members of Colombia's National Directorate of Taxes and Customs are even being trained in the state of Georgia with the Department of Homeland Security (*HSI, Colombian Tax and Customs Agency Renew Agreement to Combat Trade-Based Money Laundering*, n.d.).

Broader Application of Border Technology

Because of the corrupt and illiberal tendency of Colombia's democracy, some of these border technologies have been turned to monitor innocent Colombian citizens. One report sees Colombian police using cameras attached to helicopters used to send images to a database. These databases search for license plates and physical characteristics captured in images and compares them against a criminal database to see if they find a match. Because of inaccuracy, this method can lead to the arrest of innocent people who share physical similarities with targets (Tiempo, 2019). Also, in Bogota during the COVID-19 pandemic police have been using drones outfitted with thermal cameras in order to monitor people's temperatures and find breaches in quarantine (Acosta, 2020).

Recommendations

Currently there is a lack of accountability and effectiveness regarding border security technology at the national level. Colombia has been forced to turn to extreme measures to combat the growing problems of terrorism and drug trafficking on its border regions, but it has not provided protection to its law-abiding citizens from its growing surveillance state. Additionally, the defense measures being taken currently are not enough and drug production

continues to grow. With these concerns in mind, we recommend that Colombia take the following actions:

1. Ensure protection to citizens from unlawful spying and data gathering.
2. Commit to more intense measures rooting out drug production and organized crime.
3. Continue investment in domestic border technologies.
4. Request international aid to assist Venezuelans in Colombia.
5. Continue to target corruption and abuse of power.

The Honduras-Guatemala Border

Introduction

Asylum seekers are the main group crossing the border from Honduras into Guatemala. Authorities at this border must also monitor the movement of organized crime groups who traffic goods across the border. However, the government currently does not have the capabilities to address organized crime in the region. The lack of adequate application of border technology at the Honduras-Guatemala border presents numerous human rights and security concerns which should be addressed by increasing investment in security technology and funding anti-corruption commissions to ensure security and safety for all.

Table 15: Summary of Findings

Border Profile			
Level of Border Technology	Low (1)	**Technology**	Biometrics, Radio Frequency Identification
Level of Biometric Data Collection	Moderately Invasive (17)	**Legislation for Biometric Data**	No
Automated Border Control	No	**Border Technology Exporter**	No
Private Companies Involved	VSBLTY, Cellebrite, Facephi, Mobbeel, 3M	**Concerns Regarding the Use of Technology**	Data privacy; Data control; Lack of effectivity; Illicit use of technology; Lack of regulation; Lack of transparency; Violations of international law

Background

The border between the Republic of Honduras and the Republic of Guatemala is marked by mountains and rivers, but no physical wall. It is approximately 256 kilometers long and starts at the Montague River, extending between the Caribbean Sea until it meets the Montecrisso massif near El Salvador (“Bureau of International Narcotics and Law Enforcement Affairs,” n.d.). Following the collapse of the Spanish Empire in 1821, Central America was divided by territorial disputes amongst plantation owners. The Honduras and Guatemala border was finally settled in a Treaty of Arbitration signed in 1930 (Human Rights Watch, 2019).

There was stark inequality between the rich and poor in both regions. In the late 20th century, the poor began to challenge the elite which thrust the Northern Triangle into war (Grillo, 2016). Guatemala, home to the deadliest battleground, is scarred by these conflicts. Despite signing Peace Accords in 1996, there is little to no trust in political representation (Sanz-Levia & Jiménez-Sánchez, 2021). Honduras, despite being able to escape the brunt of the war, was similarly unable to escape economic and political instability.

Now, the border between Honduras and Guatemala is widely seen as one of the most violent borders in the world (Crisis Group, 2014). There is a very high population of gangs, traffickers, and cartels moving between these two countries. Concerningly, these organized crime groups have become the de facto authorities in these areas. Efforts to address this through martial or police force often only acts to further destabilize the region. When law enforcement comes too close, gangs are easily able to evacuate to neighboring countries. Mara Salvatrucha and Barrio 18 are two of the biggest gangs in Central America with territory that extends throughout the Northern Triangle and even up into the US. They both hold equal, if not more, power than law enforcement in certain districts.

Current Border Issues

At the border, migration is primarily moving from Honduras into Guatemala in the form of asylum seekers. Due to the high levels of gang violence, corruption, and lack of hurricane relief, residents in Honduras and Guatemala are migrating north in hopes of a more stable life. Although border security technology cannot address the root causes of migration, it can have a hand in controlling issues such as drug and human trafficking from organized crime groups.

