The Governmentality of Automated Number Plate Recognition surveillance in Rotterdam: a case study of Project A.N.P.R.

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The Governmentality of Automated Number Plate Recognition surveillance in Rotterdam: a case study of Project A.N.P.R.

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Abstract

This thesis seeks to understand the type of Governmentality used in the deployment of Automated Number Plate Recognition (ANPR) surveillance within the Dutch city Rotterdam during Project ANPR. Discipline and Security are compared and contrasted using Klauser's axes of referentiality, normativity, and spatiality. A content analysis was conducted on policy documents and a spatial analysis was conducted on the ANPR camera locations as published by the Dutch government. This thesis offers the first detailed empirical examination of the spatial characteristics of ANPR surveillance. The analysis showed Project ANPR was closely related to the Governmentality of Security. Project ANPR understood and governed crime through the lens of flows, nodes, and crime hotspots implying an understanding of reality and normativity closely associated with Security. These results were reflected in the spatial analysis. While the majority of surveillance was directed towards capturing traffic flows, some spaces were found to be fully enclosed by ANPR surveillance. In conclusion, this thesis gives the first detailed empirical insight into how ANPR surveillance is related to the Governmentality of Security, how ANPR can be used to 'protect' crime hotspots or capture traffic flows, and reiterates the importance of a spatial understanding of surveillance.

List of abbreviations

(ANPR)   Automatic Number Plate Registration

(ALPR)   Automatic License Plate Registration

(CCTV)   Closed-Circuit Television

(IT)   Information Technology

(PIO)   Politie in Ontwikkeling (*Police in Development*)

(RIO)   Regionale Informatie Organisatie (*Regional Information Organization*)

(WODC)   Wetenschappelijk Onderzoek en Documentatiecentrum (*Research and Documentation Center*)

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1 Introduction

1.1 Setting the scene: the rise of automated surveillance

Surveillance has been around long before the invention of the internet, CCTV cameras, or panoptic prisons. People have relied for centuries on surveillance to find natural resources and keep taps on potential rivals (Locke, 2010). Over time, the information collection became more sophisticated and less reliant on direct observation. These technological developments have enabled surveillance to take place far beyond historic constraints on information gathering (Lyon et al., 2012).

Contemporary surveillance is conducted amid an information revolution. Castells argues we are in the midst of a technological revolution based around information and processing technologies (Castells, 2010). Compared to the previous information revolutions like the spread of the printing press in China and Europe 'our' information revolution penetrates deep into society (Castells, 2010). In the 17th century, the printing press revolutionized the storage and exchange of information but due to the low literacy rate at the time the revolution passed by most ordinary people. Today's information revolution spreads rapidly and extensively. Within one generation top-secret military microcomputing and telecommunications technologies became accessible to people across the globe (Castells, 2010).

The extent of this technological revolution is illustrated by the fact that Information Technology (IT) is used to govern by itself. Increasingly our environment is being governed by algorithmic and code technologies who "continuously and invisibly classify, standardize, and demarcate rights, privileges, inclusions, exclusions, and mobilities and normative social judgments across vast, distanciated, domains" (Graham, 2005, p. 563). This type of governance relies on the availability of data to make the world governable. To collect the data required to govern websites, hospitals, or traffic management surveillance has become an essential part of our lives (Graham & Wood, 2003). Lyon argues surveillance is the primary form of governing and understanding of our time (Lyon et al., 2012).

Surveillance is characterized by its systemic attention directed at people or factors related to people (Klauser, 2017; Marx, 2015). In this regard, surveillance differs from other more benign forms of attention because it is concentrated and calculated qualities (Lyon, 2007). Murakami defines surveillance as the following: "purposeful, routine, systematic and focused attention paid to personal details, for the sake of control, entitlement, management, influence or protection" (Murakami Wood et al., 2006, p. 4).

The proliferation of technologies used for the collection, storage, and processing of information also expanded the possibilities of surveillance. Algorithmic surveillance relies on the capture (sensor), storage (database), and analysis (comparison and prediction) of data (Graham & Wood, 2003). The power of modern Information Technology based surveillance comes from the improvements in both gathering and processing information. Kitchin and Dodge argue software has transformed surveillance to a process that can be "automated (technologically enacted), automatic (the technology performs the regulation without prompting or direction), and autonomous (regulation, Discipline, and outcomes are enacted without human oversight) in nature" (Kitchin & Dodge, 2011, p. 85). For instance, compared to human cameras, operator code-based cameras can be deployed at a vast scale (Graham & Wood, 2003). IT-based cameras can tirelessly collect and categorize behavior, creating before unimaginable amounts of information. To make sense of these information flows algorithms are used to analyze and surveil the data (Thrift et al., 2002).

Attention has also been paid to the networks that conduct contemporary surveillance. These 'surveillance assemblages' are complex interconnected systems that conduct digital surveillance (Haggerty & Ericson, 2000). To understand IT-based surveillance is to understand the connections and the functions in these networks (Lyon et al., 2012). The increasing breadth and depth of surveillance make it harder and harder for people to remain anonymous resulting in the 'disappearance of disappearance' (Haggerty & Ericson, 2000, p. 619).

The sprawling of surveillance applications is partly caused by the technical developments outlined above, however, surveillance remains a tool to achieve an objective. Therefore, the rise of surveillance is also a consequence of new preserved threats, governmental rationalities, and changing sentiments (Lyon et al., 2012). The increase in surveillance can be seen as a response to the emergence of the *risk society* in which society becomes preoccupied with identifying, monitoring, and preventing risks (Beck, 1992). It has been observed that society and policymakers are moving towards what some call a 'preventative logic'(Boer & Buuren, 2003). This shift from the punishment to the preemption of crime places a new burden on law enforcement. To find these soon-to-be criminals police have to monitor non-criminals on a large scale. The increasing role of intelligence in police work can be seen in the expanding toolbox of police forces; network analysis, data mining, tracking of digital communication no longer seem out of place during a police investigation. The preventive logic is also disciplinary at heart, it seeks to guide citizens away from crime by mentally disciplining them (Boer & Buuren, 2003).

1.2   Research Questions

This thesis aims to understand from a Foucauldian power perspective the deployment of ANPR surveillance in the city of Rotterdam. More specifically this thesis aims to understand the rationalities that led up to the deployment of ANPR surveillance and the spatial technologies used to implement this surveillance. To this end I have formulated the following research question: According to what Governmentality has the Regionale Eenheid Rotterdam deployed ANPR surveillance cameras during Project ANPR?

To answer the central research question I have formulated the following sub-questions:

1. How did the Regionale Eenheid Rotterdam use referentiality during Project ANPR?
2. How did the Regionale Eenheid Rotterdam use normativity during Project of ANPR?
3. How did the Regionale Eenheid Rotterdam use spatiality in the deployment of ANPR cameras during Project ANPR?

1.3   The importance of ANPR

The trends outlined in the brief introduction of automated surveillance above point towards an increasing intensity of automated surveillance. One of the topics within the field of automated surveillance studies that have received considerable interest from academics and police forces is the use of Automated Number Plate Registration (ANPR). The automatic scanning of number plates became possible after the development of military technologies during the Gulf War in 1991 (Coaffee, 2021; Rogers et al., 2009). Since then the technology has been applied to many civilian purposes and modern motorways have become a place of intense surveillance. For example to limit congestion modern highways are lined with an array of sensors to track and predict the flow of traffic. Kitchin and Dodge argue this creates coded spaces where surveillance-powered software

effectively governs our streets and highways (Dodge & Kitchin, 2004). Dodge and Kitchin argue speed warnings and red light cameras function to self-Discipline drivers, and affect how drivers move across space in terms of speed and route (Dodge & Kitchin, 2006). Beyond these examples that are used to improve ease of travel and safety, surveillance is increasingly used by police to fight crime in general. The British ambition is to use ANPR technology as "a proactive policing tool which aims to prevent criminality by denying criminals the use of the roads" (National Policing Improvement Agency, 2008, p. 118).

ANPR cameras are essentially CCTV cameras aided by an algorithm to identify and recognize number plates. Much like facial recognition algorithms deanonymize passersby by coupling people's unique facial characteristics to a database, ANPR allows police to instantly deanonymize the occupants of a car by coupling the license plate to a database (Norris, 2002). The database allows drivers along a road to be identified and labeled like: offender/nonoffender, suspect/non-suspect (Norris, 2002). Norris argues the combination of instant identification and databases "exponentially increases its panoptic power" (Norris, 2002, p. 270). The following table sums up the difference between CCTV and ANPR surveillance.

Table 2.1 Characteristics of ANPR and CCTV

ANPR	CCTV
Digital	Mostly analogue*
Algorithmic and automated	Manual*
Increased capacity of storage & analysis	Limited storage of data*
One moment in time	Continuous recording
Fast	Slow*
Automatic recognition and tracking	Manual tracking*
Identities**	Images of people, cars, places
Known population**	Anonymous
Tracking of vehicles	Tracking of vehicles and people
Low coverage, limited to roads	Extensive coverage, incl. pedestrian areas
Driving population	Everybody
No need to monitor behaviour	Constant need to monitor behaviour
Reduced number of operators; reduced 'operator' bias (automatic detection of suspects)	High number of operators; highly skilled; danger of 'operator' bias (operator decides on suspicious behaviour)

* However, more digital CCTV systems are currently installed. Digital CCTV is more effective and more reliable. The data are digitally recorded and stored instead of being recorded onto video

Figure 1: The role of automatic number plate recognition surveillance within policing and public reassurance (Haines, 2009, p. 30).

ANPR cameras differ from regular surveillance cameras in several aspects (Haines, 2009, p. 30). First, ANPR cameras are not interested in the behavior but the location of subjects. Non ANPR cameras aim to observe (criminal) behavior within a specific location, the aim of ANPR cameras is simply to register the passage of vehicles along different points. Second, ANPR cameras can't provide video surveillance of a subject. ANPR cameras take one photograph of a vehicle to determine the license plate. If for instance the driver is photographed his or her face is blurred. Non ANPR cameras can continuously video monitor the behavior of the subject within the field of view. Third, ANPR

surveillance relies solely on computer systems. Artificial Intelligence is used to identify number plates of photographed cars and a computer system is used to compare the identified number plate to predetermined lists. If desired a computer analysis can be run to identify suspicious vehicle movements within the obtained dataset. This contrasts with analog cameras who rely on a human to watch to determine if criminal behavior has occurred.

Compared to traditional road policing, ANPR greatly expands the information collection and processing capabilities of police forces. The drivers increased awareness of this surveillance network can have a stronger self-disciplining effect than traditional policing (Kitchin & Dodge, 2011). The use of ANPR surveillance has moved from being limited to an anti-terror tool to being used to monitor the general public (Fussey & Coaffee, 2012). However, when it comes to the application of ANPR surveillance technologies, there are large differences between counties and regions (Dodge & Kitchin, 2007). For instance, the police in the United Kingdom heavily rely on ANPR technology while Irish police use the technology sparingly (National Policing Improvement Agency, 2008, p. 118).

Despite the rapid rise in ANPR installations and applications, ANPR is not a fix-all solution. The deployment of ANPR surveillance systems on police vehicles did not significantly deter crime or social disorder (Koper et al., 2021). However mobile ANPR systems performed similarly to traditional methods while using fewer police officers making ANPR surveillance cost-effective (Behruz et al., 2012; Ozer, 2016). The placement of ANPR cameras is also limited by the high cost of camera sets. In the United States, a mobile system costs approximately $20.000 and a fixed location costs approximately $100.000 (Ozer, 2016). However a study in Iran found the vulnerability of relying on ANPR surveillance, first camera systems could easily be taken out leading to an information blackout. Second, cunning drivers are also able to deceive ANPR systems by covering number plates, driving with an opened trunk, or installing magnetic numbers to forward traffic tickets to other drivers (Behruz et al., 2013).

1.4 Academic Relevance

The rise of ANPR and automated surveillance can be studied in a myriad of theoretical frameworks, contexts, and academic disciplines. In this chapter, I will argue specifically why the study of ANPR warrants a Foucauldian and spatially sentient approach. As discussed earlier in this chapter the rise of ANPR and surveillance, in general, is the response to the increasing importance of risk. Beck argues the concept of a *risk society* best captures this change. He relies on historical analysis to argue that the current preoccupation of risk is a consequence of modern development (Beck, 1992). In this view, risk is inherent to modern technology and its impact on the globe. However, this analysis does not address how risk is constructed and shaped by people in practice and is at times deterministic (Aradau & Van Munster, 2007). To understand the use of risk and surveillance it is necessary to understand the logic and technologies used to define and govern problems (Aradau & Van Munster, 2007). To me, a Governmentality analysis offers the fullest account of contemporary risk, and therefore of the use of surveillance and the deployment of ANPR.

The study of Governmentality, Discipline, and Security is predominantly focused on theoretical discussions and is lacking an empirical approach (Ranasinghe, 2013). This risks producing "grandiose theoretical musings that often miss the mark" (Ranasinghe, 2013, p. 90). To understand Discipline and Security it is, therefore, necessary to examine the practical workings of the concepts. As Valverde argues, just as god or religion can only be scientifically understood by examining the actions of its believers, so can Discipline and Security only be understood by their manifestations in reality (Valverde, 2011).

Significant academic attention has been devoted to the data aspects of ANPR surveillance. ANPR is extensively described from the scanning of number plates, data processing, data storage, information analysis, and finally to the use of profiling. However, this entire process is reliant on placing and positioning the number plate scanners. The resultant spatiality of ANPR cameras, by directing where traffic data is captured and where it is not captured becomes encoded into the full chain of data processing, analysis, and prediction (Marciniak, 2021). Spatiality, therefore, sets the scene of what police forces know (or remain unaware of) and where their actions are directed, based on the analysis and predictions of spatially negotiated data.

Foucault's analysis of power and surveillance has a strong spatial interest: 'Space is fundamental in any form of communal life; space is fundamental in any exercise of power' (Foucault, 1986, p. 252). The spatial dimensions of ANPR surveillance have been recognized in the literature. Coaffee's study of the deployment of ANPR in the United Kingdom is an important starting point. Following the bombings of the Provisional Irish Republican Army in 1992, the United Kingdom constructed a 'Ring of steel' around the financial center of London (Fussey & Coaffee, 2012, p. 203). This spatial logic had been used before to protect against terror attacks in Belfast, however, to avoid the 'barrier mentality' created by checkpoints of armed police ANPR technology was used to minimize the impact on the financial center of the United Kingdom (Rogers et al., 2009). The ring was designed to create a securitized safe zone protected by physical barriers and ANPR monitored access points (Fussey & Coaffee, 2012). A reversed spatial logic can be found in 'Project Champion' in the British city of Birmingham. Police units encircled two largely Muslim neighborhoods with ANPR cameras to combat Islamic terrorism (Fussey, 2013; Fussey & Coaffee, 2012, p. 207). After a public outcry, the project was canceled. The geographical distribution of ANPR cameras can create inequalities between communities as some citizens are more likely to have their data captured by surveillance systems than others (William & Webster, 2012). This model of ANPR surveillance has since been adopted by mutable locations outside of the UK (Fussey & Coaffee, 2012; Graham, 2010).

However limited academic literature is devoted to the actual placement and the location of ANPR cameras (Trotta & Donnay, 2017). The existing body of work is primarily focused on solving technical and efficiency issues. For instance, Gör and Karakaya developed a model to determine if cameras are more efficiently placed in a centralized or decentralized fashion (Gör & Karakaya, 2021). Matysiak examined ideal ANPR locations in Warsaw (Matysiak et al., 2013). Or how ANPR cameras can be positioned to establish prohibited zones for vehicles in Tehran (Behruz et al., 2012). Klauser contributed by reemphasizing the importance of spatiality in the study of surveillance and demonstrating the continued relevance of the study of Governmentalities. However, while his work has focused on CCTV camera surveillance and modern automated and IT-based surveillance a study of automated surveillance cameras such as ANPR is lacking. This thesis fills this lacune by examining the role of Discipline and Security in the deployment of ANPR surveillance in the city of Rotterdam.

1.5 Societal Relevance

Civil society has a vested interest in understanding the use and deployment of ANPR technology. Starting with the first crude implementations of ANPR technology the impact of surveillance systems on society was apparent. ANPR was first used in 1984 in an effort of the British government to end the strike of the National Union of Mineworkers. ANPR technology was used to identify and stop vehicles carrying picketers (striking union members) from assembling on strategic locations (Norris & L'Hoiry, 2017). The mining strikes accelerated the development of ANPR, however, the threat of the Irish Republican Army (IRA) caused the first wide-scale implementation of ANPR surveillance (Norris & L'Hoiry, 2017).

