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The EU's Maritime Techno-Borderscape:

A Socio-Legal Analysis of Digital Infrastructures and the Structural (Dis)protection along the Migrant Journey

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Abstract

This thesis explores the digitalisation of the European Union's maritime borders and its implications for the human rights of migrants and asylum seekers. It argues that the increasing use of technological infrastructures is not merely a question of operational efficiency but reveals a deeper legal and political architecture that governs mobility at sea.

Drawing from critical border studies, legal anthropology, and mobility theory, the thesis demonstrates that mobility is not a neutral or universal right, but a legally produced condition—one that is often stratified and conditional. The study shows how legal norms and digital infrastructures co-produce what it defines as an architecture of (dis)protection: a regime where protection exists, but access to it is increasingly filtered through data, risk, and legal ambiguity.

This thesis calls for a reimagining of border governance. It recognises the EU's institutional capacity to lead with values, and proposes that the same technological and legal resources currently used for deterrence can be redirected towards strengthening safe pathways, timely protection, and legal clarity. Ultimately, the thesis offers a new lens to approach migration governance—one that places the dignity of the human being at its centre, and urges for a shift from surveillance to solidarity.

Keywords: EU maritime border, (im)mobility, digital border control, human rights, asylum seekers, techno-borderscapes, structural (dis)protection

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List of Abbreviations

AI Act – Artificial Intelligence Act

AMMR – Asylum and Migration Management Regulation

APR – Asylum Procedures Regulation

CAT – Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment

CEAS – Common European Asylum System

CFREU – Charter of Fundamental Rights of the European Union

ECHR – European Convention on Human Rights

ECCHR – European Center for Constitutional and Human Rights

ECtHR – European Court of Human Rights

EES – Entry/Exit System

EU – European Union

EUROSUR – European Border Surveillance System

ETIAS – European Travel Information and Authorisation System

EUTF – Emergency Trust Fund for Africa

EURODAC – European Dactyloscopy

Frontex – European Border and Coast Guard Agency

GDPR – General Data Protection Regulation

HAPS – High Altitude Pseudo-Satellites

IBM – Integrated Border Management

ICCPR – International Covenant on Civil and Political Rights

ICESCR – International Covenant on Economic, Social and Cultural Rights

MS – Member States

NGOs – Non-Governmental Organisations

OHCHR – Office of the High Commissioner for Human Rights

PMA – Pact on Migration and Asylum

RBP – Return Border Procedures

SBC – Schengen Borders Code

SIS II – Schengen Information System (Second Generation)

UNHCR – United Nations High Commissioner for Refugees

VIS – Visa Information System

Chapter 1 – Introduction

"... we are on the edge of a technological revolution that promises to shift the advantage in favour of law enforcement in a significant way, perhaps for the very first time in history."[1]

This statement, articulated at the World Border Security Congress held in Madrid, Spain, in March 2025[2], reflects the prevailing optimism surrounding the use of technology in border management. In this high-level forum, representatives from security experts, policymakers, technology providers and border agencies– including the Frontex – convened to discuss the evolving landscape of border, migration management, and security.

Yet, beneath this optimism lies a critical question: If this technological revolution is indeed reshaping the balance in favour of law enforcement, what are its implications for the protection of human rights? Does it ensure greater security for all, or does it risk deepening exclusion, discrimination, and inequality for some? At the heart of this inquiry is a fundamental tension between the promise of enhanced border control and the principles of human rights.

Over the past decade, the EU has undertaken a series of initiatives aimed at reinforcing and 'securing' its external borders, with a particular focus on maritime regions. These efforts, driven by a growing perception of migration as a security challenge, have been accompanied by a process of technological enhancement, transforming European maritime borders into digitally monitored spaces. This shift can be traced back to the so-called 'migration crisis' of 2015, a pivotal moment when approximately one million individuals reached European shores via dangerous maritime routes in search of safety and protection[3].

However, despite a significant reduction in sea arrivals in the years that followed—from over one million in 2015 to 199,400 in 2024[4]—the number of deaths at sea has remained distressingly high. In

[1] Border Security Report, 'BSR March/April 2025' (2025) 4. https://www.border-security-report.com/wp-content/uploads/2025/03/BSRMarApr2025.pdf accessed 10 May 2025
[2] World Border Security Congress 'About the Congress' https://world-border-congress.com/ accessed 10 May 2025
[3] International Organization for Migration, 'Irregular Migrant, Refugee Arrivals in Europe Top One Million in 2015: IOM' (IOM, 22 December 2015) https://www.iom.int/news/irregular-migrant-refugee-arrivals-europe-top-one-million-2015-iom accessed 10 May 2025.
[4] According to UNHCR data, a total of 199,400 migrant arrivals by sea were recorded in European coastal areas in 2024. For further details, see UNHCR, 'Europe Sea Arrivals - May 2025' (UNHCR, 2025) https://reporting.unhcr.org/europe-sea-arrivals-overview accessed 10 May 2025

2015, 3,771 lives were recorded lost in the Mediterranean, while in 2024, despite the deployment of far more sophisticated surveillance and interception technologies, 2,452 deaths were still documented along the same route.[5] This paradox—fewer crossings, yet persistently high fatalities—raises urgent questions about the human cost of the EU's securitised and technological border regime. It compels us to move beyond a purely operational critique of technological efficiency and towards a deeper interrogation of the structural foundations upon which Europe's maritime border governance is built. The problem, this thesis argues, is not only that technology is misapplied or insufficiently regulated in this context, but that it also operates within a legal and political framework that systematically obstructs protection, selectively produces visibility, and redefines the conditions under which movement is recognised or denied.