Organized Crime

Many gangs have access to technology the Honduran and Guatemalan governments cannot afford, and consequently, they are also able to control cross-border flows. Central American organized crime groups typically act as transport, or *transportistas,* for drugs and contraband. They are able to engage in trafficking through intimate knowledge of the land and long-lasting public and private relationships (Velde, 2012). Ioan Grillo argues that, “gangsters often operate more efficiently across borders than governments do” (Grillo, 2016, 229). As organized crime groups began earning more money through rents and the black markets, they were able to fund increasingly sophisticated schemes. Additionally, these gangs target many human rights organizations through violence, surveillance, theft, and harassment. This makes it extremely hard for human rights defenders to protect vulnerable groups and pursue positive change (Washington Office on Latin America, 2020, Section 3). This has a consequence of pushing Central American youth to join gang networks as the only route for social mobility outside of migration

The Guatemalan and Honduran governments respond to the high levels of organized crime through a *mano dura*, or iron fist, policy. They have granted law enforcement extra power in order to suppress such activity. In 2018, the Honduran government formed the Honduran National Anti-Gang Force, a special force with the goal of tracking trans-national movement of gangs. This group is a collaboration between all levels of the government with members from the police, military, and Attorney General's office. It uses traditional investigatory forces as well as information analysis via info sharing with the US and the use of Cellebrite, a digital intelligence agency (Olvera, n.d.). However, this iron fist approach has only led to deeper crisis, due to overcrowding, corruption, and insecurity, as prisons have become home bases for gangs to organize further action (Velde, 2012, p.22).

Corruption and Lack of Transparency

Many Honduran and Guatemalan public officials are complacent with, and even benefit from, organized crime. The former chief of the Honduras National Guard was convicted of collaborating with drug trafficking organizations and related weapons offenses (US Drug Enforcement Administration, 2020). The current Honduran President, Juan Orlando Hernandez, is the chief's brother and has since vowed for a "full frontal fight against criminals, no matter who they are" (AFP International Text Wire in English, 2017). However, as noted before, militarizing law enforcement seems to do little against organized crime. Instead, the government seems to weaponize law enforcement against non-compliant citizens. For example, following the protests against the reelection of President Hernandez in 2014, at least 23 citizens were killed, believed to be at the hands of police (Daugaard, 2019).

Due to the high levels of corruption within the Honduran and Guatemalan governments, they rely on help from third parties to address corruption. An example of third-party aid is the International Commission against Impunity in Guatemala (CICIG) between the Guatemalan government and the United National Department of Political Affairs; and the Mission to Support the Fight against Corruption and Impunity in Honduras (MACCIH) between the Honduran government and the Organization of American States. Both organizations were ultimately disbanded in 2019 and 2020 despite popular support (Irías, 2020).

While in action, the CICIG uncovered a massive underground corruption ring dubbed La Linea involving many high-profile public officials including former president Otto Perez Molina. It was revealed that Guatemala's customs authority, the SAT, robbed the state of millions of dollars through customs fraud. Between May 2014 and April 2015, La Linea was estimated to have gained 5.1 million quetzales in bribes and 14.3 million in taxes. Furthermore, La Linea is suspected to be involved in drug trafficking due to a related raid where authorities seized over 7.8 million quetzales worth of ephedrine (Gagne, 2015). Three of the officials who were arrested for being a part of the customs fraud are still employed by the Superintendencia de

Administración Tributaria de Guatemala, the customs authority in Guatemala (Papadovassilakis, 2020, para. 5).

Following the dissolution of the CICIG, the Special Prosecutor's Office Against Impunity (FECI) is one of the only anti-corruption institutions left in Guatemala. It is an anti-impunity unit within the Guatemalan Attorney's Office led by Juan Francisco Sandoval. When asked about the rule of law in Guatemala, Sandoval responded "it doesn't exist. There is a systematic attack against any who fight to stop impunity, such as prosecutors, FECI and judges...mechanisms of state to ensure impunity have only become more sophisticated" (Avalos & Olaya, 2020).

Corruption is hidden from the public eye due to a lack of transparency from Honduran and Guatemalan administrations. Freedom House, in a rating out of four, has granted both Guatemala and Honduras a score of one for governmental transparency (The Freedom House, 2020a, 2020b). In Transparency International's Corruption Perception Index, both countries have declined in rating since 2012. Honduras lost four points, scoring a 24/100; Guatemala lost eight, now at 25/100 (*Corruption Perceptions Index 2020*, n.d.).

COVID-19

Following U.S. President Biden's inauguration, there has been a wave of northern-bound migrants hoping for new US immigration policies (Semple & Wirtz, 2021). However, Guatemala has not loosened its immigration policy and remains strict with Honduran migrants (Global Detention Project, n.d.). The Guatemalan military continues to deploy batons, tear gas, and other enforcement measures in order to deter Honduran migration into the region.