Video surveillance can be used to establish access control, and manage the flow of people between spaces by identifying and stopping undesired travel movements (Klauser, 2004b). For instance, facial recognition technology is used at Zurich airport to scan travelers and compare them to known illegal migrants. The scale and intensity of modern ANPR surveillance have a significant impact on the privacy of citizens. A single ANPR system can capture information about all passing vehicles of a section of a road. When camera systems are connected to a network, the amount of gathered data can be enormous. For instance, a study in the Chinese city of Guangzhou revealed 516 stationary ANPR locations identified 260 million movements by 14 million vehicles in only one month (Gao et al., 2019). Besides the scale of surveillance, the collected location-based data is highly personalized. Even when data is stored in anonymized datasets researchers found 90% of citizens of Guangzhou could be identified by five spatiotemporal datapoints (Gao et al., 2019). Given the sensitivity of location-based data from a societal perspective, it is important to understand the logics and power relations that underlie the placement of ANPR surveillance systems. For instance, the controversy and the subsequent cancellation of Project Champion demonstrate the public has a vested interest in understanding the logic behind the spatial allocation of ANPR surveillance (Norris & L'Hoiry, 2017). In response to a freedom of information request about the locations of British ANPR cameras the British Information Commissioner's Office acknowledged "The existence and extent of the ANPR network both within Devon and Cornwall and nationwide is of considerable significance to the balance of the public interest" (Information Commissioner's Office, 2010, p. 7). The release of ANPR locations was denied hampering the democratic legitimacy of ANPR surveillance in the United Kingdom (Norris & L'Hoiry, 2017).

Profiling plays an important role in the deployment of ANPR surveillance systems since locations are chosen with perceived increased risk (Warren et al., 2013). This can result in inequalities between communities as surveillance is directed towards low-income, high crime, and not 'safe' middle-class areas (Warren et al., 2013). This type of profiling can create a self-fulfilling prophecy or a 'ratchet effect' increased surveillance detects more crime, warranting more surveillance (Harcourt, 2007). The only way to prevent profiling is to deploy the ANPR cameras randomly (Warren et al., 2013).

1.6 Thesis Outline

The objective of this thesis is to provide insight from a Foucauldian perspective into the motivations behind the deployment of ANPR surveillance in the Dutch city of Rotterdam. The central research question of this thesis is as follows: according to what Governmentality has the police unit of Rotterdam deployed ANPR surveillance cameras during 'Project ANPR'? To answer this question the Project ANPR is used as a case study to determine whether the Governmentality of Discipline or the Governmentality of Security is most applicable to ANPR surveillance in the city of Rotterdam. The two central Governmentalities are compared and contrasted using Klauser's concepts of referentiality, normativity, and spatiality.

The first chapter of this thesis consists of the introduction of the topics of automated surveillance, Automated Number Plate Recognition, the problem description, and resulting research questions. In the last part of the first chapter topic of ANPR, surveillance is further motivated in the section's academic and societal relevance. The second chapter addresses the main theoretical components of this thesis, the study of Governmentality in the form of Discipline and Security is outlined. The third chapter outlines the methods used to compare and contrast Discipline and Security. The chapter starts with the research design and is followed by the motivation for the use of the single case study of Project ANPR. And last, the concepts used to contrast Security and Discipline, namely

referentiality, normativity, and spatiality are discussed and operationalized. Chapter 4 uses the methodology developed in chapter 3 to analyze Project ANPR with the help of both a content and a spatial analysis. Chapter 5, summarizes the conclusions drawn from the analysis of referentiality, normativity, and spatiality. The chapter concludes Project ANPR is closely related to the logic and methods of the governmentality of Security.

2 Theoretical framework

To better understand how and why surveillance is deployed the following section will introduce Foucault's concept of Governmentality. Following a description of two types of Governmentality, Discipline, and Security the theoretical framework will be completed by introducing the framework developed by Klauser. The framework juxtaposes the Governmentalities of Discipline and Security along three axes of analysis, the first being referentiality, the second being normativity, and the third being spatiality.

2.1 Governmentality

The Governmentality framework developed by Foucault seeks to describe the rationalities and techniques used to manage and condition populations. Governmentality seeks to analyze a generalized form of power *"the way in which one conducts people's conduct,"* (Foucault, M ; Davidson, Arnold I ; Burchell, 2007, p. 389). More specifically, Governmentality consists of: "the ensemble formed by institutions, procedures, analyses and reflections, calculations, and tactics that allow the exercise of this very specific, albeit very complex, power that has the population as its target, political economy as its major form of knowledge, and apparatuses of Security as its essential technical instrument" (Foucault, M ; Davidson, Arnold I ; Burchell, 2007, p. 108). Huxley describes how the two components of Foucault's term Governmentality capture its essence (Huxley, 2006). First, government relates to the programs aimed to shape the conduct of people. These tools of influence or technologies can take many forms. For example, the panopticon prison is a technology to condition prisoners (Murakami Wood, 2007, p. 257). The organization of space can be used as a technology to shape the conduct the behavior of people (Huxley, 2006). Or the use of statistics, the compiled knowledge of the state of its resources and populations (Foucault, 2007; Newheiser, 2016). The second part; mentality, the truths and rationalities that set the values and goals of the government (Huxley, 2006). Thus to understand the 'conducts of conducts' it is essential to understand the rationalities that are constructed and then set the programs of the government. Rose and Miller argue that rationalities set moral goals, set who or what is to be governed, provide a language that makes problems 'thinkable' (Miller, P. ; Rose, 2008).

Power always takes the form of certain rationalizations from which objectives are formulated (Rose et al., 2006). A Governmentalities analysis consists of determining what objectives are being pursued (rationalities) and how these objectives are being achieved (technologies) (Rose et al., 2006). Rose, O'Malley, and Valverde write: "An analysis of governmentalities then, is one that seeks to identify these different styles of thought, their conditions of formation, the principles and knowledges that they borrow from and generate, the practices that they consist of, how they are carried out, their contestations and alliances with other arts of governing" (Rose et al., 2006, p. 84). Huxley argues that the study of Governmentality should first consist of examining the mentalities and rationalities that set objectives to which people are to be shaped. And second, the examination of how programs and technologies are deployed to shape the conduct of people (Huxley, 2007). For instance, the organization of space can be understood as a rationality of government. That is, spatiality is used to understand reality. But space can also be used as a technology of control and surveillance with the panopticon (Huxley, 2007). Therefore space should not only be seen as the product but also as a tool of surveillance (Klauser, 2017, p. 17). Space can therefore be seen as a canvas on which power is projected, the concrete result of rationalities. Thus by examining how space is shaped, power and rationalities can be exposed and questioned (Huxley, 2007).

2.1.1 Discipline

Foucault is interested in the history or genealogy of power (Murakami Wood, 2007, p.246). In *Discipline and Punish* he argues how power historically has taken on different forms. Foucault first examines how sovereign monarchal power relied on corporal punishment. Gradually, reformers replaced corporal punishment with detention and the reform of prisoners and governments developed 'disciplinary projects' to shape and improve people.

Foucault argues 'disciplinary projects' originated in an attempt to stop the spread of plagues by surveilling, segregating, and punishing a population (Foucault, 1995, p. 198). During quarantine the state would intensely survey the condition of the citizens, arrest all movement with a 'lock up' and harshly punish transgressions. Foucault argues this image of a quarantined city under total surveillance and control of the state functions as the "political dream" for a disciplined society and the "utopia of the perfectly governed city" (Foucault, 1995, p. 198). The more well-known example of disciplinary power is the panoptic prison designed by Bentham. Instead of citizens locked in their homes to arrest the spread of a virus, the prison locks up citizens to contain and cure social ills. The panopticon differs from quarantine in two ways, first, the panopticon is a permanent structure, the quarantine is a temporary emergency measure. And second is the aim of surveillance. During a quarantine, surveillance is used to stop the movement of people and track the spread of the disease from house to house. With the panopticon surveillance is used to change the citizens themselves by internalizing a constant feeling of being watched. From a central tower, an "inspector" could view all behavior of the people in their cells while the inhabitants of the cells could never be certain if the inspector was looking in their cell (Foucault, 1995, p. 201). Even though Bentham's design was never implemented, to Foucault the panopticon serves as a "diagram of a mechanism of power reduced to its ideal form" (Foucault, 1995, p. 205). This mechanism of power has broad applications to Foucault: "all that is needed, then, is to place a supervisor in a central tower and to shut up in each cell a madman, a patient, a condemned man, a worker or a schoolboy" (Foucault, 1995, p. 200). The panopticon, as a tool of surveillance, is a political technology to alter the conduct of the prison inhabitants and society at large (Haggerty & Ericson, 2000; Huxley, 2006).

The concept of the panopticon remains an important idealized form that is used to understand modern surveillance (Murakami Wood, 2007, p. 252). For instance, modern cities with electronically connected CCTV cameras can be understood as "enormous panopticons" (Koskela, 2000, p. 243). However, the enclosing quality of Bentham's prison cells is missing in CCTV surveillance of public spaces, and therefore it lacks an essential element of the panopticon (Murakami Wood, 2007, p. 252). However Foucault's genealogy of Discipline and Security is limited to the eighteenth and nineteenth century and modern applications of surveillance and the panopticon are lacking in his work (Haggerty & Ericson, 2000). Lyon argues the panopticon has not useful to understand modern surveillance (Lyon, 2003).

2.1.2 Security

Foucault argues Security seeks to "support in the reality of the phenomenon, and instead of trying to prevent it, making other elements of reality function in relation to it, in such a way that the phenomenon is canceled out" (Foucault, 2007, p. 59). Foucault illustrates the difference between Discipline and Security using the example of the port city of Nantes. The central challenge of the city of Nantes is how to deal with the flows or 'circulations' of people and goods. The challenge is to allow the right flows to take place and to reduce or eliminate unwanted flows. Foucault illustrates how Discipline and Security take on this challenge through the organization of space in distinct ways. First is the question of how space should be approached. Security seeks to work with space, using the natural elements and taking advantage of them (Foucault, M ; Davidson, Arnold I ; Burchell, 2007, p.

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19). For instance, the natural riverside of Nantes could be used to construct a long quay to accommodate shipping. However, Discipline seeks to 'completely' construct a new space. By building on one side of the river the quay and the city would become stretched out, lose its grid structure and hamper circulation. And so city builders proposed bridging the Loire, construct a new space in an expansion of the grid structure. The second question is, can space be constructed to a final and ideal state? Discipline seeks to achieve perfection, Security seeks merely to manage space. The third, is space polyfunctional? Security allows space to take on multiple forms, Discipline imprints one function onto a space. Forth, is space managed by constant modifications or a single static plan? Security takes on problems by a series of spatial interventions, Discipline formulates one solution and implements it. Both Discipline and Security rely on regulations but Security seeks to keep regulations to a minimum for the system to function. Discipline "seeks to regulate everything" (Elden, 2007, p. 565).

Deukmedjian warns against the tendency to view all surveillance as disciplinary. To him, surveillance can have Disciplinary and Security functions. Deukmedjian distinguishes two types of surveillance, Disciplinary-surveillance, and Security-surveillance. The first, disciplinary-surveillance has centripetal qualities, it is used to contain and compress. It seeks to register and counter *all* undesired behavior by prevention, correction, and enforcement (Deukmedjian, 2013). Security surveillance has centrifugal qualities, it seeks to preempt undesired actions by encompassing an ever-increasing network of detection. Security tolerates and if forced it seeks to counter *some* undesired behavior (Deukmedjian, 2013). Security surveillance monitors the *rate of flow* of undesired behavior and acts to minimize it if it is deemed intolerable (Deukmedjian, 2013).

2.2 Klauser's Framework

The following section will outline the conceptual framework developed by Klauser, and highlight the differences between Discipline and Security. Based on Foucault's work on Governmentality Klauser developed a framework to distinguish between modern surveillance of Security and Discipline. The framework uses three-axis to approach power: first is the question of how the governed reality is approached (referentiality), second the use of normalization, and third the use of space (Klauser, 2017, p. 31). This three-pronged approach aims to uncover the technologies and rationalities of power with a distinct spatial awareness that is often missing in the application of Foucault's work. The three axes of the framework are of equal importance. The axes of analysis are discussed in the following order: first, the use of referentiality, second the use of normativity, and third the use of space (spatiality). In the following figure, the theoretical framework is summarized.
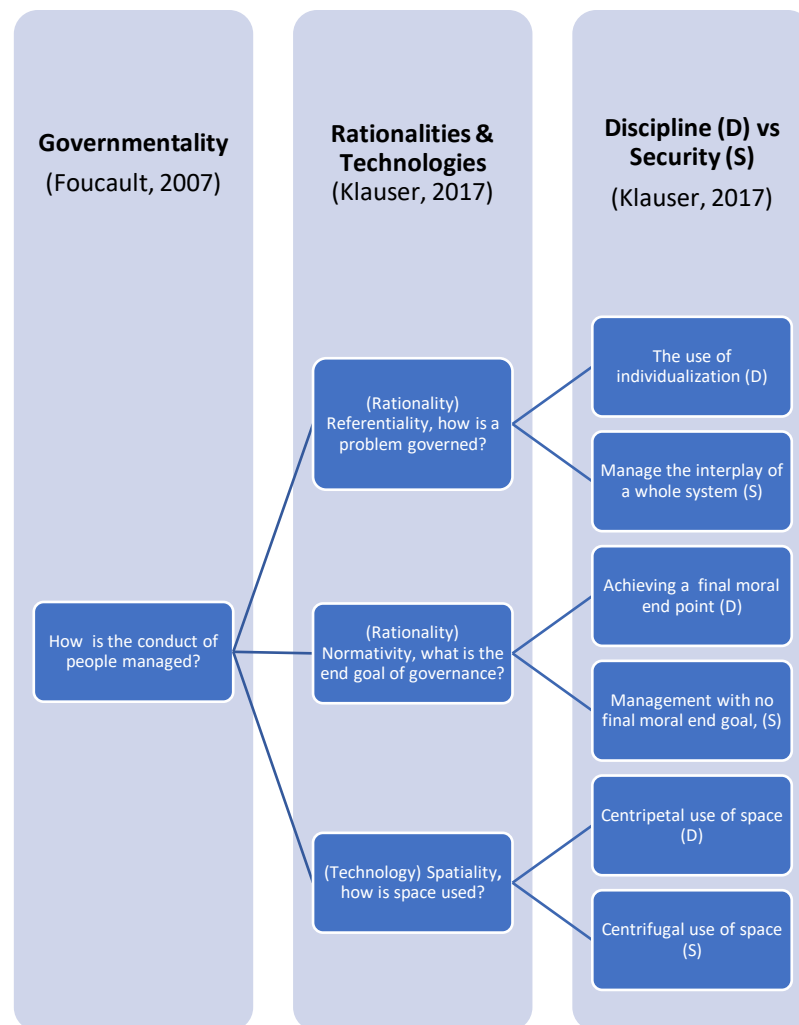
Figure 2: Klauser's framework of Governmentality, Rationalities, and Technologies.

2.2.1 Referentiality

The first axis at which Discipline and Security can be differentiated are the differences in the conception of reality. Referentiality, the references of a concept to other concepts, forms an important distinction between Discipline and Security (Klauser, 2017). Discipline and Security attribute different importance to links between concepts. Discipline seeks to understand reality with the minimum amount of references, it seeks to break down concepts and individualizes them into the minimum observable and governable reality is found (Foucault, 2007; Klauser, 2013). Security understands reality as an interlaced network of concepts and references and seeks to understand these references to understand and manage reality (Foucault, 2007).

Klauser argues Discipline and Security deal with reality in distinct ways, Discipline starts with a normative model that is imposed on reality, Security seeks to understand and work with reality (Klauser, 2017). The difference in the approach of reality can according to Foucault be understood by the management of plague and food shortages. During a pandemic disciplinary logic aims to stop and isolate a virus with the use of quarantines it imposes its will on the virus and the population (Foucault, 2007). Security in the case of a pandemic works with the virus by managing its spread with variolization and vaccination. With this controlled spread, the virus effectively nullifies itself by building up immunity in the patient. The second example deals with how Discipline and Security

confront the reality of food shortages (Foucault, 2007). Historically a central concern of French policymakers was the prevention of grain shortages, and to this end, a complex system regulating price and supply was established in France that lasted until the middle of the eighteenth century. This disciplinary approach, of working against shortages was challenged by the physiocrats who argued that if government intervention was ended and shortages were allowed to develop demand and supply would eventually nullify the problem.

2.2.2   Normativity

The second axis of analysis contrasts Discipline and Security by the conception of the norm. Normativity, the use of norms to govern and understand reality, forms the second fundamental distinction between Discipline and Security. The norm, the normal, and the abnormal are concepts that take on a different cause and effect according to Discipline and Security. To Discipline the norm is primary to the normal and abnormal, thus by setting a norm people can be divided up into normal and abnormal (Foucault, 2007). To Security, the normal and abnormal are both primary to the norm, as the normal and the abnormal are compared and contrasted to establish the norm. To understand how Discipline and Security understand the norm and the normal we will return to the example of the plague.