Notably, both of these countries are especially vulnerable to COVID-19. Not only are they lacking in public health infrastructure, but the constant movement of people also makes it hard to track and regulate. In January 2021, a particularly large caravan of over 9,000 asylum seekers approached the border between the two countries. Amongst those who were able to access the immigration checkpoint, 21 tested positive for COVID-19 (Sebastian, 2021, para. 14).

Not only is northward migration a breeding ground for the virus, but there is also risk for southward transmission. During the pandemic, both the US and Mexico have continued to deport undocumented immigrants despite incomplete testing procedures. Between March and mid-April of 2020, over 6,500 Guatemalans and 5,000 Hondurans have been deported (Crisis Group, 2014). Out of that figure, there were at least 85 confirmed COVID-19 cases by the Guatemalan government, although the real total is very likely higher (Hora, 2020).

Border Technology

Due to corruption and a lack of funds, the Honduras-Guatemala border lacks security technology. Governments have responded to conflict through militarization of law enforcement, which often has the effect of reinforcing violence rather than mitigating it. In 2021, Guatemala deployed troops, police, and health workers to 16 checkpoints across the

country to detect undocumented migrants (McDonald, 2021). Central American countries, in general, have tightened border controls since COVID-19 in hopes of assuaging migrant flows (Mechu & Diaz, 2021). However, in the past, US Customs and Border Protection has reported that checkpoints between Guatemala and Honduras are disorganized and require biometric regulation (Menchu, 2019).

Biometrics

Guatemala has started installing biometrics technology in its airports. In 2015, the Mundo Maya airport imported kiosks from US conglomerate 3M that are equipped with fingerprint scanners and facial recognition (Currier, 2019). Starting in late 2019, VSBLTY, a company specializing in facial recognition and weapons detection, began installing cameras in La Aurora International Airport in Guatemala City. The goal of installing this technology is to gauge interest in airport signage. Although it has facial recognition abilities, only limited data will be collected, such as gender, age, emotion and footfall unless the face is recognized on an airport watch list (Weiss, 2020). There is no national database but VSBLTY can use a closed local database with biometric entries in order to identify objects of interest without internet connection (VSBLTY, 2019). Notably, the Guatemalan government has not yet released any information as to who is on their watch list and why.

Radio Frequency Identification (RFID)

Vehicle tracking is being used at the Honduras-Guatemala border. This technology allows for contactless tracking and identification via radio frequency tags and an RFID reader. In 2015, the US Agency for International Development requested proposals from RFID technology distributors to install RFID equipment at the borders between Honduras, Guatemala, and El Salvador (USAID, 2015). In 2020, Honduras entered its phase II for the integration of RFID to facilitate trade at border crossings, automating the customs process (Aduana, 2020).

Regulation for Use of Border Technology

Honduras' and Guatemala's lack of legislation regulating technology use can be attributed to the overall lack of technology use at the border, but there is also evidence that it is a byproduct of corruption, such as the Special Law for the Intervention of Private Communications which allows law enforcement to capture private communications in secret (Venis & Reina, 2018). The Guatemalan Constitution implicitly covers the Right to Privacy, but has no concrete legislature covering it (Valle & Gordillo, 2020). Notably, other non-governmental organizations have started utilizing technology such as drones and biometrics. There is currently no regulation on how these technologies can be used and how data should be collected.

International Involvement

The following section highlights the most relevant examples of how the Honduras-Guatemala border has been influenced by acts of international involvement. It has several third-party agreements, both bilateral and multilateral.

International Commission Against Impunity in Guatemala (CICIG)

Guatemalan officials have been extremely difficult to prosecute throughout history. Many of them help facilitate trafficking due to bribery from organized crime groups. In 2013, following citizen demands, the Guatemalan government and the United Nations Department of Political Affairs joined together to create the CICIG. It was a commission with the goal of uncovering corruption and preventing impunity. From 2013 to 2019, the CICIG uncovered over 60 corruption schemes in all three branches of the government and even led to the arrest of the former president and vice-president. However, corruption runs so deep that many of these trials have been severely delayed (Human Rights Watch, 2019). The decision to not renew the CICIG for another term has been criticized by many third-party human rights organizations.

Mission to Support the Fight Against Corruption and Impunity in Honduras (MACCIH)

Honduras' financial transactions, including taxes from trade, are often obscured by corrupt legislation. MACCIH is a collaboration between the Organization of American States (OAS) and the Honduran government to prevent corruption and impunity in Honduras starting in 2016. It was able to uncover many unconstitutional laws, such as the Official Secrets Law, but was unable to push for any effective change in Congress (Irías, 2020). Ultimately, MACCIH has led to significant improvements with local support including the prosecution of 133 people (OAS General Secretariat, 2020).

Inter-Agency Task Force

Honduras and Guatemala have also teamed up to address the flow of drugs between this region. In March 2015, they created the Maya-Chorti Interagency Task Force with the goal of improving security at the border. The US pledged $13.4 million to help set it up. However, the Task Force's methods are shrouded in mystery. It is unclear how these units will deal with irregular migrants, how criminals will be apprehended, or even what training would look like (Washington Office on Latin America, 2016).

US Strategy for Central America

As drug trafficking and irregular migration continued to flow into the US from the Northern Triangle throughout the 2010's, the Obama administration made Central America a key foreign policy issue for the US. In 2015-2018, the administration launched the *US Strategy for Central America*. Its goal was to holistically treat institutional and economic instability and to promote US public and private interests in the Northern Triangle and was particularly successful at lowering homicide rates in the region (Meyer, 2021).

Following these developments, the Trump administration suspended most Central American aid in March 2019. The lack of funding forced many human rights organizations to shut down. However, Biden's administration has expressed intention to resume foreign aid into the Northern Triangle. As of June 2020, they have announced intention to release over $705 million new and previously suspended aid (Meyer, 2021).

Also in 2019, a classified memorandum of cooperation was signed between the President of Guatemala and the acting U.S. Secretary of Homeland Security, who agreed to share information intelligence regarding migration. Both US troops and Department of Homeland Security investigators are now stationed at the border (Caribbean News Now, 2019).

Broader Application of Border Technology

Drug trafficking leaves organized crime groups with much more funding than local law enforcement. These groups leverage extremely sophisticated technology in order to evade capture and to secure safe trafficking routes. In June 2020, Honduran police found a surveillance network that the MS13 had installed throughout several northern neighborhoods in San Pedros Sula (Honduras National Police, 2020). This network includes video cameras on all entrances and exits as well as drones from above. In February 2019, MS13 was able to avoid capture through the use of these drones, proving their success (La Prensa, 2019).

Gangs have historically used advanced technology, including tools like bugs, phone interception, and advanced coding (Wells, 1997). Now, they have moved on to using drones and jets to map out northern drug routes. Guatemalan law enforcement in Laguna del Tigre National Park have reported hearing drones fly over their bases in the area followed by the arrival of a narco-jet. However, they were unable to take legal action due to lack of support and lack of air travel. In 2013, the US government donated six helicopters in an attempt to address aerial trafficking, but they were all grounded in 2016 due to poor maintenance (Sief, 2020).

Recommendations

There are several pressing issues at the border between Honduras and Guatemala. In addition to heavy irregular migration, there are also high levels of smuggling and trafficking, which is further complicated by serious corruption that obscures the movement of organized

crime. Concerningly, organized crime groups have access to significantly more funds than either government and consequently, more access to sophisticated tech. Because introducing advanced technology at the border has potential to both alleviate and exacerbate issues at hand, it is important to first focus on preventing further human rights violations. Promoting trust between local citizens and their governments is key. In light of these concerns, we recommend that the international community take the following actions:

1. Renew anti-corruption organizations like the CICIG and MACCIH that promote transparency and prevent public protection of trafficking and smuggling.
2. Protect and invest in third party human rights organizations in the Northern Triangle, especially those that address journalism, health care, shelter, food distribution, and education, to protect irregular migrants.
3. Create robust protocols for the use and distribution of surveillance technology, both for the public and private sphere.
4. Introduce regulated and transparent biometrics at the border that remove personal biases from law enforcement. COVID-19 testing should be a priority.

The United States-Mexico Border

Introduction

Activity at the United States-Mexico border region is dominated by human migration in the forms of asylum seekers and migrant workers. Authorities at the US and Mexico border have political mandates to monitor people's movement and contraband at ports of entry and between ports of entry. The United States has employed many technologies to surveil the highly controlled and trafficked ports of entry and the vast areas in between. These technologies include automated border controls, AI-powered drones, and biometrics, among others. The use of these technologies at the US-Mexico border region has presented numerous concerns regarding human rights and data privacy, which the US should address by creating an independent national authority to monitor the use of border technology and doing away with administrative subpoenas to initiate investigations.

Table 16: Summary of Findings

Border Profile			
Level of Border Technology	High (7)	**Technology**	Predictive Analytics; Automated Border Controls; Biometrics; Drones; Closed-Circuit Television; Night Vision Devices; Thermal Imaging; Integrated Fixed Towers; Fiber-Optic Sensor Systems
Level of Biometric Data Collection	Highly Invasive (6)	**Legislation for Biometric Data**	No
Automated Border Control	Yes	**Border Technology Exporter**	Yes
Private Companies Involved	Palantir Technologies, Amazon, Lockheed Martin, Microsoft, Elbit Systems; Thales Group	**Concerns Regarding the Use of Technology**	Data privacy; Data control; Violations of international law

Background

The US-Mexico border is 3,145 kilometers (1,954 miles) long, spanning from the Pacific Ocean to the Gulf of Mexico. The terrain on the border area ranges from arid land to densely populated cities. The Rio Grande River demarks the border of the states of Texas and Chihuahua. To the east of the Rio Grande, the Sonoran Desert is situated in Arizona and a part of California, along with its namesake state of Sonora in Mexico. The area is also the traditional home to 36 US-recognized Native American tribes that predate the border and live on both sides of the demarcation line (Leza, n.d.).