To Foucault, the practice of variolization forms an important insight into how the norm is conceived by Discipline and Security. From a disciplinary conception, the norm was to be in good health, healthy people are thus considered normal and sick people abnormal. From the perspective of Security, the normal is not the healthy person but the population as a whole understood as a mortality figure. For instance, it was normal in the eighteenth century to have a death rate of 1 in 7.7 during a smallpox epidemic. With this statistical figure, it is possible to plot the performance of neighborhoods compared to the normal, and differentiate between under and overperforming neighborhoods. And so the most desirable performing neighborhoods become the norm to be emulated by underperforming neighborhoods. The norm is thus deduced from reality by comparing and contrasting different characteristics.

The outlined approaches to the normativity of Discipline and Security have three main effects according to Klauser (Klauser, 2017). First, unlike Discipline Security cannot achieve an end goal. As discussed earlier, Security has no moral starting point because its understanding of the norm relies on the evaluation of reality, and the dynamic nature of reality forces a constant process of optimization and readjustment. Therefore Security cannot attain a definitive solution to a problem, it can only manage and evolve with reality.
Second, Security in contrast to Discipline has a flexible understanding of the normal/abnormal and permitted/not-permitted. Where Discipline rigidly deducts the normal and abnormal from the fixed norm, Security forms the norm based on an assessment of the most favorable normality in reality. As the norm evolves with reality, the permitted and unpermitted must change with it.
Thirdly, Security attributes no permanent or intrinsic value to the different forms of the normal. It merely "makes use of certain distributions considered to be, if you like, more normal than the others, or at any rate more favorable than the others. These distributions will serve as the norm" (Foucault, 2007, p. 63). These components of reality are judged on their function and are allowed to operate freely within the limits of the acceptable (Klauser, 2017). Foucault illustrates this reasoning by giving examples of the questions that arise by managing crime through the lens of Security: "What is the average rate of criminality?... How much does this criminality cost society?... What, therefore, is the comparative cost of the theft and of its repression, and what is more worthwhile: to tolerate a bit more theft or to tolerate a bit more repression?" (Foucault, 2007, p. 4).
To Klauser, this last characteristic of Security, the management of reality's components to operate

freely within the acceptable is the hallmark of liberal government. It follows that freedom requires the control of the conditions that make freedom possible. Klauser argues this has important implications for the function of liberalism on the contextual level, to create and protect freedom requires disciplinary techniques of power (Klauser, 2017, p. 66). To expand freedom it can be necessary to increase regulation, in this sense "control is no longer just the necessary counterweight to freedom, […] it becomes its mainspring" (Foucault, 2008, p. 67).

2.2.3   Spatiality

The third axis of analysis between Discipline and Security concerns the use of space. Before the differences between Discipline and Security will be highlighted, a short definition of space will be given. Space is understood not simply as a static stage where people and matter interact. Space is understood as a dynamic phenomenon that is constantly recreated by social and material outcomes (Dodge & Kitchin, 2005). Therefore if software and code are used to manage people or matter the code coproduces this space. This production of space can take on various forms: *code/space* where the functioning of space is fully dependent on the functioning of code, *coded space* where a space relies on code but can function (in a reduced capacity) without it. *Background coded space* applies to places where code is present but unused. When the background code is activated the space becomes either code/space or coded space. By this definition the essence of the space we call 'roads' is not the physical layout of the road itself but the continuous interplay between the physical, code-based governance and road users. Code-based governance produces driving spaces in four different ways: spatial behavior, affecting access, movement, and flow (Dodge & Kitchin, 2006). The first *spatial behavior*, automated surveillance, has the effect of disciplining drivers altering their movement around a road network. Second, *affecting access,* code is used to control or monitor access to the road. The third *movement*, fourth *flow*, code-based governance can optimize flows for effective traffic management or block unwanted flows with the help of ANPR surveillance.

Foucault developed a 'spatial grammar' to make sense of how power in the form of Discipline and Security shape space (Klauser, 2013). By juxtaposing openness and enclosure, flexibility and fixity, circulation and internal organization the spatial logics of surveillance can be recognized and analyzed (Klauser, 2017). Klauser warns against essentializing the spatial dynamics of Security and Discipline. To Klauser, the strength of Foucault's framework and spatial grammar is its ability to analyze the interplay between the spatial logics of surveillance (Klauser, 2013, 2017). For instance, the spatial logics of surveillance used by cities hosting mega sports events such as soccer tournaments and the Olympic games rely on both the free circulation of fans and the strict enclosure of parts of the city.

Klauser describes how the different types of spatial distribution are related to different types of surveillance practices, punctual linear and planar. Punctual cameras are related to fixity, concision, and containment. Linear places are related to connectivity, movement, contrast, and separation, and planes are related to boundlessness and differentiation (Klauser, 2017, p. 56).
This vocabulary allows locations to be categorized based on the type of surveillance. For example, if an individual is recorded by a Security camera when entering the door of a shop, the surveillance is based on fixity and containment. The camera is placed to protect the property of the owner by monitoring who enters or leaves the shop. If the same individual is filmed by multiple, vertically (static) placed cameras when walking on the street linear surveillance applies. If the same individual walks across a public square monitored by a mobile camera he or she crosses the planal surveillance. The following figure summarizes Klauser's framework of points, lines, and planes.

Geographical description	View of CCTV camera	Aim of detection	ANPR
Point	Single vertical camera.	Entrance of an enclosed space.	Entrance of an enclosed space.
Linear	Series of vertical cameras.	Movement along a route / across a line.	Movement along a route / across a line.
Planar	Horizontal camera.	Movement within a plane.	Entrance and movement within a plane

Table 1: Points, lines, and planes, the fields of view of surveillance.

3 Methodology

3.1 Research Design

As stated in the introduction this thesis seeks to answer the following central research question: according to what Governmentality has the Regionale Eenheid Rotterdam deployed ANPR surveillance cameras during Project ANPR? To understand what type of Governmentality (Discipline or Security) shaped the deployment of ANPR surveillance, Project ANPR is analyzed using Klauser's framework of referentiality, normativity, and spatiality. The central research question is therefore split into three sub-questions:

1. How did the Regionale Eenheid Rotterdam use referentiality during Project ANPR?
2. How did the Regionale Eenheid Rotterdam use normativity during Project of ANPR?
3. How did the Regionale Eenheid Rotterdam use spatiality in the deployment of ANPR cameras during Project ANPR?

To understand how the Governmentalities of Discipline or Security shaped the deployment of ANPR surveillance during Project ANPR it is necessary to elaborate on the research design of this thesis. A research design is a logical and coherent plan to answer the central research question and outline how questions are turned into conclusions (Yin, 2003b). This thesis follows a qualitative approach as qualitative research is best suited to answer 'how' and 'why' questions like the research question of this thesis (Rich & Ginsburg, 1999). Understanding how Governmentality shapes the deployment of ANPR surveillance requires an in-depth discussion on the rationalities and technologies outlined in the literature review. The complex and contextual nature of Governmentality thus necessitates a qualitative approach. The analysis of this thesis follows a deductive approach, Discipline and Security will function as two distinct possible forms of Governmentality used in the deployment of ANPR surveillance. The aim of this thesis is thus to understand if and in what way these theory-derived concepts can be found in reality. The central research question is answered by determining if and how the Governmentality of Discipline or the Governmentality of Security shaped the deployment of ANPR surveillance.

To determine if and how Discipline or Security shapes the deployment of ANPR surveillance a case study design was used. Case studies are defined by Yin as "an empirical inquiry that: investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not evident" (Yin, 2003b, p. 13). Case studies are useful to understand emerging, complex, and in-depth topics (Garcia et al., 2013). More specifically, Yin argues case studies are best suited to (1) how and why questions, (2) events that don't require control over behavioral events, (3) rely on contemporary events as opposed to historic events (Yin, 2003b). This thesis shares characteristics outlined by Yin in the following way: First, this thesis relies on a how question as it seeks to understand how Discipline or Security shape ANPR deployment. Second, the research does not require behavioral control over events, the deployment of ANPR cameras can be studied using desk research with the help of policy reports and without the need for intervention or control over the deployment. Third, the research has to rely on contemporary events, the large-scale deployment of ANPR surveillance is a recent development. Project ANPR started in 2006 and was one of the first large-scale deployments of ANPR surveillance. This situates Project ANPR in a contemporary setting.

This thesis makes use of a single holistic case study of the Project ANPR. Single case studies rely on a well-chosen case to understand unique or new contexts (Yin, 2003b). While single case studies may

be less representative than multiple case studies, Yin argues single case studies can, under the right conditions, provide valuable insights. For instance, if a case represents a *critical case*, a case study can be used to test or extend existing theory with clear established propositions (Yin, 2003b). As the literature review showed within the Governmentality literature ANPR is more closely associated with Security than with Discipline (Fussey & Coaffee, 2012). The Project ANPR represents a critical case study, as it tests this association using the framework developed by Klauser. Using the existing framework of referentiality, normativity, and spatiality to determine the type of Governmentality used in the deployment of ANPR surveillance in Rotterdam. To answer the central question of this thesis use was made of a single holistic case study; the implementation of ANPR surveillance in the Dutch city of Rotterdam under the name 'project plan ANPR'. The single unit of analysis is Project ANPR and it is investigated in one context, the police district of Rotterdam.

To understand what Governmentality shaped Project ANPR, Discipline and Security are analyzed using the framework of Klauser. The following figure shows how Klauser juxtaposes Discipline vs Security along the axes of referentiality, normativity, and spatiality.
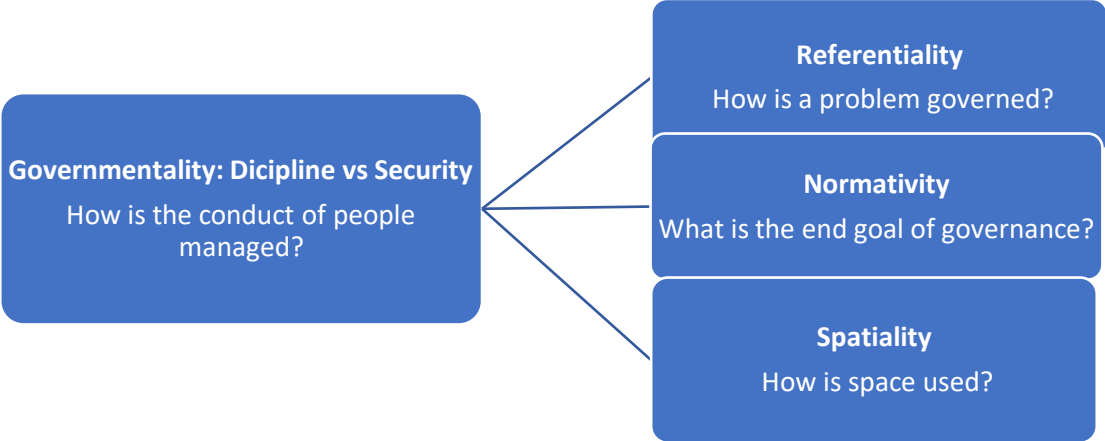
Figure 3: Klauser's framework of referentiality, normativity, and spatiality (2017).

3.2 Case Selection

The following section outlines the motivations behind the selection of Project ANPR for the case study. First, briefly, the choice for police forces as operators of ANPR surveillance is motivated. Second, the choice of a case within the Netherlands is motivated. And third, the choice of selecting the police district of Rotterdam and Project ANPR is motivated.

First, from a Foucauldian perspective police take on an important role in both understanding a population with the use of statistics and surveillance and the management of a population by a series of interventions based on the gathered information (Johnson, 2014). While private actors do use surveillance, their goal is to provide local security (Klauser, 2004a). Governments use surveillance with the aim of guiding or governing citizens (Klauser, 2004a). Within the apparatus of government police forces have the resources and capabilities to acquire and operate ANPR surveillance at a large scale. For instance, within the Netherlands, police departments form the largest operators and users of ANPR surveillance (Berkel et al., 2020). Police forces are therefore well suited to a Governmentality analysis because of the capability to operate significant ANPR surveillance and the intent to guide or govern citizens.

Second, the Netherlands is an international transit hub with multiple harbors, airports and has a highly developed infrastructure. The country faces transit crime as criminal flows go to and from Europe (Neve, 2010). The European Union with its free flow of people, capital, goods, and services, together with its national approach to policing, has benefited criminal networks. For example, Castells noted how Dutch harbors are used by heroin smugglers of the Chinese Triad (Castells, 2010).

The use of ANPR technologies in the Netherlands has been described by multiple authors. Ooijen and Bokhorst described how ANPR surveillance has gained legitimacy in the Netherlands (Ooijen & Bokhorst, 2012). Law enforcement legitimizes the use of surveillance technology because of its effectiveness to fight crime. Interviews with police staff tasked with placing and handling ANPR surveillance showed ANPR is not deliberately used to 'Discipline' drivers. However, Ooijen notes despite these intentions the surveillance still can have a disciplinary effect, as drivers now know they could be watched (Ooijen, 2014). Flight and Egmond found Dutch police placed ANPR cameras at strategic locations like tunnels, to allow law enforcement some extra time to respond to suspect vehicles (Flight & Egmond, 2011).

The use of ANPR surveillance by Dutch police is well established. In the Netherlands stationary ANPR cameras are operational 24 hours, seven days a week, and are capable to monitor all passing traffic (Flight & Egmond, 2011). The surveillance network is partly shared with Belgium, Luxemburg since the Benelux countries signed an agreement to share access to police datacenters based on hit/no-hit (Rijksoverheid, 2018). However, what makes the Dutch ANPR surveillance network truly unique is the legal requirement to publish the location of stationary ANPR cameras. To appease privacy concerns a law was passed requiring the Dutch government to yearly publish an overview of stationary ANPR surveillance locations. This policy of transparency allows the public and academia to monitor the yearly development of the surveillance locations. This stands in contrast to the approach of other European countries, where secrecy and the effectiveness of surveillance supersede the value of public transparency. Police forces view the publication of ANPR locations as a serious reduction of the potential of ANPR surveillance (Trotta & Donnay, 2017). Other countries have, despite public pressure, kept the ANPR locations a closely guarded secret and to my knowledge, no researcher has used this data to develop an in-depth geography of ANPR surveillance.

Third, local governments play a pivotal role in the realization of camera surveillance sites (Webster, 2004). While policy is set on a national level, local governments are often tasked with financing, implementing, and operating surveillance systems. The port city of Rotterdam is by population the second largest city in the Netherlands. Rotterdam was one of the first cities in the Netherlands to make use of ANPR surveillance and since the start of Project ANPR, the city has one of the most developed ANPR surveillance systems in the country (Berkel et al., 2020). In addition, the coverage of ANPR surveillance cameras in the city is considered to be extensive (Berkel et al., 2020). The city also forms a distinct police unit Regionale Eenheid Rotterdam responsible for the deployment of ANPR technology within its borders. As discussed ANPR surveillance derives its power from linking together cameras into a network across space. To understand ANPR surveillance it is necessary to examine the deployment at the level at which the network was designed, in this case, the police unit Regionale Eenheid Rotterdam. The Regionale Eenheid Rotterdam, therefore, makes a valuable organization to study the deployment of ANPR surveillance.

The size of the city and the presence of the port and large industrial complexes allow for an analysis of multiple types of city geography in one case study. The project plan in Rotterdam was one of the first ANPR surveillance projects in the Netherlands, the knowledge and experiences it produced were used by the national police. Following Foucault's study of the port of Nantes the fact that Rotterdam is the largest port of the Netherlands, and the tenth-largest port in the world creates the perfect

opportunity to examine the logic of Security (World Shipping Council, 2019). This case forms a critical case study, if the logic of Security is not found in a port city like Rotterdam, it is unlikely to be found in other Dutch police forces.

3.3 Data Collection

To understand if the Governmentality of Discipline or Security influenced the referentiality and normativity of the Project ANPR it is necessary to understand the goals, expectations, and measures that were taken during the deployment of ANPR surveillance. The documents containing the planning and evaluation of the deployment were retrieved from the website of the journalist Rejo Zenger who received them after freedom of information request (Zenger, 2011a).

The use of documents from an organization has several advantages according to Yin. Documents are stable and can be reevaluated, documents can provide exact information and yet documents can cover a broad area of time and provide insight into years of developments (Yin, 2003a). However, relying on documents also comes with several risks according to Yin. Documents can be hard to find, can be released selectively creating a bias in the sample, and may carry the bias of its creator and finally, access to documents may be blocked by organizations (Yin, 2003a). In the case of this study, the documents used in the content analysis were retrieved by the journalist Rejo Zenger with the help of a freedom of information request (Zenger, 2011a). The Rotterdam police were required by law to provide Zenger with the original (but redacted) plans and evaluations of the ANPR project. The fact that the plans and evaluations were intended to be read exclusively by police officials significantly increases the reliability of the documents. The documents used for the content analysis Rotterdam are as follows:

- Projectplan ANPR 1^e face politie regio Rotterdam Rijnmond (Politie regio Rotterdam-Rijnmond, 2006b).
- Project ANPR tussen rapportage: ANPR, toezicht wat er toe doet (Politie regio Rotterdam-Rijnmond, 2006a).
- Projectplan ANPR 2^e face politie regio Rotterdam Rijnmond (Politie regio Rotterdam-Rijnmond, 2007)
- Projectplan ANPR 3^e face politie regio Rotterdam Rijnmond (Politie regio Rotterdam-Rijnmond, 2008).
- Eindrapportage project ANPR Automatic Number plate Recognition (Politie Rotterdam-Rijnmond, 2009).
- Automatic Number Plate Recognition: Naar een landelijke toepassing (Politie Rotterdam-Rijnmond, 2007).

To understand the spatial logics used in the deployment of ANPR systems during Project ANPR an analysis of camera locations is conducted using data obtained from the Staatscourant. Documents used for the spatial analysis:

- Het cameraplan 2019 van de Nationale Politie tbv 126JJ Wetboek van Strafvordering. Nr. 72789 (Nationale Politie, 2018).
- Het cameraplan 2020 van de Nationale Politie (Nationale Politie, 2020).
- Het cameraplan 2021 van de Nationale Politie (Nationale Politie, 2021).

The data needed to perform the spatial analysis was gathered from the Staatscourant. This government outlet publishes all new laws and public announcements. As required by law since 2019 (article 126jj) each year the government publishes the Cameraplan, in which it discloses the locations of ANPR cameras using capabilities outlined in article 126jj for the coming year. However, the Project

ANPR was already started in 2006. Since 2006 the police unit Rotterdam-Rijnmond has merged with smaller municipalities into the Regionale Eenheid Rotterdam. The police organization in 2006 is not the same as in 2021, however, because Project ANPR was so influential in guiding ANPR policy, and the fact that Rotterdam-Rijnmond absorbed smaller municipalities makes this change minimal in my estimation.

The data of the cameras for the years 2019, 2020, and 2021 was entered into Excel to be coded later. These public releases only provide information about the 300 locations of fixed ANPR cameras, the locations of ANPR cameras fixed on police cars are not publicly disclosed. It should be noted that 92% of ANPR cameras used by the Dutch police are under a 126jj license, in other words, 8% of ANPR cameras in the Netherlands are not disclosed in the Staatscourant (Berkel et al., 2020; Nationale Politie, 2021). However the report of the Scientific Research and Documentation Center, or Wetenschappelijk Onderzoek- en documentatiecentrum (WODC) also states the number of ANPR cameras licensed as 126jj has increased, and on the map no ANPR cameras without 126jj license remain in Rotterdam (Berkel et al., 2021). To understand the spatial aspect of ANPR surveillance the raw location data was first sorted and categorized. To prepare the data for the spatial analysis the locations from the Staatscourant were identified and categorized based on location and infrastructure type. The open-source information was collected and structured as follows:

(1) List the camera addresses given in the Staatscourant.
(2) Trace the precise coordinates of the cameras.
(3) Map camera locations using OpenStreetMap (Umap).
(4) Log the name of the city.
(5) Log the locations and the type of roads.
(6) Log the locations and the type of infrastructure.

3.4 Data Analysis

The following sections outline the process by which the central research question is answered using Klauser's framework of referentiality, normativity, and spatiality. The axes of referentiality and normativity are analyzed through a content analysis on policy documents, the role of spatiality is examined by using content analysis on the policy documents of Project ANPR and spatial analysis on the actual camera locations. The combination of the content analysis and the analysis of the camera locations allows Project ANPR to be analyzed both in its intent (the plans formulated in policy documents) and in its realization (in terms of the realized camera locations).

3.4.1 Content Analysis

To understand if and how Discipline and Security influenced the deployment of ANPR surveillance the concepts of referentiality, normativity, and spatiality need to be retraced in the logic of the Rotterdam police. To answer the research question it is, therefore, necessary to examine the policy papers that have staked out the expectations and goals of the ANPR surveillance program. To provide a reliable insight into the role of Discipline and Security in ANPR surveillance it is necessary to perform a textual analysis that can detect the logic of Discipline and Security. To this end, content analysis was conducted to determine if either the logic of Discipline or the logic of Security was present in the deployment of ANPR surveillance in Rotterdam.

Content analysis can be defined as "the use of replicable and valid method for making specific inferences from text to other states or properties of its source" (Krippendorff, 1969, p. 103). Content

analysis can be used to detect the presence of words, themes, and explicit or implicit logic in a text (Kuckartz, 2019; Mayring, 2000). The use of codes allows large texts to be analyzed in a systemic, replicable, and efficient way, as the content of a text can be expressed in a compact and concise manner (Stemler, 2001). The content analysis used in this thesis consisted of a qualitative approach, as the goal was to detect the disciplinary or Security logic behind the shaping of ANPR surveillance. Since the categories on which Discipline and Security are compared are rather broad, it is essential to make the correct interpretation using the most 'rich' data. A qualitative content analysis offers researchers the ability to extract the most complex and meaningful inferences compared to a quantitative approach (Kuckartz, 2019; Mayring, 2000).

The content analysis was conducted using the following steps proposed by Mayring; first, the categories were established using a deductive approach, the concepts of Discipline and Security were subdivided using Klauser's framework (Mayring, 2000). Second, the categories of referentiality, normativity, and spatiality were operationalized and coded into a code agenda. Third, using the codes from the code agenda the documents were read and coded. Fourth, the established categories and corresponding codes in the code agenda were revised and checked to ensure reliability. Fifth, using the code agenda the documents were coded and the second check of reliability was conducted by comparing the coded text with the code agenda. Last, the codes were analyzed and compared to the research question using AtlasTI.

To understand the rationalities and technologies used in the deployment of ANPR surveillance in Rotterdam a three-pronged analysis is conducted. Using Klauser's framework the rationalities (referentiality and normativity) are examined using content analysis. The technology (spatiality of surveillance) is analyzed using content and geographical analysis. The following figure gives an overview of the three central concepts used in the data analysis.

Table 2: Discipline and Security, compared on the axes of referentiality, normativity, and spatiality.

Type of Governmentality	Referentiality	Normativity	Spatiality
Discipline	Understand and govern reality in its smallest parts. Individualization, breaking up of a community.	Normative model rigidly applied to reality.	Enclosure, fixity, internal portioning. Space is to be constructed anew to arrive at a fixed endpoint of good.
Security	Understand and govern reality with the Relationships within reality as a whole, optimize interplay.	No normative model, managing 'reality' (1) no clear end goal, optimization, (2) flexible Governmentality, (3) components judged on their function not whether they are inherently good or bad.	Circulation, flexibility, openness. Space is to be managed in its many forms to allow freedom to function.

3.4.2   Operationalization of referentiality and normativity

To explore the logic behind the deployment of ANPR cameras in Rotterdam a content analysis was conducted. To understand how (referentiality) and to what end (normativity) ANPR surveillance was conceived as a solution, the content of the documents of Project ANPR are analyzed. In the following figure, the concepts, definitions, and indicators of the three axes of rationalities referentiality and normativity are operationalized.

Governmentality	Concept	Definition	Indicators
Discipline	Referentiality	Crime is understood in its isolation from other issues and by the smallest governable components.	Police policy is focused on the level of the individual offender.
		Crime is judged from a normative understanding derived outside of reality.	Providing Security consist solely of upholding the law and pursuing lawbreakers.
	Normativity	The problem of crime can be definitively solved.	Police policies are judged based on being a step towards ending crime.
		A crime is solved by holding on to the enforcement of the permitted/nonpermitted binary.	Police policy is rigid and not open to change and new understandings.
		Components of a problem are intrinsically good or bad.	Police policies are judged whether the policy is good or bad in itself, efficiency is a lesser consideration.
Security	Referentiality	Crime is understood in its connection with other issues.	Police policy is not only focused on the individual criminal but at the level of the collective or criminal milieu.
		Crime is understood by grasping the internal realities within its components.	Providing security consists at its core of understanding and addressing root causes and relies on grasping the components that constitute 'crime' and the normal.
	Normativity	The problem of crime can be managed but never solved.	Police policies are judged on reducing or managing crime or the effects of crime.
		A problem is managed by a dynamic understanding of the permitted/nonpermitted as the situation requires.	Police policy is flexible and open to change if new methods are more efficient.
		Components of a problem are not intrinsically good or bad. The value of a component is based on its usefulness.	Police policies are only judged on their usefulness in managing the problem.

Table 3: The operationalization of Discipline and Security on the referentiality and normativity axis.

3.4.3 Operationalization of spatiality

The following section outlines how the axis of spatiality is operationalized for the spatial and the content analysis required to understand the spatiality of Project ANPR. This section begins with the operationalization of the content analysis, which is followed by a short introduction of Klauser's concepts of points, lines, and planes. In the final section Klauser's concepts of points, lines and planes are adapted and operationalized for the spatial analysis on ANPR surveillance.

3.4.3.1 Operationalization of the spatial content analysis

The content analysis was conducted on the documents of Project ANPR to understand the spatial logic used by police policymakers. This content analysis complements the analysis of the actual placement of the ANPR cameras by revealing the intent behind the deployment of ANPR surveillance. The following section operationalizes the concepts of Discipline and Security.

Concept	Definition	Indicator
Discipline	Discipline seeks to pin down, control space with the use of enclosure, fixity, internal partitioning, and separation	Policymakers use ANPR to 'secure' or 'protect' specific locations by enclosing or partitioning spaces.
Security	Security seeks to open up a space with circulation, flexibility, and openness	Policymakers use ANPR to monitor by capturing points of high traffic flows.

Table 4: Content analysis operationalization of the spatial logic of Discipline and Security.

3.4.3.2 Klauser's framework and the spatiality of ANPR surveillance

To be able to operationalize the spatial functions of Discipline and Security it is first necessary to understand the differences between CCTV surveillance and ANPR surveillance. Klauser's framework of points, lines, and planes is developed to analyze CCTV surveillance. In the following section, the general spatial differences between CCTV and ANPR surveillance are outlined. After this brief discussion, the framework is adapted and operationalized for the use of coding ANPR surveillance.

The impact of ANPR cameras located on roads is different from the impact of regular CCTV cameras. First, ANPR cameras are vertically placed and are unable to be moved mechanically. Therefore the cameras are at first glance only able to monitor a tiny part of the road they are placed on. However because ANPR cameras monitor the movement and locations of vehicles, a single camera can have significant spatial implications. Since vehicles are confined to roads drivers can only leave the monitored area by connecting to other roads. This effectively enlarges the surveillance area of the ANPR camera, from the camera towards the next opportunity to exit the road. From this, it becomes clear spaces under ANPR surveillance are coproduced by the cameras and the geography in which the cameras are placed. Police consider this effect when placing cameras by for example placing cameras at the entrance of a tunnel. When a suspicious car gets flagged, an intercept team knows the vehicle is between the camera and the exit of the tunnel (Ooijen, 2014). A more extreme example is the camera locations on either end of the Afsluitdijk who monitor 24 kilometers of Dutch highway. The spatial importance of surveillance becomes more pronounced when the field of view gives way to the effective surveillance of a camera set. In the following sections, the application of Klauser's framework of points, lines, and planes will be adapted to the surveillance of ANPR systems.

3.4.3.3 Point surveillance

The punctual application of cameras on roads differs in scale and spatial meaning to cameras placed in shops or airports. Fixity, concision, and containment take on different scales when applied to the

placement of ANPR cameras within a street, neighborhood, or city. As discussed earlier ANPR cameras are fixed in a vertical, non-movable position. However their surveillance is not limited to the view of the camera but to the road location, it is placed on.

To Discipline, punctual surveillance is aimed at protecting the entrance of an enclosed space. The ANPR camera functions as a 21st-century gatehouse monitoring all traffic in and out of a secure location. Like the punctual camera at the entrance of a shop, an ANPR camera at the entrance of an industrial area can enclose and protect a specific location at risk. To Security, punctual surveillance is not aimed at enclosing and protecting a specific spot, but it is aimed at capturing the maximum flow of traffic in an area.

3.4.3.4 Line surveillance

The application of Klausner's framework on ANPR cameras also changes the meaning of linear surveillance. As mentioned a single ANPR camera can monitor large stretches of road, particularly on highways. Linear surveillance in Klauser's conception entails a series of vertically placed (immovable) cameras capturing movement along the line of cameras. For Klauser lines can have two functions, to capture movement along the line (for instance a person walking along a series of fixed street cameras) or to capture movement when crossing a line of cameras (a person climbing over a prison wall).

The first kind of linear surveillance has implications for the surveillance of road traffic, tracking the movements of a number plate along different road locations. The second type of linear surveillance, movement across a line entails the monitoring movements between two areas. Here the separation between the spaces is monitored. Linear cameras of this type separate but do not cordon off a geographical area. This type of surveillance relies on bottlenecks in the geography or urban planning of an area to monitor flow between two areas. For instance, ANPR cameras can be used to monitor all highway bridges spanning the Maas river to effectively draw a line of surveillance through large parts of the city. These locations are chosen for the ability to funnel traffic over a geographical or urban barrier.

To Discipline, linear surveillance entails the logic of separation. The aim of line surveillance is for a series of cameras to protect or monitor the approaches to a location. To Security, linear surveillance entails the logic of movement, a series of ANPR cameras track the flow of traffic by monitoring points of high traffic flow. The aim of this surveillance is not just to capture a vehicle in one busy location, the aim is to track the vehicle if possible across the line of its movement along multiple choke points.

3.4.3.5 Planar surveillance

In Klauser's view, planar surveillance differs from punctual and linear surveillance in scale and differentiation. Where punctual and linear surveillance form intensely monitored spots, planar surveillance can monitor a whole area. For instance, an adjustable camera in the middle of a square creates a wide plane of surveillance as it can capture all the behaviors of all individuals on the square. Planar surveillance is also marked by different intensities of surveillance within the surveilled plane (Klauser, 2017). For instance, the Security camera can zoom in or out to focus on particular points of interest within the square.

Beyond the application, to a single camera, Klauser uses the concept of planar surveillance to analyze surveillance at a larger scale. For instance, at mega-events such as the Olympics, hundreds of cameras can be used to conduct surveillance. Planar surveillance at this scale not only relies on large numbers of cameras for direct views of the visitors. By enclosing spaces and monitoring the exits and entrances with cameras planar surveillance can monitor vast spaces. Klauser views the encircling cameras as "linear in functioning and planar in aim" (Klauser, 2017, p. 53). Here lies the strength of Klauser's vocabulary as it can describe surveillance in its interconnectedness and on its different levels of scale.

Planar surveillance applied to ANPR cameras has several implications. First, planar surveillance with ANPR cameras can only be established with the coordination of cameras since individual ANPR cameras are unable to move and monitor large spaces by themself. Planar surveillance applied to ANPR is thus always "linear in functioning and planar in aim" (Klauser, 2017, p. 53).

Second, ANPR cameras capture location data. So a surveillance system can only establish if a vehicle is or was in or outside the plane of surveillance. Not how it acted within the plane. Third, differentiation of surveillance. From a technical standpoint, all Dutch ANPR cameras have roughly the same capabilities to capture license plates. The lack of different types and uses of ANPR surveillance cameras is at odds with Klauser's conception of planar surveillance.

To Discipline, the plane is an enclosed space where additional ANPR cameras can monitor the movements of vehicles. This surveillance aims to protect and monitor an area similar to the Ring of steel in London. To Security, the plane entails surveillance of flows of traffic not the protection of a single area. A plane of surveillance is established when a majority of major traffic choke points (bridges, highway intersections, tunnels, and ferries) are covered by ANPR cameras enabling police to capture most of the traffic flows in a city.

	Monitored activity	Camera distribution
Point	Presence in or outside a point.	At the entrance of a small enclosed space.
Linear	Movement along or across different points.	At points of high traffic flow.
Planar	Presence in or outside a plane.	Entrance of a large enclosed space.

Table 5: Points, lines, and planes: the monitored activity and camera distribution.

A key distinction between points, lines, and planes is the scale of analysis. As Klauser argues a single camera at an entrance can perform point surveillance, however, if we zoom out and see the camera is part of a line of cameras linear surveillance applies at this scale. If we zoom out further and see the line encloses a large space, planar surveillance is the most powerful description tool. Only cameras installed in public spaces have the scale and reach to control social behavior (Klauser, 2016, p.51).

This spatial vocabulary of surveillance allows for analysis at both macro and micro levels. The logic of points, lines, and planes can be applied from the surveillance of simple doors to the surveillance of entire cities (Klauser, 2008). For example, Klauser mapped the spatial logics of public and private cameras in the city of Olten (Klauser, 2004a). The figure on the following page shows the operationalization of the spatial differences between Discipline and Security when applied to ANPR surveillance.