The US has taken actions to secure its border in several ways that range from erecting physical barriers to separating children from their parents to law enforcement actions against immigrants. In 2006, the Secure Fence Act authorized the building of fencing along the Mexican border by then US President George W. Bush, which created the basis for the use of technology today (*Fact Sheet: The Secure Fence Act of 2006*, n.d.). While not expanding the building of physical barriers, President Barack Obama dramatically increased internal enforcement action, which infamously earned him the label of "deporter in chief" by activists against immigration enforcement actions (Bolter, 2017). President Donald Trump announced his candidacy for office by denigrating migrants and refugees and pledging to build a wall that Mexico would finance. Through President Trump's term, border security became less bipartisan. Harsh rhetoric on the part of President Trump had the effect of hardening Republican voters' views on the need for security at the border, particularly in communities far from the US-Mexico border (Gravelle, 2018, p. 113). Dehumanizing rhetoric used against migrants affects the technologies that Americans deem acceptable for use by the government at the border. While the intensity of the rhetoric swings from hawkish to dovish, calls for a secure border are constant. As technology is increasingly used to carry out the political mandate of securing the US-Mexico border, the US should pay special attention to the unintended consequences and human impacts of border technology that expands the reach and scope of surveillance.

Current Border Issues

At the US-Mexico border, people traveling north can be classified as migrants and asylum seekers. Drug cartel violence and severe economic insecurity forcibly displaces people in Mexico and Central America. Only some of the people migrating are considered refugees by the US. A "refugee," under US law, is a person that the US has determined was forced to leave their home country because of a "well-founded fear of persecution" due to race, membership in a particular social group, political opinion, religion, or national origin. The law is based on the United Nations 1951 Convention Relating to the Status of Refugees (*An Overview of U.S. Refugee Law and Policy*, 2015). In addition to the migration issue at the US-Mexico border, capacities to produce illicit drugs in Mexico and demand from the US propel drug trafficking.

Migration North

While border security is an essential mandate of the US, there is an opportunity to re-evaluate the response given the facts at the border, the US public's needs, and people seeking to cross the US-Mexico border. Migration poses a challenge for US authorities as hundreds of thousands of people seek to enter the United States at levels not seen since the early 2000s. In fiscal year 2019, a total of 977,509 people attempting to enter the US encountered the US Customs and Border Protection, an 87% increase in encounters year over year. Of those encounters in 2019, 53% were considered family units, and 8% were unaccompanied minors. The attempted border crossings for fiscal year 2020 were significantly lower at 458,000. The COVID-19 pandemic partly explains the lower number of attempted crossings in 2020. The most recent numbers available for the four months of the 2021 fiscal year to date on border crossings show an 80% increase year over year in crossings, aligning with 2019 levels (*Southwest Land Border Encounters*, n.d.).

The encounter numbers only tell a part of the story. The number of people seeking refugee status has also increased as people continue to flee violence in Central America and Mexico. The US government's policy response has not helped. In 2019, the Trump administration enacted a "metering" policy that set daily limits on the number of people that could request asylum at the border. Then, the administration implemented a policy that forced people seeking asylum to remain in Mexico until a US judge could adjudicate their case (*Asylum Seekers at the Border*, n.d.). The Biden administration announced the repeal of the "Remain in Mexico" policy on February 19, 2021, allowing up to 300 people per day to enter and wait for the resolution of their asylum case (Diego, 2021).

The Trump administration justified its policy response by invoking national security concerns over gang members entering the US. However, data shows that the overwhelming majority of the people coming across the border before COVID-19 were people seeking refuge without any ties to organized crime or gangs (*Who's Really Crossing the U.S. Border, and Why They're Coming*, 2018). The migrant groups are made of mostly women and children who travel through harsh terrain seeking refuge from the same gang violence purportedly invading the US. According to numbers provided by the Customs and Border Protection (CBP), in FY2018 and FY2019, gang members accounted for less than 1% of all apprehensions and interactions at the border (*CBP Enforcement Statistics Fiscal Year 2021*, n.d.).[2]

Moreover, policies that facilitate the free movement of goods, such as the North American Free Trade Agreement, have shifted and consolidated industries in rural Mexico to cater to food demands in the north. These consolidations in farming, for example, have exacerbated unfavorable economic conditions in rural Mexico. NAFTA incentivizes the

[2] FY2019 was .09% or 976 gang members out of 1,148,024 migrants; in FY2018 the number of gang members was 0.12% or 808 gang members out of 683,178 migrants.

production of crops desired by the US, such as avocados, and illegal ones such as marijuana (Mercille, 2011, p. 1640). The US and Mexico's economic policies impact the choices impoverished people have when trying to remedy financial and bodily safety. Border security is tied to economic policies, drug enforcement in the United States and Mexico's interior, and can significantly impact the flow of economic migrants and refugees.