Description	Scale of analysis	Discipline: enclosure, fixity, internal portioning	Security: circulation, flexibility, openness
Point	Local (a single street)	The single camera is placed at the entrance of a location like an airport, industrial area, or railway station.	The single camera is placed at points of high traffic intensity like road intersections.
Line	Neighborhood or district-wide	A series of cameras, placed to separate spaces by monitoring the approaches to a location, creating a line of monitored approaches from and to the next unmonitored alternative.	A series of cameras are placed at points of high traffic intensity like ANPR cameras at bridges spanning a river or all tunnels, enabling the surveillance of flows of traffic along multiple points.
Plane	District-wide	A series of cameras are placed at the entrance and inside an area, allowing continual surveillance inside the space (Ring of steel).	Most major points of high traffic flow (highway intersections, bridges, tunnels, and ferries) are covered by ANPR cameras creating a city-wide coverage of the main traffic flows.

Table 6: Points, lines, and planes: enclosure fixity vs circulation and flexibility.

The spatial analysis was conducted as follows, first, the ANPR locations were identified and coded based on point or local logic. Cameras located at the entrances of strategic sites (airport, industrial area, or railway station) were coded as 'point Discipline', the remaining locations were coded using the codes assigned to 'point Security'. After this, the identified points were analyzed again using the codes of line (area-wide logic). Last, the identified points were analyzed using the codes to detect planes on a city-wide basis. To ensure the success of the analysis the number of uncoded cameras could not exceed 5 percent of the total cameras. To ensure transparency and reproducibility the camera locations are coded on UMap, an OpenStreetMap-derived public access mapping tool. This tool is also used in the ANPR industry to locate and map ANPR cameras and vehicles (Polisservice, n.d.).

3.5 Validity of data and reliability of data

To determine the strengths and weaknesses of this thesis the research methods are analyzed using the following concepts: reliability, replicability, and validity.

The first aspect, reliability is used to determine if the research delivers the same results if a study or experiment is repeated (Bryman, 2012). If results are consistent reliability is high, conversely changing results indicate low reliability. To ensure the reliability of the content and spatial analysis the coding scheme was used twice to detect and address coding differences within the coded data.

The second aspect is replicability or the measure in which the research can be repeated by other researchers (Bryman, 2012). Replicability relies on the detailed description of the research design, research methods, and the collected data. To make the design of this thesis transparent and replicable the operationalization of the content and spatial analysis as well as the sourced data is included in this thesis.

The third aspect is validity or the degree to which the design successfully measures the phenomenon it seeks to understand. Validity has four components that will be examined to their relationship with this thesis. The first element of validity is measurement validity, the degree to which concepts are successfully operationalized and the degree to which the concepts are effectively measured in the analysis. The central concepts of referentiality, normativity, and spatiality were operationalized using

Klauser's literature. As measurement validity is closely related to reliability, because a correct measurement will produce consistent results, the measurement validity was ensured by recoding the spatial and content analysis. The second element of validity is internal validity or the degree to which the dependent variable influences the independent variable. This thesis seeks to classify Project ANPR as either using the Governmentality of Discipline or Security. So cause and effect and internal validity do not apply. The third element is external validity, the degree to which the conclusions of the research are applicable outside of the investigated setting. This is low because single case studies have limited generalizability (Bryman, 2012). Understanding how Discipline or Security shapes the referentiality, normativity, and spatiality aspects of ANPR surveillance is inherently a local matter as surveillance systems are often implemented, used, and maintained at a local scale (Webster, 2004). The context of Rotterdam as a global harbor and a large city within the Netherlands is also peculiar because of the ambition to create a 'Nodale politie' (a Dutch police philosophy aimed at policing criminal flows and nodes). These two elements form an extreme case of Security and skew the external validity of this case study. Put differently, the knowledge gained from this case study is highly contextual and of reduced value when applied to other cases (even within the Netherlands). The fourth element of validity is ecological validity. This deals with the accuracy of the instrument used to gauge the knowledge of studied populations. Researchers can unknowingly influence and distort the responses if the information is collected in a skewed or unnatural setting (Bryman, 2012). The content analysis of this thesis relies on internal police documents describing the progress and ambitions of the ANPR program in Rotterdam. This eliminates possible influence from the researcher and increases the validity of the data. The documents were only published after a freedom of information request (Zenger, 2011a). A possible skew in the documents could exist if police knew in advance that the documents were to become publicly available.

4 Case study: Project ANPR

Chapter four is structured as follows: first, the general ANPR policy of the Netherlands, the legal requirements surrounding the placement of ANPR cameras, and the beginning of Project ANPR are outlined. After this introduction Project, ANPR will be first analyzed using content analysis to establish the use of referentiality, followed by a content analysis on the use of normativity, and the chapter ends with an analysis on the use of spatiality. This final section comprises of two parts, the first part contains the content analysis of policy documents used in Project ANPR, the second part contains the spatial analysis using the ANPR locations.

4.1 Introduction of ANPR surveillance in the Netherlands

4.1.1 The deployment of ANPR in the Netherlands

The ANPR surveillance systems used by Dutch police can register the following data with each passage of a vehicle in front of a camera: an overview photo, a cutout of the overview showing the name, the identified number plate, the coordinates of the photo, time and date, and the camera number (Berkel et al., 2020).

Police forces within the Netherlands increasingly rely on ANPR surveillance. It is estimated that in 2011 there were around 200 ANPR cameras in the Netherlands, by 2015 this number has risen to 300 cameras (Homburg et al., 2016). The scientific advisory board of the Netherland (the Wetenschappelijk Onderzoek- en documentatiecentrum) has reviewed the rising numbers of ANPR cameras in the Netherlands (Berkel et al., 2020). It concluded that in 2020 there were 300 locations with ANPR 126jj cameras, and in addition to these fixed locations 150 police cars are fitted with mobile ANPR cameras. In total ANPR 1580 individual cameras were identified of which 1324 were accessible to the police (126jj cameras) (Berkel et al., 2020). The difference between the total number of ANPR cameras and the number of cameras accessible to the Dutch police is partly caused by an ongoing privacy issue with the city of Amsterdam. While Amsterdam initiated the sharing of ANPR data from environmental and traffic cameras with law enforcement agencies, as of 2019 it is in question whether it is legal to share this data (Berkel et al., 2020).

To protect the privacy of citizens the applications or new ANPR cameras have to consider the possibility of a so-called network effect. That is to say, the placement of cameras cannot form a countrywide network in which citizens are permanently monitored (Berkel et al., 2020). The Police branch responsible for the cameras, The National Coordinator Team ANPR (LCTA) is of the opinion that the current number of camera locations is not sufficient to establish a nationwide network (Berkel et al., 2020). Though in a report from 2008 on the future use of ANPR, the establishment of national coverage was set as an objective (Politie Rotterdam-Rijnmond, 2007). It is clear however that there is a strong concentration of cameras within the Randstad (including Rotterdam) area of the Netherlands (Berkel et al., 2020).

4.1.2 The legal limitations on ANPR surveillance

The deployment of ANPR cameras is subject to legal limitations according to Dutch law, ANPR cameras can only be used to aid the detection of criminal offenses. Locations are also judged on the proportionality and subsidiarity principles. These determine whether the placement of the cameras is proportional to the utility of the cameras and if the objective (the detection of criminal offenses) can be achieved in a different less invasive manner (Berkel et al., 2020).

In 2019 a new law (Vastleggen en bewaren kentekengegevens door de politie) introduced article 126jj which states police can save captured data for a maximum of 28 days. The law also regulates the placement of ANPR cameras to strict requirements. Locations for ANPR cameras with article 126jj applications are subject to legal controls (Berkel et al., 2020). Each camera location requires permission from the Public Prosecutor. Camera locations are only considered suitable when one of the following conditions apply:

a) Locations should be chosen for their specific nature and specific risk. WODC lists these locations as airports, border crossings, and industrial areas. For example cameras at the Dutch-Belgian scan vehicles moving from Belgium to the Netherlands. Another example of a specific risk is the border parking place Patiel (Politie, 2016). On this parking spot, ANPR surveillance is present to capture vehicles engaged in crimes on parking spaces and truck stops (Regiopolitie Limburg-Zuid, 2009).

b) Locations of high traffic intensity. These locations are described as major traffic junctions, roads leading to airfields, or train stations. For example within the province of Limburg ANPR surveillance is placed at major highways (Regiopolitie Limburg-Zuid, 2009).

c) Locations where crimes have historically been committed on the road itself. The main type of crime under this category are illegal activities in parking spaces, such as drugs trade or theft of trucks. For example to combat this type of crime Dutch police have used the 'trechter' or funnel application to analyze the behavior of cars coming and going from parking spaces (Homburg, 2017). The application relies on data from ANPR cameras to establish if a car visits multiple parking locations to determine if goods can be stolen.

The 126jj law lists two distinct uses of ANPR cameras by Dutch police. The first type is the use of reference lists. Cameras compare the license plate of a passing car to preexisting lists of cars wanted by the police. These lists are filled with license plates connected to stolen vehicles, unpaid fines, or people on the run. The key function of a reference list is to find known criminals based on a preexisting list (Berkel et al., 2020).

The second application is the storage and analysis of all the number plates in a specific area and time frame. Contrary to the use of reference lists, the goal is not to identify the location of a known criminal but instead to identify a vehicle connected to a new crime. Number plates are analyzed to discover criminal activity with the use of profiles of suspicious behavior connected to specific crimes. A special function of the mass capture of data is called 'calamiteitenlogging' or calamity logging. In the case of serious, acute threats to the rule of law all ANPR data can be stored for up to three hours after which the data is destroyed (Berkel et al., 2020).

4.1.3   Project ANPR: the expansion of ANPR surveillance in Rotterdam

Project ANPR was launched in 2006 to establish the first operational use of ANPR surveillance within the police district of the police region Rotterdam-Rijnmond (Politie regio Rotterdam-Rijnmond, 2006b). Police recognized the power of the surveillance network would depend on the number of connected cameras. Project ANPR sought to expand the network in two ways. First, by installing cameras owned and operated by the Rotterdam police. The Regionale Informatie Organisatie (Regional Information Organization) the regional intelligence department of police is closely involved in the placement of camera sites (Politie Rotterdam-Rijnmond, 2009). And second by connecting to existing surveillance systems operated with other (police) partners. The first phase of the 'Project ANPR' Rotterdam police stressed the importance of national cooperation between police districts, particularly the establishment of a national 'ANPR data server' to exchange license plate information (Politie regio Rotterdam-Rijnmond, 2006b). The police also sought to integrate ANPR cameras

operated by other municipal agencies into the crime surveillance network (Politie Rotterdam-Rijnmond, 2009). The 'Project ANPR aspired to get access to the ANPR camera network of the environmental and traffic control agencies (Politie Rotterdam-Rijnmond, 2009).

To police the effectiveness of ANPR, surveillance is closely linked to the coverage of the surveillance area (Politie Rotterdam-Rijnmond, 2007). Or as one of the document states the greater the 'input' the greater the 'output' (Politie Rotterdam-Rijnmond, 2007, p. 12). To increase the power of the surveillance network the police aim to deploy ANRP nationally and expand the number of partners who can contribute ANPR capabilities for example Rijkswaterstaat, the ministry responsible for operating the national highways (Politie Rotterdam-Rijnmond, 2007).

4.2 Project ANPR and referentiality

The following section compares and contrasts how the logic of Discipline and Security are used to understand reality within Project ANPR. The first part examines how Project ANPR valued relationships between concepts, the second part examines if the project understood crime from a normative or non-normative point of view.

4.2.1.1 The use of concepts

The first difference in how Discipline and Security understand reality is the importance of the relationship between concepts (Klauser, 2017). Discipline seeks to understand reality, in this case, crime, at the minimum level. Security understands crime in its relationships with other concepts, it seeks to zoom out as opposed to zooming in.

Project ANPR attributed functions to ANPR that go beyond simply catching criminals. ANPR surveillance and the expected reduction in crime was also part of a broader strategy to improve the trust of Dutch citizens in police and government in general (Politie regio Rotterdam-Rijnmond, 2006b). One of the first policy documents stated that "the use of ANPR will contribute to a more credible government" (Politie regio Rotterdam-Rijnmond, 2007, p. 10). To police the role out of surveillance was thus connected to other policy areas.

ANPR surveillance as a tool for information collection was also expected to help prevent crime (Politie regio Rotterdam-Rijnmond, 2006b). Police envisioned that in the future "crime could be prevented or detected" (Politie regio Rotterdam-Rijnmond, 2007, p. 21). The expected future value of ANPR is the proactive analysis, data mining, profile building, and prediction of crime (Politie Rotterdam-Rijnmond, 2007). ANPR surveillance is not only expected to provide information on the present but to provide intelligence, actionable information for the future. To this end information from various sources is pooled and enriched with ANPR data to analyze, predict and provide intelligence (Politie regio Rotterdam-Rijnmond, 2006a). Project ANPR sought not only to address individual criminal acts in the present it sought to address and prevent crime in the future.

The documents show that to policymakers the rollout of ANPR surveillance in Rotterdam was closely related to the implementation of the 'nodale oriëntatie' or nodal orientation (Politie regio Rotterdam-Rijnmond, 2007). The 'nodale oriëntatie' understands crime as illegal activities at nodes or the flows between nodes. Therefore to combat crime police should deanonymize criminals operating at or traveling between nodes. Because of this police viewed ANPR as "a significant tool within the nodal orientation"(Politie regio Rotterdam-Rijnmond, 2007, p. 7). Crime is thus managed through policing flows, and not only by addressing individual criminals.

This broad understanding of crime is reflected in the conception of criminals. Criminals are defined as people who do not conform to the rules and laws within the Netherlands (Politie regio Rotterdam-Rijnmond, 2008). However, the targets of police actions are individuals who are "balansverstoorders" or people who disturb the balance (Politie Rotterdam-Rijnmond, 2007, p. 8). Policing is thus aimed at governing the balance, not just stopping criminals. ANPR was for instance expected to stop 'unwanted subjects' at the border of sensitive areas (Politie regio Rotterdam-Rijnmond, 2006b).

4.2.1.2   The use of norms

The second distinction between how reality is conceived between Discipline and Security is the use of a normative model or the lack thereof. Discipline imprints its preconceived norms on reality, Security examines reality to establish the norm. Thus to understand how Project ANPR relates to referentiality it is necessary to understand how police in Rotterdam conceived the norm.

Police in Rotterdam sought to use ANPR as part of a policing philosophy to encourage citizens to uphold the law and bring into view citizens who are less strict with the law. The question of how to police was put as follows "how do we get people who don't always take the law and regulations to seriously ["niet al te nauw nemen"] better within the view of police with the least amount of hindrance to the bona fide citizens?" (Politie regio Rotterdam-Rijnmond, 2006b, p. 14). This statement reveals how police view the role of normation, as it's the task of the police to deal with citizens who are not strict enough in following the norm. In this statement the wording reveals the relativist approach towards crime, criminals are defined as citizens who are too lax in following the rules, the criminal and his or her crimes are not inherently bad, just unwanted. Nevertheless, the law functions as the norm to distinguish between the normal and abnormal, prohibited/nonprohibited. The law in this context is not fixed or absolute, as police seek to use ANPR data to define or shape issues by providing strategic partners and society with "signaling and advice" about crime (Politie Rotterdam-Rijnmond, 2007, p. 14). The task of police to provide "signaling and advice" is an explicit goal outlined in the Politie in Ontwikkeling (PIO) strategy document. Police, therefore, understand the norm (the law) not as a concept outside of reality, but as a result of understanding and engaging with reality.

Policing this norm (the law) is not done uniformly. While the law forms the primary norm, policing is done based on managing differing distributions of crime. Project ANPR aimed to follow the British example by "denying criminals the use of the roads" (Politie regio Rotterdam-Rijnmond, 2006b, p. 14). The ambition of this approach is to move beyond simply addressing illegal acts as they happen. The aim is not only to stop a crime but to limit the criminal in its movements and to address the logistical basis that underly criminal activity. This approach is based on British research highlighting the relationship between serious crime and road-based crime (Association of Chief Police Officers, 2007; Politie regio Rotterdam-Rijnmond, 2007). The norm, in this case, is deducted from a population of criminals, who either operate on or off-road. The aim of ANPR policy is thus to bring in line the population of criminals using roads (with increased criminal characteristics) with criminals not operating on roads (with reduced crime characteristics), by denying or reducing criminal access to roads.

Thus the norm, the normal, and the abnormal are formulated by examining reality, a key characteristic of Security. The process of normalization is embedded into the functioning of ANPR itself. Police can use ANPR to establish a 'normal' traffic behavior within traffic flows. If vehicles deviate from this norm for instance by traveling in a convoy, analysis tools will detect this behavior using the 'Konvooianalyse' tool (Politie regio Rotterdam-Rijnmond, 2008). More generally, ANPR analytical tools were expected to "preventatively detect deviant behavior [and] patterns matching the preparation or execution of serious crime" (Politie regio Rotterdam-Rijnmond, 2008, p. 10).