Civil society groups such as the International Rescue Committee champion reforms to the current asylum system that is currently "unsafe, unfair and broken" and assumes asylum-seekers are guilty until proven innocent (*IRC*, 2021). The US Citizenship Act of 2021, introduced February 19th, contains many of the reforms long sought by immigration reform activists. Among many reforms, this act would clear a path for citizenship for undocumented immigrants in the US and overhaul the visa system.

Human rights concerns remain over the health and safety of people seeking entry into the US. The COVID-19 pandemic compounds the health risks posed by United Nations camps for refugees. As many as 70,000 people wait in Matamoros and Juarez, Mexico, for their asylum claims to be adjudicated by US courts. The majority of these people will likely not fit the narrow criteria for asylum. It is undetermined what recourse, if any, people who seek asylum on the basis of domestic and gang violence will have if their claims are denied (Hennessy-Fiske, 2021).

Drug Trafficking

Keeping gangs from Central America out of the United States is not the only political mandate animating the militarized and technological response at the border; the war on drugs also impacts policy, technology use, and the US's enforcement actions.

It is not known exactly how much marijuana, methamphetamine, fentanyl, and other illicit drugs are smuggled into the US through its southern border. Still, numbers can be estimated through the data that is available by way of drug seizures. In FY2019, marijuana was by far the most-seized illicit drug by border officials at ports of entry and between them. CBP seized slightly over 550,000 pounds of marijuana in that year, of which 52% were seized at the ports, and 48% were seized between ports. Seizures of drugs such as methamphetamines, heroin, cocaine, and increasingly, fentanyl have varied. In FY2019, nearly 30,000 pounds of this drug class was seized by CBP (Finklea, n.d., p. 2). Smugglers looking to move illicit drugs north into the US use various methods that include underground tunnels, aircraft, drones, water vessels, and migrants who carry drugs in backpacks. Not surprisingly, most drug interceptions by law enforcement in the US occur at ports of entry where travel documentation and freight checks are administered (Finklea, n.d., pp. 2–3).

The effectiveness of programs to curb the trafficking of illicit drugs using technology, such as drones, infrastructure, and added personnel, are also unclear as the precise flows of people and goods are unknown. What the data does show is that external drivers such as the US demand for drugs and labor have a significant impact on the rate at which illicit drugs make

it across the border, and the success of border security programs are tied to these externalities (Finklea, n.d., p. 7). Meanwhile, groups that track corruption in Mexico, such as Transparency International and Advocacy for Human Rights in Latin America, link the illicit drug trade with the paying off of judges, police, and politicians (WOLA, n.d.). The widespread corruption and dominance by the cartels fuel rampant violence in Mexico, contributing to tens of thousands of homicides every year (*Mexico's Long War*, n.d.).

Border Technology

US law enforcement agents under the Department of Homeland Security, including both Customs and Border Protection (CBP) and Immigration and Customs Enforcement (ICE), utilize the Border Surveillance System (BSS) to conduct border security missions. The technology employed ranges from commercially available systems, such as fixed and mobile video surveillance systems, range finders, thermal imaging devices, radar, ground sensors, and radiofrequency sensors, to military-grade technologies such as drones, biometrics, satellite imagery, integrated fixed towers, and artificial intelligence. The following is a list of the most relevant technology currently used or is planned to be used at the US-Mexico border.

Predictive Analytics

Investigative Case Management (ICM) serves as the core case management tool primarily used by ICE Homeland Security Investigations (HSI) special agents and personnel. Palantir's technology can take personally identifiable information (PII) data on immigrants, such as names, known addresses, phone numbers, relatives, and even biometric data, and associate it with public data (Biddle et al., n.d.). This vast data gathering and mining operation yields comprehensive relationship trees of undocumented people and anyone associated with them.