To summarize, Project ANPR understands the law as flexible and derived from reality. Police seek to understand this reality and contribute to defining issues. Project ANPR understands and governs this reality through the lens of populations and distributions who are managed according to their varying desirability. Police thus understand crime in its interconnectedness and seek to govern crime by 'zooming out' and addressing the flows and nodes that make up a criminal network. The referentiality of Project ANPR is thus related to Security in its use of reality to form the norm and its interconnected understanding of reality.

Definition of referentiality (Security)	Indicator	Project ANPR
Crime is understood in its connection with other issues.	Police policy is not only focused on the individual criminal but at the level of the collective or criminal milieu.	- ANPR surveillance is connected to other policy areas (confidence in government). - ANPR surveillance is used to govern criminal flows and keep 'the balance'.
Crime is understood by grasping the internal realities within its components.	Providing security consists at its core of understanding and addressing root causes and relies on grasping the components that constitute 'crime' and the normal.	- ANPR surveillance is used to understand crime and to provide advice to society. - ANPR is used to establish the norm of crime.

Table 7: Summary of the referentiality of Project ANPR

4.3 Project ANPR and normativity

In the following section, the role of normativity in the deployment of ANPR surveillance is discussed in its relationship to Discipline and Security. The analysis consists of three parts, the first part examines if Project ANPR was aimed at stopping or at managing crime, the second part explores whether norms were used rigidly or flexible, and the third part examines how Project ANPR values components of reality.

4.3.1.1 Project ANPR and the end goal of policing

The first distinction between Discipline or Security is the end goal of policing, Discipline seeks to end crime, Security seeks to manage it. The overarching goal of Project ANPR was to "increase safety within the public domain by limiting the use of the public roads by criminals c.q. increase the apprehension rate of criminals using the road" (own translation) (Politie regio Rotterdam-Rijnmond, 2006b, p. 4). The wording of 'limit criminals' and 'increase safety' point to a philosophy that has resigned itself to the containment of crime and that is aware ANPR surveillance will not completely end crime. Police also try to balance both the efficiency of surveillance and the privacy of citizens (Politie regio Rotterdam-Rijnmond, 2006b). The goal of maintaining the right balance between privacy and the effectiveness of surveillance also indicates a relativist approach. Even if ANPR would be a wonder weapon to stop crime, the privacy implications would be so severe police would hesitate to implement the tool. Project ANPR should be understood as an attempt to reduce and manage crime rather than to solve it, a characteristic associated with Security.

4.3.1.2 Project ANPR and flexibility of the norm

The second difference between Discipline and Security is the flexibility or rigidity towards the norm. To Discipline, the norm is fixed as it is based on a normative model. To Security, the norm is flexible

as it is based on reality. The police in Rotterdam has an executive function, namely to enforce the law (the norm). The binary of permitted/nonpermitted is handed down for police to enforce. This implies a certain rigidity and disciplinary logic. However, in Rotterdam or the Netherlands more general, police also seek to influence policymakers and help define crime and consequently the permitted/nonpermitted.

The Project ANPR was influenced by the police strategy 'Politie In Ontwikkeling' (PIO) (Politie Rotterdam-Rijnmond, 2007). The vision was outlined by the supervisory board of police officers and it establishes a vision and strategy for the Dutch police (Raad van Hoofdcommissarissen, 2005, p. 67). The Politie in Ontwikkeling (PIO) vision argued police should when possible adopt information-based policing (informatie gestuurd werken). According to the PIO vision, information was expected to form the starting point of police work (Politie Rotterdam-Rijnmond, 2007). ANPR surveillance was expected to support this new vision by enabling police to identity and indicate flows of crime (Politie regio Rotterdam-Rijnmond, 2006b; Politie Rotterdam-Rijnmond, 2007). Significantly, the strategy gives the police the responsibility to collect and analyze information in order to define policing issues and provide 'signaling' and 'advice' to partners and society (Politie Rotterdam-Rijnmond, 2007; Raad van Hoofdcommissarissen, 2005, p. 67). This use of surveillance not only as a tool of repression, but also as a tool for understanding, and demonstrates the police have a semi-flexible understanding of crime and policing, a characteristic of Security.

4.3.1.3   Project ANPR and its valuation of reality

The third divergence from Discipline and Security is how components of a problem are valued. Discipline values components of reality based on a fixed normative model, Security values components of reality based on utility. To Discipline, the value of a component is therefore fixed, but for Security, the value shifts depending on the utility. In relation to Project ANPR, the valuation of reality is first understood through the use of hotspots, second by the use of ANPR as a tool to understand reality, and third the importance of balancing policing and privacy.

To understand how Project ANPR valued reality, in this case, crime it is necessary to understand how crime is managed. Police aim to address crime by improving surveillance over "risicogebieden" or areas of increased risk (Politie regio Rotterdam-Rijnmond, 2006b, p. 23). Examples listed in the documents are, industrial areas, the harbor, and crime-sensitive neighborhoods or sections of neighborhoods (Politie regio Rotterdam-Rijnmond, 2007). This understanding of crime as a risk-prone area, hotspot, or flow/node of criminality provides insight into how police understand and governs crime. These areas are under increased police attention and surveillance because they deviate from the norm, the areas without increased criminal activity. Normation, the process of getting citizens to conform to the norms, in this case, the laws within the Netherlands, is achieved by comparing the expected crime of areas and directing resources towards areas that exceed the normal intensity of crime. Crime in the case of hotspots or risk areas is considered extra bad because it exceeds the norm of expected crime. The valuation of crime is thus dependent on context and is thus flexible.

ANPR is also viewed as a tool to improve the awareness of new developments and trends in criminality (Politie regio Rotterdam-Rijnmond, 2007). ANPR surveillance is thus not only used to fight crime but also to understand the trends within crime itself. According to the police, this helps to understand crime at a strategic level and provides input for policy decisions (Politie regio Rotterdam-Rijnmond, 2006b). This approach is linked to an important quality of Security, it stands back, it lets things happen in order to understand reality and govern it (Deukmedjian, 2013; Fussey, 2013). Reality is thus not intrinsically good or bad, situations are allowed to develop in order to be understood and managed.

The value of the components of reality are also weighed against each other. To Project ANPR crime is not just 'bad', it has to be assessed in relation to other topics, such as the privacy of citizens. For instance, the report on the second phase of the project states 4% of photographed vehicles resulted in checks or interventions (Politie regio Rotterdam-Rijnmond, 2007). According to the report, this resulted in 96% or 470.000 vehicles not being "unnecessarily bothered" (Politie regio Rotterdam-Rijnmond, 2007, p. 19). The report states "only those who disregard the agreed-upon rules will be exposed to privacy infringements" (Politie regio Rotterdam-Rijnmond, 2007, p. 18). The limitations set on policing indicate different realities are weighted against each other. For instance, the police in Rotterdam stresses the need for the police itself to conform to the existing laws and regulations (Politie Rotterdam-Rijnmond, 2007). Besides the need for legality, two guiding principles were established to guide the implementation of ANPR. These principles are proportionality and subsidiarity (Politie Rotterdam-Rijnmond, 2007). These principles in their relationship to ANPR are explained by police as follows: "to what degree is the remedy appropriate to the ailment, are there also less severe ways to solve the issue" (Politie Rotterdam-Rijnmond, 2007, p. 18). This balancing of surveillance between effective policing and the impact it has on citizens is a constant aspect of ANPR surveillance. Also because the police are acutely aware of the public debates surrounding the use of smart software and cameras (Politie Rotterdam-Rijnmond, 2007). Privacy within this context is not only viewed as a responsibility of the police but also as a threat to ANPR surveillance in Rotterdam (Politie regio Rotterdam-Rijnmond, 2006b). To ensure the continuation or expansion of ANPR surveillance within Rotterdam a public relations campaign was started during the first phase of the project (Politie regio Rotterdam-Rijnmond, 2006b). The aim was to assure the public that their Security would improve at a minimal loss of privacy and reformulate the debate by arguing safety and privacy are not antagonistic (Politie regio Rotterdam-Rijnmond, 2008). In short, police weigh multiple components of reality against each other. This indicates that components are valued by their utility, a characteristic of Security.

To conclude, the normativity of Project ANPR is closely related to Security. The analysis showed that the Regionale Eenheid Rotterdam understands crime in relativist terms. First, the application of the norm does not lead to a final solution. Project ANPR seeks to reduce crime and increase safety. Secondly, police understood the norm to be semi-flexible. While the law dictates what are crimes/noncrimes, police also seek to define crime in an effort to advise key partners and society. The understanding of crime is thus not fixed. Third, Project ANPR valued components of reality, in this case, crime, based on utility.

Definition normativity (Security)	Indicator	Project ANPR
The problem of crime can be managed but never solved.	Police policies are judged on reducing or managing crime or the effects of crime.	• Project ANPR aimed at managing not 'solving' crime
A problem is managed by a dynamic understanding of the permitted/nonpermitted as the situation requires.	Police policy is flexible and open to change if new methods are more efficient.	• Policing consists of perusing lawbreakers • ANPR surveillance is used to understand crime and provide advice to partners and society
Components of a problem are not intrinsically good or bad. The value of a component is based on its usefulness.	Police policies are only judged on their usefulness in managing the problem.	• Crime is policed according to intensity (risk areas) or utility (in relation to other issues such as privacy)

4.4 Project ANPR and the spatiality of surveillance

In this section, the spatial aspects of ANPR surveillance in Rotterdam will be outlined and discussed. This chapter consists first of a content analysis of policy documents used during Project ANPR. The content analysis examines the spatial logic used by policymakers during Project ANPR. This analysis provides insight into the intended spatial use of ANPR locations. It complements the second part, the spatial analysis, and thus both the intended spatial dynamics and the actual placement of ANPR surveillance in Rotterdam are brought into view. The second part, the spatial analysis starts with a general description of the distribution of ANPR cameras in Rotterdam. This section aims to establish general patterns at a macro level. This broad description is followed by a detailed description of the spatial dynamics involved in ANPR surveillance. The analysis starts with the spatial distribution of ANPR cameras located points (at entrances or points of high traffic), this is followed by the analysis of lines by zooming out and examining the spatial logic at a district-wide scale, the final part of the analysis consists of a description of planes.

4.4.1.1 Content analysis of spatiality

The following section examines the spatial logic outlined by policymakers in the documents of Project ANPR. Discipline seeks to enclose and control spaces, Security seeks to open up spaces and monitor high traffic flows. Policymakers intended to use both the spatial logics of Discipline and Security in the deployment of ANPR surveillance.

The logic of Security played a primary role in the rollout of Project ANPR. ANPR surveillance is expected to contribute to the 'nodale benadering' by "deanonymizing flows traffic" (Politie regio Rotterdam-Rijnmond, 2007, p. 7). Capturing high traffic flows was a primary objective for Project ANPR. For instance, policymakers specifically target the road connections that span the Maas river and connect the northern and southern part of Rotterdam (Politie regio Rotterdam-Rijnmond, 2006a). The aim is to capture the maximum flow of traffic across the river. For example, policymakers point out that the Maastunnel alone accounts for 50% of traffic within Rotterdam (Politie regio Rotterdam-Rijnmond, 2006a). The Maastunnel captures 'traffic flows' on a continual basis (Politie Rotterdam-Rijnmond, 2009, p. 9). After the start of ANPR surveillance on the Maastunnel in 2006 policymakers push to expand the project to 'secure' also the Willems bridge and Erasmus bridge (Politie Rotterdam-Rijnmond, 2009). Project ANPR concludes in its final report "ANPR will be placed on the most important intracity bridges" (Politie Rotterdam-Rijnmond, 2009, p. 9). The "securing of traffic flows" was a primary consideration in the expansion of the ANPR network (Politie regio Rotterdam-Rijnmond, 2008, p. 5).

The logic of Discipline, enclosure, and fixity was also found to be used for specific cases. Policymakers envisioned ANPR surveillance to help secure and monitor areas of increased risk. ANPR was expected to "bring areas of increased risk into view and register who enters or leaves the area" (Politie regio Rotterdam-Rijnmond, 2007, p. 23). For instance, policy documents discuss how "sensitive" areas such as the Botlek area are to be "secured" by static ANPR cameras (Politie regio Rotterdam-Rijnmond, 2006b, p. 13). How this was accomplished is explained as follows: "the Botlek will be fully surrounded with ANPR cameras on 7 locations, on access roads" (Politie Rotterdam-Rijnmond, 2009, p. 9). Policymakers advise filling a surveillance "gap" in the harbor area to "complete the coverage" (Politie Rotterdam-Rijnmond, 2009, p. 24). The most concentrated form of protection was the ANPR surveillance used to secure the house of the mayor of Rotterdam (Politie Rotterdam-Rijnmond, 2009). ANPR cameras were also considered to play a critical role in the 'Ring of Steel' to be

developed around sensitive areas within the city center (specifically the central train station). This was done in an effort to enclose and secure the area (Politie regio Rotterdam-Rijnmond, 2007). The plan to create an ANPR Ring of Steel was never implemented as other surveillance options were considered to be more effective.

In conclusion, it can be said policymakers of Project ANPR used both the spatial logic of Discipline and Security to deploy surveillance cameras. The primary approach was to monitor areas of high traffic flow, the logic of enclosure was reserved for specialized cases (and was ultimately not used as a Ring of Steel). It is noteworthy that Project ANPR from 2006 to 2009 deployed cameras on locations of high traffic flow and areas of increased risk. This approach mirrors the legal requirements for placing cameras introduced in 2019 (the 126jj law). It can be concluded that the new legal requirements did not significantly alter the spatial logic used by police to deploy ANPR surveillance.

4.4.1.2   Spatial analysis, the general description of the spatiality of ANPR surveillance

In total 101 cameras were found to be operational within the police district Regionale Eenheid Rotterdam. Of these, 42 cameras were located within the city of Rotterdam, 8 in Dordrecht, 5 in Capelle aan de Ijssel and 3 in Vlaardingen. It should be noted that 27 of the cameras were located within the harbor area and 3 cameras were located at Rotterdam The Hague Airport. The following figure shows the number of cameras per geographical location.
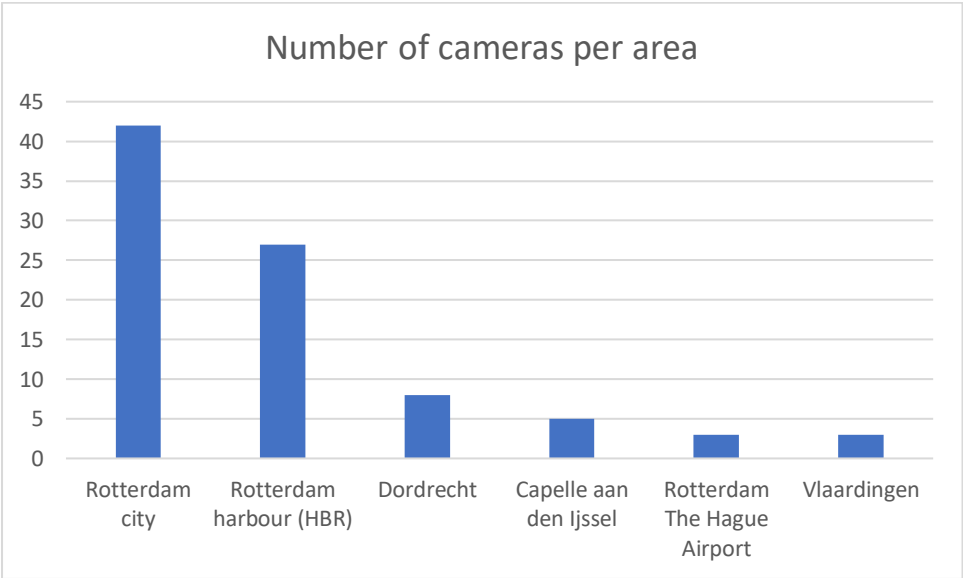

Figure 4: Distribution of ANPR cameras in the police district Rotterdam.

From this simple starting point, it becomes clear a considerable amount of surveillance resources are deployed in Rotterdam and the harbor. To understand the spatial logics that underly the distribution of these cameras the following section will start the spatial analysis by examining the distribution of points where the cameras are located.

4.4.1.3   The spatiality of points

To assess if the ANPR surveillance cameras follow the logic of Discipline or Security, the individual locations were categorized into points at entrances (Discipline) or points of high traffic flow (Security).

The first part of the spatial analysis outlines the general distribution of ANPR cameras within the Regionale Eenheid Rotterdam. The following figure gives an overview of the locations of ANPR cameras within the area policed by the Regionale Eenheid Rotterdam.
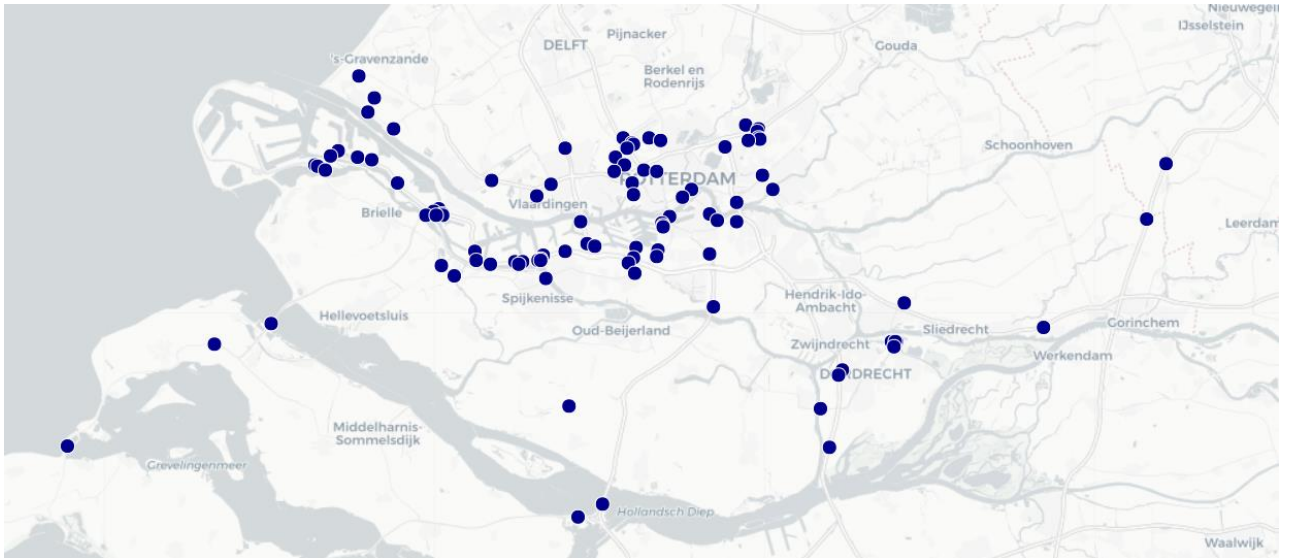
Figure 5: Overview of the points of surveillance.

For a more detailed understanding of the ANPR surveillance, the cameras were categorized based on the local conditions. The following figure shows the camera locations.
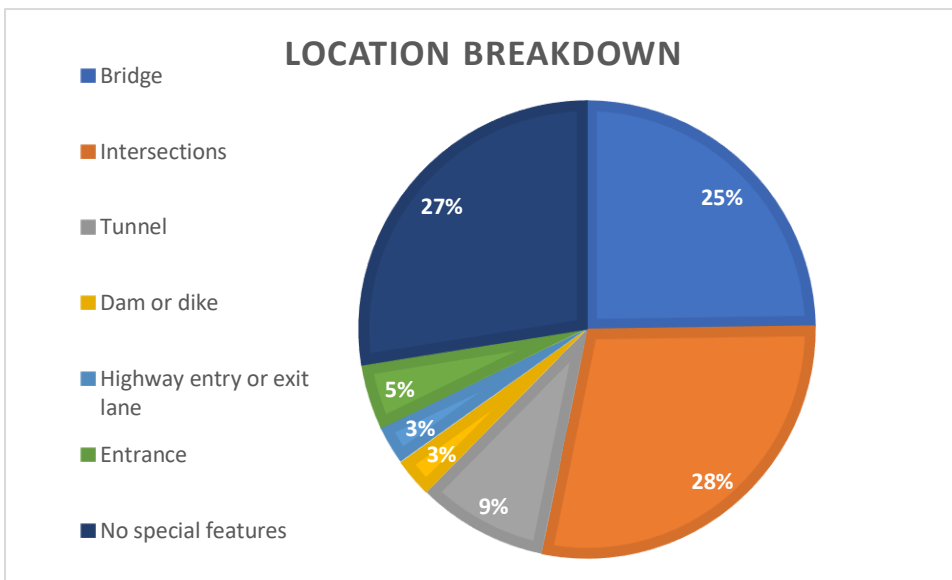

Figure 6: location breakdown of ANPR sites.

From this overview, it becomes clear that only 5% of the ANPR cameras are located directly at the entrance of a location. This implies the disciplinary logic of fixity, enclosure, and internal partitioning are a minority within the data set. The table also shows the particularness of the case of Rotterdam or the Netherlands in general. Within the dataset, 28% of ANPR cameras were located on bridges or dams/dikes. These high traffic flow locations together with tunnels, intersections, and highway entry or exits form 68% of the dataset. Generally speaking, the points of surveillance are located near geographical funnels that guide traffic towards an ANPR camera.

In the following section, an example of ANPR cameras at the Rotterdam The Hague Airport used at points of entrance and points of high traffic flow will be given.
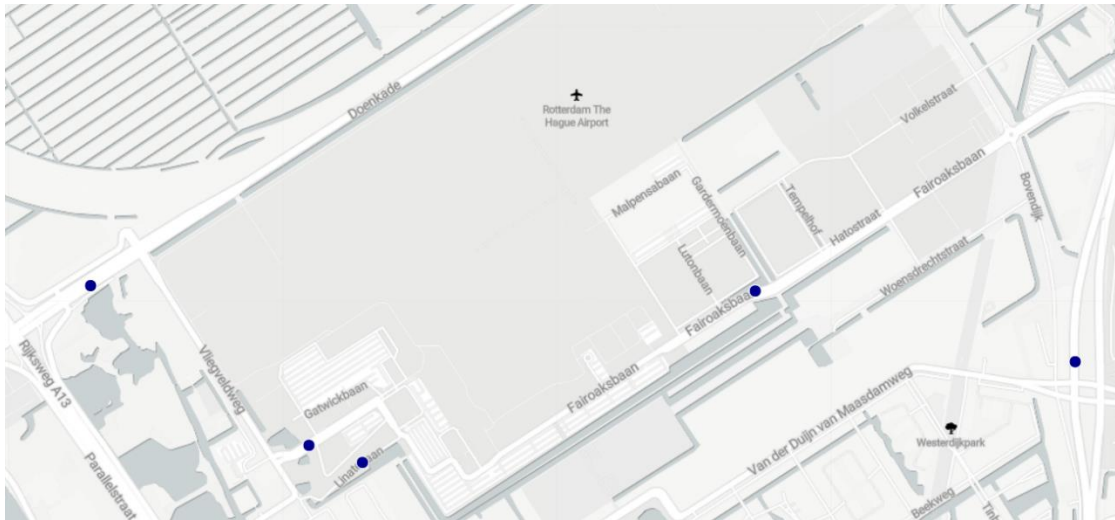
Figure 7: ANPR surveillance around Rotterdam The Hague Airport.

The figure above shows the points of ANPR cameras in blue. The points within this figure were categorized as follows: the cameras on the far left and far right were categorized as being characterized by high traffic flow. These cameras are placed at junctions that experience high traffic flow and are not strategically located to completely cordon off an area. However, the three cameras in the middle and at the entrance of the Rotterdam The Hague Airport were coded 'entrance' as they are situated directly at the gate into the airfield and monitor the only exit and entry of the airfield. The advantage of surveillance enclosure is that it increases the precision of surveillance. A camera location capturing traffic provides police with the precise location of a vehicle at the time of capture by the camera. However, if this camera (co)produces an enclosed space, police can deduct where the vehicle traveled next, namely, it was in or outside the enclosed space. However, camera locations aimed at capturing high traffic flow can monitor vast amounts of traffic. For example, a single camera location at the Maastunnel monitors roughly 50% of the traffic flowing within the city of Rotterdam (Politie regio Rotterdam-Rijnmond, 2006a).

4.4.1.4   The spatiality of lines
The following section will discuss the spatial logics of ANPR at a larger scale, to understand the use of surveillance lines ANPR cameras are analyzed in relation to each other rather than in isolation, as was the case in the analysis of points.

Following Klauser's framework lines of surveillance can be differentiated in two forms, lines of separation (for instance a line of cameras guarding the wall of a prison) and lines of movement (for instance a series of cameras following the movement through a shopping street).
From the point analysis, it became clear only 5 percent of cameras were directly located at the entrance of an enclosed space. This implies 95% of cameras are placed to capture movement along different lines of travel. This result confirms the statement of the national ANPR project that in 2011 argued that many of the traffic flows to and within the city of Rotterdam are covered by ANPR surveillance (Landelijk Programmabureau ANPR, 2011). It would be impractical to plot all possible lines of movement between these points but the sheer number of traffic flow locations shows that line surveillance is the dominant form of surveillance.

An example of a line of movement is the series of cameras stationed along the entrance of the A13 highway towards the city center. In the figure below the line of movement is shown in red, the line of separation is shown in grey.
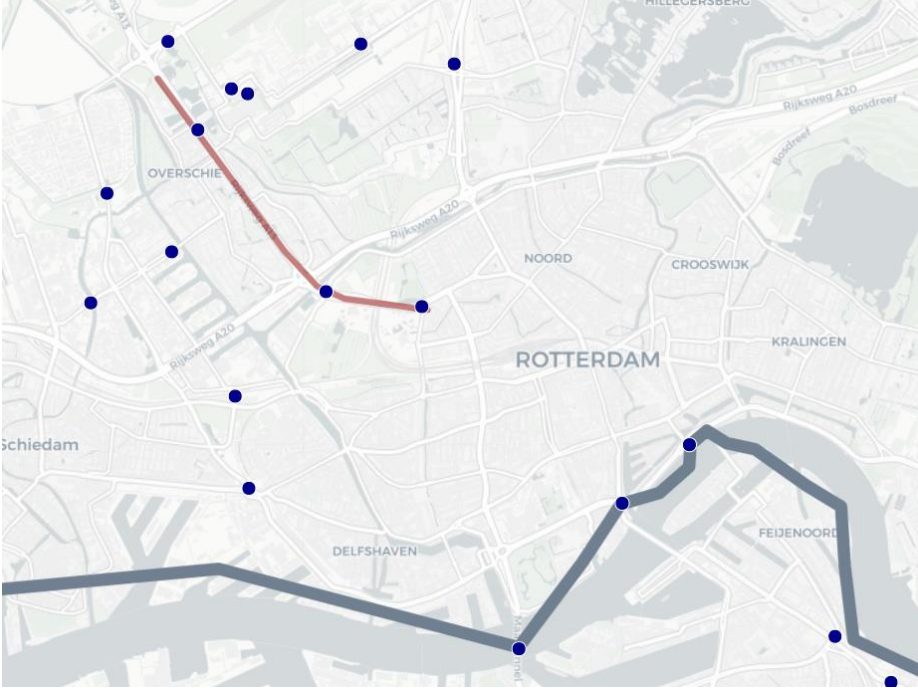

Figure 8: Lines of movement (orange) and separation (gray) in Rotterdam city center.

However, while few surveillance lines were found to fully enclose locations, the spatial analysis revealed that a significant number of high traffic flow locations form lines of separation.
At a local level, these locations function to capture a large volume of traffic, when viewed on a regional scale these locations linked together effectively capture all traffic traveling in a direction. These lines are plotted through high-traffic locations that funnel traffic over strategic bridges, tunnels, and dams. In effect, these strategic locations form a wall capturing all traffic from a certain approach towards Rotterdam. To illustrate this, a distribution of these lines is plotted on the figure on the following page. ANPR locations are shown in blue and the gray lines indicate lines of separation.
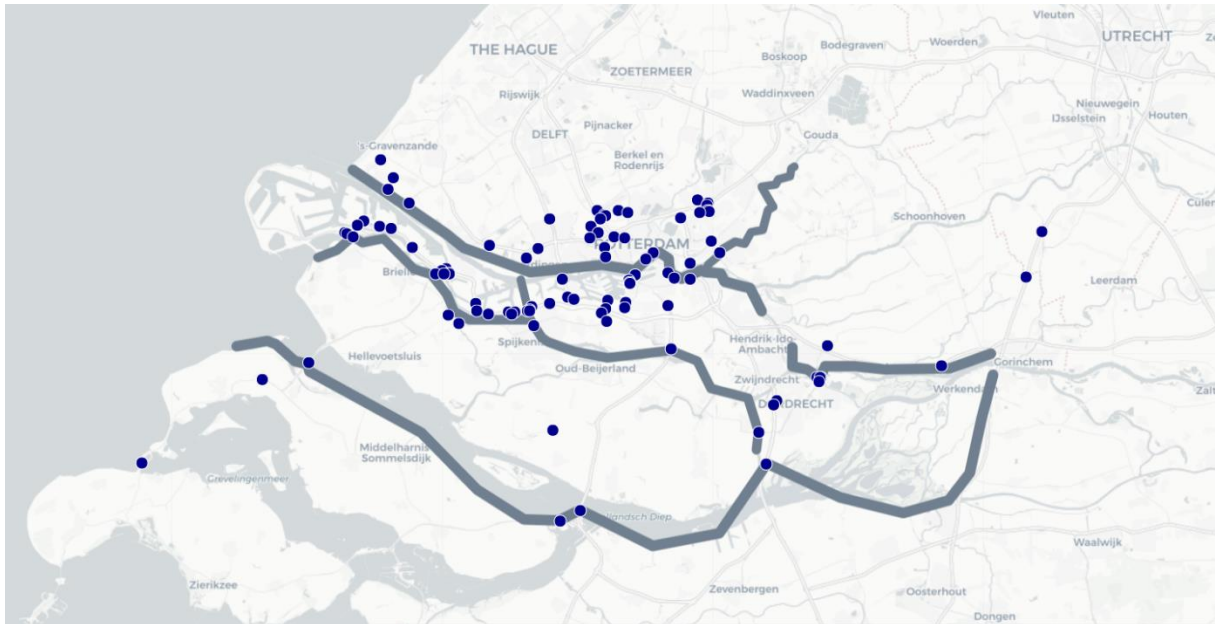
Figure 9: Locations of ANPR cameras (blue) and lines of separation (grey).

To grasp the spatial importance of the lines of separation, imagine wanting to drive a vehicle from Zierikzee (bottom left of the map) towards the city center of Rotterdam without crossing a single ANPR camera. Only three strategically placed cameras (Haringvlietdam, Haringvlietbrug, and after the Moerdijkbruggen) on the bottom line would force the driver to make a large detour to Gorinchem (center right of the map). To finally reach the city center, the driver would have to head north to Moordrecht (under Gouda) and then drive back south to reach the destination. This itinerary shows that when it comes to the power of surveillance, it is not just the volume of cameras that counts, the spatial distribution has the ability to concentrate, link and multiply surveillance. Within the context of Rotterdam, the crossings over waterways are used to funnel traffic through a chain of monitoring sites. The lines of surveillance are exclusively located on waterways and within the dataset, 28% of ANPR cameras were located on bridges or dams/dikes.

It should be noted a hole in the network remains, between Zwijndrecht and Hendrik-Ido-Ambach (located north of Dordrecht). If additional ANPR cameras were positioned there at these locations all road traffic could be monitored between the Maas and Hollands Diep. Besides road transport, the lines of surveillance are crossed by two local ferries at Maassluis and Kop van Het land (Veerponten.nl, n.d.-a, n.d.-b).

4.4.1.5   The spatiality of planes
The following section will discuss the planes of surveillance and their relationship to Discipline and Security. A plane of surveillance is the effective area that an ANPR camera has under its surveillance. This way of documenting surveillance allows the impact of ANPR to be mapped and analyzed more in detail than only looking at locations. The difference between a field of view of an ANPR location and its effective field of surveillance is the area beyond the direct line of sight from which the location of a vehicle still can be deduced. Put differently, an ANPR camera can only record the location of a vehicle when it captures it driving by. However, if the camera is located for instance at the only entrance and exit of a harbor more information can be deducted, namely the presence of the vehicle within the enclosed space. The area of surveillance is thus defined by the routes of travel.

The following figure shows the camera locations in blue and the effective plane of surveillance in yellow.

Figure 10: ANPR camera locations (blue) and effective planes of surveillance (yellow).

As can be seen in the figure above, the harbor of Rotterdam forms the largest space of effective ANPR surveillance. The area stretching from the city center out west to the North Sea is divided by waterways and guarded by ANPR systems on access roads and strategic locations.

Besides these planes of surveillance located in the harbor, ANPR locations in the south of Rotterdam form an even larger plane of surveillance. The area stretching from the west of Dordrecht till Brielle is strictly speaking fully enclosed by ANPR locations. This space was not coded as a plane of surveillance because the enclosed space is too vast to truly be effectively monitored.