ICE most recently utilized Palantir to directly target the parents and other family members of children apprehended at the border (Biddle et al., n.d.). Homeland Security Investigations conducts domestic and transnational criminal investigations in national security, as well as illicit cross-border movements of people, goods, and money. ICM is also used to compile information for prosecution, including criminal offenses and civil offenses in the US interior. ICM also allows the case management system to utilize artificial intelligence to communicate and gather information from disparate data sources within the federal government on subject's seizures, arrests, immigration, and criminal history data. The types of information collected and analyzed by ICM includes biographic data, biometric data such as eye and hair color and physical characteristics, financial data, and location related data, among others. The telecommunications data includes device identifiers and usage data on targets of investigations, potential targets, associates of targets, and any individuals or entities that receive calls from these individuals ("Privacy Impact Assessment," n.d.).

Biometrics

The Department of Homeland Security, including ICE and CBP, utilize facial recognition technology to bolster investigations and facilitate checks at ports of entry (Schwartz & American-Statement, n.d.; "DHS/ICE/PIA-054 ICE Use of Facial Recognition Services," n.d., p. 9). Facial recognition technology, though useful for tracking human movement, is dangerous as it may yield false positives leading to women and people of color being adversely impacted by the technology. A report by The National Institute of Standards and Technology found racial and gender bias in facial recognition software employed by the Department of Homeland Security (Grother et al., 2019).

An Automated Passport Control (APC) is a self-serve technology used by CBP to streamline the entry process for US citizens, US legal permanent residents, Canadian citizens, eligible Visa Waiver Program (VWP) participants, and specific US visa holder travelers. Travelers entering under the VWP are required to have ePassports, which include both biometric and biographic data. The US ePassport and many VWP participant countries are built by Thales Group. The kiosks can be found at international terminals in most major airports in the US. Travelers seeking entry using APC have their passport scanned by the kiosk, take a photograph, and answer a series of CBP inspection-related questions verifying biographic and flight information. The kiosk then transmits this information to CBP via secure encryption protocol (*Automated Passport Control (APC)*, n.d.).

Drones

To solve the security conundrum of surveilling thousands of miles along the US-Mexico border, drones are being used by CBP. The aircraft range in size from older models measuring 11 meters and weighing two and a half tons to newer models resembling drones in size and capabilities seen at American parks or in YouTube video footage (Ghaffary, 2019). The drones range in capabilities too. The larger Predator drones, initially developed for military operations, can fly for longer distances for a prolonged period in less than perfect weather. The larger drones are more difficult to operate, require special training, and have been known to crash (Ghaffary, 2019). The smaller drones fulfill many of the capability gaps that the larger ones leave behind as they are generally less expensive, easier to fly, and more easily deployable.

According to the CBP, which produces impact assessments on their own technologies, both types of drones have narrow and defined use cases primarily for ad-hoc investigative purposes. Moreover, CBP points out that the same surveillance technology, such as wide-area motion imagery (WAMI) sensors that can detect objects and track their movement, are used in other manned aircraft like helicopters. Any personally identifiable information data produced by drones and manned surveillance aircraft can then be associated with individual case files in the ICM (Eckardt & Cantor, n.d.). While the drones allow CBP to scale their border security

efforts, they are not a panacea as they still require teams of trained agents to launch and operate them, limiting their stated benefits. The troves of data gathered on people seeking to cross the US-Mexico border then have to be logged and analyzed by agents (Ghaffary, 2019).

Drones equipped with artificial intelligence technology can automate many of the time-intensive tasks of CBP and ICE agents, and in turn, amplify the ability to track and detain immigrants and people mistaken as immigrants (Crawford et al., n.d., p. 40). Drones use AI to monitor large areas of land, process images, differentiate between humans and animals, and do the work of flagging possible undocumented immigrants or smugglers (Ghaffary, 2019). Aside from questions of the long-term effectiveness of programs to cut migration and drug trafficking into the US, the use of AI technology at the border raises questions of constitutional rights. AI technology makes CBP's and ICE's investigative work more automated, but the reliance on these tools also creates the possibility for populations and areas to be overly policed.

The use of drones, with or without the use of AI technology, is sanctioned within a 100-mile (161-kilometer) border zone. Nearly two-thirds of Americans live within CBP and ICE's jurisdictions. Under the guise of active and ongoing investigations and only internal oversight mechanisms to oversee the agency's use of technology, the tools are vulnerable to abuse (*The Constitution in the 100-Mile Border Zone*, n.d.). Without more safeguards and independent oversights, the human rights of both citizens and undocumented people stand to lose from the continued expansion of AI technology.

Closed-Circuit Television (CCTV)

CCTV is used extensively at ports of entry as well as on drones and towers. The CCTV feeds can be analyzed by artificial intelligence models such as facial recognition technologies ("DHS/CBP/PIA-014(a) Centralized Area Video Surveillance System," n.d.).