As the figure below shows the effective areas of surveillance in the city center of Rotterdam are small. This is because within the city center streets and intersections are numerous and offer vehicles plenty of alternative routes limiting the scope of surveillance. During Project ANPR it was considered to implement a 'ring of steel' around the city center similar to the 'ring of steel' surrounding the city of London (Politie regio Rotterdam-Rijnmond, 2006a). However this ambition was not fulfilled by Project ANPR as the city decided to rely on existing ANPR cameras owned by the dienst Stedebouw en Volkshuisvesting (dS+V) (Politie Rotterdam-Rijnmond, 2009). It remained unclear in what shape or form the goal to protect the city center was achieved (Zenger, 2011b). The spatial analysis using the concept of planes of surveillance shows no Ring of Steel exists within the city center of Rotterdam.

Within the city of Rotterdam, large planes of observation are present at the Rotterdam The Hague Airport (pictured yellow at the top middle of the figure) and the harbor area Waalhaven and Eemhaven (pictured bottom left).
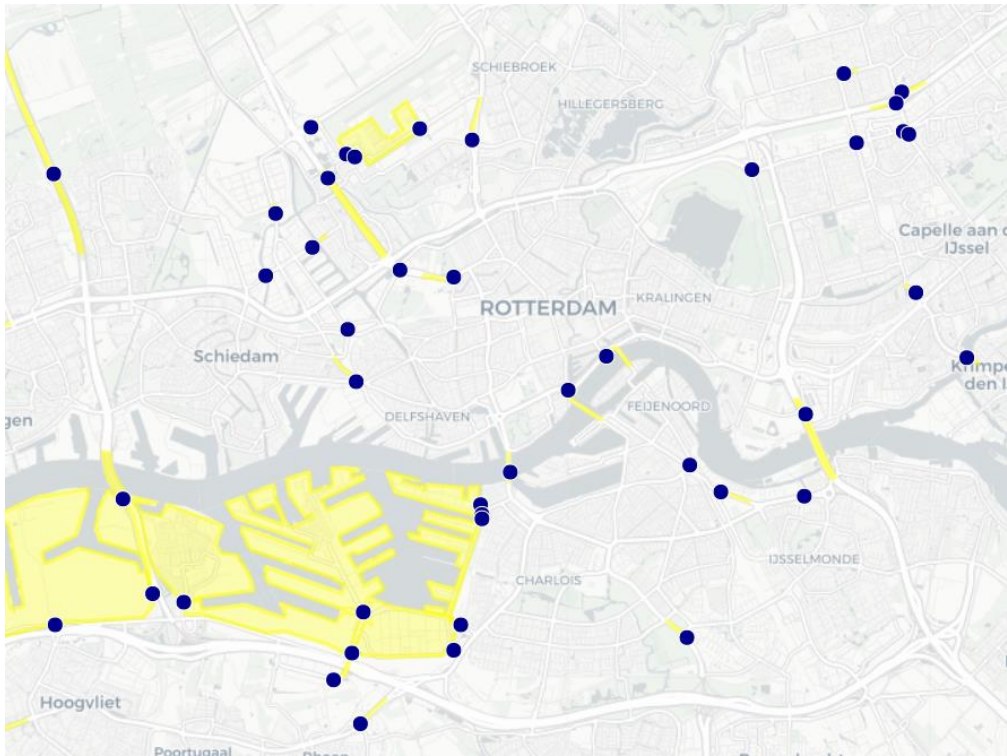
Figure 11: An overview of ANPR camera locations (blue) and planes of surveillance (yellow) in the city center.

In the following figure, a detailed overview is given of the planes of surveillance near the Waalhaven. The figure below shows how two ANPR cameras (pictured blue) are positioned to close off the streets going into or out of the Waalhaven harbor. Effective field or plane of surveillance is pictured yellow.
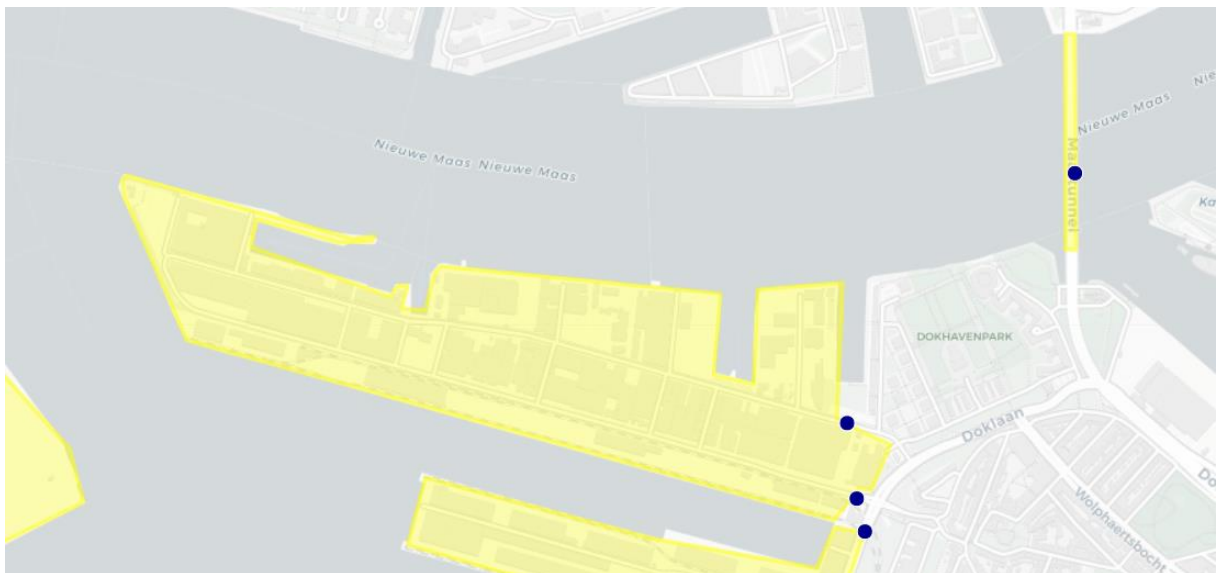
Figure 12: An overview of a plane of surveillance at the Waalhaven, ANPR cameras (blue), and the enclosed space in yellow.

Within the dataset, only two types of fully enclosed planes were observed, the airport and the harbor. Both areas are characterized by their function to enable large flows of people and goods. Thus paradoxically, the most intensively secured and monitored spaces are designed to accommodate flows. The intensity of surveillance is thus related to the intensity of flows.

The analysis of the effective fields of surveillance has revealed that a large number of planes of surveillance can be categorized as Discipline because the entrances at the airport and large parts of the harbor are monitored by ANPR surveillance. However, as the analysis of points and lines showed earlier, aside from these specialized locations the majority of ANPR surveillance is based on capturing points of high traffic flow. The analysis did not map this field of surveillance as category Security, however, from the fact that 50% of traffic can be captured by one camera location, it can be concluded that planes of surveillance associated with Security are present.

The impact of ANPR was found to be heavily influenced by the location of the surveillance camera. This chapter showed the importance of a spatial understanding of surveillance as the deployment of ANPR systems is done in a highly spatialized manner. For instance, in most directions of travel towards the city of Rotterdam ANPR surveillance was unavoidable. The analysis shows that the deployment of surveillance tells us more about the impact of surveillance than the number of cameras, as a strategically placed camera can capture data from large amounts of citizens. The unique geography of the West Netherlands plays an important role in amplifying the impact of a surveillance camera as vehicles have limited options to cross rivers.

In conclusion, the spatial distribution of surveillance within the Regionale Eenheid Rotterdam closely resembles the logic of Security. First, the spatial analysis of points revealed the majority of ANPR surveillance locations are at points of high traffic flow and only 5% of cameras were located directly at entrances. This implies ANPR surveillance is primarily directed at the flows of traffic rather than at the protection of certain spaces. Second, the lines of surveillance are primarily aimed at capturing movement, not at the enclosure of spaces. However, some of the cameras capturing movement have separating qualities. These lines of separation do not enclose but guard strategic approaches towards the city of Rotterdam. Third, the planes of surveillance showed a combination of spatial logic, spaces enclosed with ANPR surveillance were found at the airport and the harbor. These spaces followed the spatial logic of Discipline, however, outside of these specialized zones the spatial logic of Security was found to be prevalent. It should be noted that the deployment of surveillance reflected the spatial logic outlined in the policy documents of Project ANPR. The spatial understanding outlined in the content analysis shaped the actual deployment of ANPR surveillance. The table on the next page summarizes the findings of the spatial analysis.

Description	Indicators of Discipline: enclosure, fixity, internal portioning	Indicators of Security: circulation, flexibility, openness	Project ANPR
Point	The single camera is placed at the entrance of a location like an airport, industrial area, or railway station.	The single camera Is placed at points of high traffic intensity like simple road intersections.	• Only 5% of the cameras are placed directly at an entrance. • 68% of the cameras are placed at locations of high traffic flow.
Line	A series of cameras, placed to separate spaces by monitoring the approaches to a location, creating a line of monitored approaches from and to the next unmonitored alternative.	A series of cameras are placed at points of high traffic intensity like all ANPR cameras at bridges spanning a river or all tunnels.	• A limited number of lines of separation. However, the lines are able to segregate large spaces. And capture significant traffic flows. • The majority of ANPR cameras are placed to capture high traffic flow in strategic locations.
Plane	A series of cameras are placed at the entrance and inside an area, allowing continual surveillance inside the space (Ring of steel).	Most major points of high traffic flow (highway intersections, bridges, tunnels, and ferries) are covered by ANPR cameras creating a city-wide coverage of the main traffic flows.	• Fully enclosed locations were limited to the airport and parts of the harbor area. • Not all points of high traffic flow are covered by ANPR. However, the majority of cameras are located in high-traffic locations.

Table 9: Summary of points, lines, and planes: enclosure fixity vs circulation and flexibility.

5 Conclusions and recommendations

5.1 Conclusion and summary of results

This thesis used a single holistic case study to understand the type of Governmentality that underlies the deployment of ANPR surveillance in the district of Regionale Eenheid Rotterdam. The central question is as follows: according to what Governmentality has the Regionale Eenheid Rotterdam deployed ANPR surveillance cameras during Project ANPR? The content analysis of the referentiality, normativity, and spatiality axes and the spatial analysis of the locations of ANPR cameras indicated that Project ANPR was closely related to the Governmentality of Security. The following sections will answer the sub-research questions to highlight the precise role of Security in referentiality, normativity, and spatiality.

5.1.1 The role of referentiality in project ANPR

The first sub-research question deals with the use of referentiality by Project ANPR. Referentiality, the degree to which relationships between concepts are valued, fundamentally differs between Discipline and Security. The analysis showed Project ANPR understood reality, in this case, crime, in its interconnectedness. Crime was understood beyond the individual criminal act, Project ANPR understood crime as flows and hotspots of populations of criminals. The objective of policing was also derived from reality, police sought actively to define policing issues and provide their understanding to society.

5.1.2 The role of normativity in project ANPR

The second sub-research question explores the use of normativity by project ANPR. The normativity, or the formulation and the use of norms to govern society, used by Project ANPR was closely related to the Governmentality of Security. First, Project ANPR was not set up to definitively stop crime, it aimed at managing crime by reducing criminality at certain spots. Second, police understood the definitions of crime, the permitted/non permitted are not set in stone. As discussed in relation to referentiality, police sought to define policing issues and provide 'advice' to society. This signals flexibility incomparable to Discipline. Third, police did not attribute inherent value to parts of reality or crime. Not all crime was judged the same, the use of flows and hotspots showed. The value of reducing crime is also balanced against other issues such as the privacy of citizens.

5.1.3 The role of spatiality in project ANPR

The third sub-question deals with spatiality, the use of space to accomplish surveillance of certain areas. Both the content and the spatial analysis showed the majority of ANPR cameras were aimed at capturing traffic flows. The network of cameras, spatiality articulated in the form of points, lines, and planes derives its power from connecting cameras and segregating spaces. Project ANPR sought to establish, link, and expand a network of cameras while using spatiality to multiply the effect of surveillance by dividing space into surveilled or non-surveilled areas with planes and lines of separation. Project ANPR also sought to take advantage of the local geography of South Holland, as waterways play a major role in funneling traffic over dikes, dams, and bridges. The research shows that the positioning of surveillance can be more impactful than the number of cameras. Geography thus influenced the positioning of ANPR cameras, which in turn influences the data the surveillance systems capture. The effective area of surveillance expressed through points, lines and planes revealed the full spatial impact of surveillance. And large parts of the harbor of Rotterdam are enclosed by strategically positioned ANPR surveillance at a distance from the entrance at dikes,

bridges, and access roads. This approach of enclosing sites of increased risk and monitoring the flow along major routes mirrors the philosophy of the 'nodale benadering' outlined in Project ANPR.

5.1.4 Conclusion compared to other work

The results of this thesis provide a detailed conformation of other work on ANPR and Governmentality. Project ANPR, like Project Champion, sought to control flows rather than to simply stop crime and control a territory (Fussey, 2013). However, this thesis provides the first detailed spatial understanding of how ANPR surveillance can be utilized to police flows and crime hotspots. While the Governmentality of Project ANPR was in line with Security to manage flows and crime hotspots on a contextual level Project ANPR used the logic of Discipline and enclosure. The spatial approach of this thesis outlined how contextual logics of enclosure are part of the Governmentality of Security. This resonates with the work of Klauser to who Security can make use of Disciplinary tools to foster freedom (Klauser, 2017). He concludes "On this contextual level, Security also relies on prohibitive, coercive – in sum, Disciplinary – techniques of power" (Klauser, 2017, p. 66). Flows or circulation to use Foucault's words are managed, sorted, and controlled in order to allow them to function (Foucault, 2007). ANPR can be used to seal off space. But Project ANPR, in line with Security, used the technology to allow circulations to take place and monitor the flow, and intervene only incidentally (Behruz et al., 2012; Fussey, 2013). This thesis confirms the value of the study of ANPR surveillance in terms of Governmentality, Klauser's framework of referentiality, normativity, and spatiality proved capable of detecting the rationalities behind Project ANPR. The following section will discuss the limitation of Klauser's axis of spatiality when applied to ANPR surveillance.

5.2 Limitations and future research

5.2.1 Discussion of Klausers framework

The adaption of Klauser's framework of lines, points, and planes for the analysis of ANPR surveillance proved capable of detecting the spatial logics of surveillance. By introducing the effective field of surveillance individual cameras (points), lines of cameras, and planes could be distinguished between Discipline and Security. The use of the effective field of surveillance inadvertently categorized the impact of surveillance in either enclosed (points and planes related to Discipline) or non-enclosed (points and planes related to Security). While separating lines of surveillance (related to Discipline) could be detected reliably, lines of movement (related to Security) remained elusive. However, since the lines of separation provide the most significant impact on citizens the framework remains useful, if imperfect.

While the framework provides a valuable tool to describe the different spatial functions of cameras within an ANPR surveillance network. The case study showed ANPR surveillance is conducted at such a large scale, that beyond the level of Points the levels of Lines and Planes have to be precisely coded to accommodate for the local context. This limits replicability and reduces for instance the possibility of making a comparison between cases. This is however a limitation of all case studies (Bryman, 2012).

While in general the framework allows for the identification of Disciplinary or Security oriented spatial distributions at the micro-level, the precise functioning of a surveillance camera remains elusive. This is because the framework ascribes functions to cameras without knowing the legal justification for the camera placement. However, as these considerations are police secrets the framework offers the best available understanding of the spatiality of ANPR surveillance.

5.2.2 future research

This thesis sought to provide an empirical understanding of the role of Discipline and Security in the use and deployment of ANPR surveillance within the city of Rotterdam. Future research could continue this empirical approach along the following lines.

First, future research could be directed towards the coalitions or actor-networks that supported the use of ANPR surveillance in the first place. This thesis explored the logic and techniques of how surveillance was established, but for a more complete understanding of why and how these logics came to the forefront and fell in favor with policymakers, additional research could be conducted.

Second, for the content analysis, this thesis relies on documents outlining the general ANPR deployment strategy within the city of Rotterdam. Future research could provide a more detailed account of the spatial motivations behind the individual placement of surveillance systems, by for instance (anonymously)interviewing members of the Regionale Informatie Organisatie (Regional Information Organization). These interviews could also provide valuable information on why cameras are not placed at certain locations. Currently, research is limited to the cameras that have been placed, this makes for an incomplete account of the logic and considerations behind the placement of ANPR surveillance, while as the thesis shows, the police constantly balance efficiency and the rights of citizens.

Third, the influence of Project ANPR was not limited to the city of Rotterdam as it played an influential role in the adoption of ANPR surveillance throughout the Netherlands (Berkel et al., 2020). Future research could examine in more detail how police agencies in other districts viewed and came to adopt the lessons from project ANPR. In a similar vein, this thesis described and examined one of the first large-scale deployments of ANPR surveillance in the Netherlands. However, currently, ANPR cameras are installed in every police district meriting coordination between police forces. Future research could examine this coordination and the spatial dynamics of ANPR surveillance on a national level.

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