Night Vision Devices (NVDs)

Various technologies employed by CBP and other agencies use NVDs to carry out surveillance in the dark. The NVDs are generally used in drones, towers, and CCTV cameras ("Guns, Drones, and Night Vision," 2017).

Thermal Imaging

Various technologies employed by CBP and other agencies use thermal imaging technology to carry out surveillance. Thermal imaging technology is generally used in drones and towers (FLIR Systems, Inc., n.d.).

Integrated Fixed Towers (IFTs)

IFTs, built by Elbit Systems, are also being used by CBP to monitor large areas of borderlands for unlawful activity (Elbit Systems Ltd., n.d.). IFTs are physical structures typically 25 to 40 meters tall that can surveil a radius of up to 10 kilometers. They are equipped with night vision capabilities, radar, and add to the ecosystem of tools used by CBP (Ghaffary, 2019). The data gathered by towers can also be wrangled using AI technology and has raised many of the same concerns that other surveillance poses to civil liberties and human rights.

Fiber-Optic Sensor Systems

Fiber-Optic Sensor systems are buried cables that can detect movement below and above the ground using an optical pulse sent down through a cable that then measures changes in the light. This technology is being considered for use by CBP to detect tunnels as well as the movement of people above ground at the border (Mark, n.d.).

Regulations for Use of Border Technology

There are no regulations that govern the acquisition or use of technology at the border by the Department of Homeland Security and its various agencies. The Department of Homeland Security, CBP and ICE are largely self-regulated, except in cases of ad-hoc interventions by the U.S. Congress (Jasper, n.d.).

International Involvement

The United States and Mexico have a history of bilateral agreements on issues of border infrastructure and the flow of people and goods (Department Of State. The Office of Electronic Information, n.d.). US foreign policy, particularly interventionist policies such as drug enforcement policies, have contributed to worsening conditions in Mexico and driven migration northward.

The United States – Mexico Entry/Exit Data Sharing Initiative

The US – Mexico Entry/Exit Data Sharing Initiative creates a cooperation mechanism for the CBP and Mexico's National Migration Institute (INM) to exchange border crossing information collected from travelers entering Mexico at ports of entry along the US-Mexico border. The exchange of border crossing information under this initiative is intended to facilitate the creation of an entry-exit database for both countries with the goal of bolstering law enforcement missions (*DHS/CBP/PIA-050 United States - Mexico Entry/Exit Data Sharing Initiative*, 2017). The data sharing creates more access for the US government and more opportunity for technology to be implemented.

Broader Application of Border Technology

Many of the technologies used by the Department of Homeland Security are widely used in society, often with deleterious effects on people of color. In fact, many of the technologies were first invented for the purpose of mass market use and marketed as features. For example, in 2018 Amazon discovered one of its artificial intelligence systems set up to automate employee recruitment of engineers was reproducing bias against women. The AI models were trained on resume data submitted to the company over a ten-year period, creating a feedback loop because more men had submitted and were hired during that time frame (*Amazon Scraps Secret AI Recruiting Tool*, n.d.). Widely available facial recognition technology has also been shown to produce harmful outcomes for Black women and people of color. An MIT study showed an error rate of 34.7% for dark-skinned women, but only an 0.8% for light-skinned men (*Study Finds Gender and Skin-Type Bias in Commercial Artificial-Intelligence Systems*, n.d.). Perhaps the most consequential use of technology shows up in the use of AI for the purposes of policing. Considering the Amazon example, one can see how faulty data is used to train the AI systems which in turn disproportionately criminalize Black people. Predictive policing analyzes information from historical crimes to infer when and where crime is likely to occur. In a feedback loop, areas and people more likely to have been policed are then more likely to be flagged for more policing by the AI system (Guariglia, 2020).

Recommendations

Currently, regulations that govern the use of technology at the US-Mexico border are not specific enough or have not kept up with emerging technologies such as drones, surveillance systems, biometrics, and AI. Technologies used to track, identify, and collect information about migrants, refugees, and asylum seekers are largely governed by the departments that use them. As technology advances, regulations need to be able to adapt and respond to the needs and demands of border security. With little to no independent oversight and the Fourth Amendment, which protects anyone on US soil from unreasonable searches and seizures, in mind, regulations need to consider how data collection by border security officials and their technology impacts a person's privacy, instead of focusing on specific data types. In light of these concerns, we recommend that the U.S. Congress takes the following actions:

1. Create an independent and neutral party to analyze and vet new technologies used by the Department of Homeland Security at the US-Mexico border.
2. Enact legislation that places a buffer between the DHS and subjects of investigations by forcing all subpoenas to be court-approved by a judge in the US government's judicial branch. Currently, the Department of Homeland Security can issue administrative subpoenas signed by in-house lawyers with no traditional safeguards, leading to unjustified intrusions of privacy and indiscriminate deployment of border technology.

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