To make sense of this complex configuration, the thesis draws on analytical tools from anthropology and critical border studies. Concepts such as *regimes of (im)mobility*,[6] *techno-borderscapes*,[7] *and politics of (in)visibility*,[8] are employed as conceptual lenses to examine how law, institutions, and technological systems shape the EU's maritime techno-border; and how this very infrastructure reflects what this thesis terms an architecture of (dis)protection**:** a system in which the appearance of legality coexists with the systematic erosion of access to rights.

By examining the legal entanglements that enable this digitalised governance of mobility, the research aims to uncover how the EU's maritime borders function as techno-legal formations that reconfigure the conditions under which rights are accessed, suspended, or denied, especially for those seeking international protection by crossing perilous routes at sea. It will eventually suggest that reimagining the structural foundations of border governance is not only necessary, but possible, if human rights are placed at the centre of protection, rather than at its margins.

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[5] Ibid.

[6] Mimi Sheller, *Mobility Justice: The Politics of Movement in an Age of Extremes* (Verso 2018); Ronen Shamir, 'Without Borders? Notes on Globalization as a Mobility Regime' (2005) 23(2–3) Sociological Theory 197; Nina Glick Schiller and Noel B Salazar, 'Regimes of Mobility across the Globe' (2013) 39(2) *Journal of Ethnic and Migration Studies* 183

[7] Marie Godin and Giorgia Donà, 'Rethinking Transit Zones: Migrant Trajectories and Transnational Networks in Techno-Borderscapes' (2020) *Journal of Ethnic and Migration Studies*

[8] Andrea M. Brighenti, *The New Politics of Visibility: Spaces, Actors, Practices and Technologies in the Visible* (Intellect Books 2022).; Martina Tazzioli and William Walters, 'The Sight of Migration: Governmentality, Visibility and Europe's Contested Borders' (2016) 23(6) Global Society 681;

Relevance of the thesis and research questions

There is a growing body of academic work showing that the deployment of technologies at borders can risk violating human rights, especially when they are used without proper safeguards.[9] Building on this evidence, this thesis pretends to take a different step. Drawing on insights from sociology, anthropology, and critical legal studies of mobilities and borders**,** it suggests that the issue may not be purely operational, but systemic: rooted in a governance model that constructs the migrant as a threat and protection as conditional.

This becomes particularly visible at sea, where in 2024 alone, an average of nine people died every day attempting to reach European shores.[10] At sea, jurisdiction is fragmented, responsibility often deferred, and surveillance technologies play a central role in detecting, monitoring, and managing mobility. In such spaces, protection is not only difficult to access, but also frequently mediated by layers of legal ambiguity and technological filtering.

Despite these alarming figures, the digitalisation of the maritime border continues to expand. Yet little attention has been paid to how legal frameworks and technological infrastructures interact to structure (in)visibility, access to rights, and conditions of (im)mobility**.** This thesis pretends to address that gap.

The core research questions guiding this investigation are:

1. To what extent does the EU's technological border regime reconfigure the legal construction of human mobility at sea?
2. In what ways do new technologies contribute to the structural exclusion of migrants from legal protection, and what role does law play in legitimising, enabling, or contesting these practices?

[9] Petra Molnar, 'Technological Testing Grounds: Migration Management Experiments and Reflections from the Ground Up' (2020) *Refugee Law Initiative Working Paper Series* No 43; Huub Dijstelbloem, *Borders as Infrastructure: The Technopolitics of Border Control* (MIT Press 2021; Trauttmansdorff, 'The Politics of Digital Borders' in Cengiz Günay and Nina Witjes (eds), *Border Politics: Defining Spaces of Governance and Forms of Transgressions* (Springer 2017)
[10] CEAR, 'Nueve personas mueren cada día intentando llegar a Europa por mar en 2024' (CEAR, 4 julio 2024) https://www.cear.es/destacados/nueve-muertes-dia-mar-europa-2024/ accessed 9 July 2025.

Methodology

This thesis employs a socio-legal and interdisciplinary methodology, drawing from legal analysis, critical border studies, legal anthropology, and migration sociology. The aim is to understand how legal frameworks and technological infrastructures co-construct conditions of (im)mobility and access to protection at the EU's maritime border.

Primary sources include EU legal instruments, policy documents, institutional communications, and relevant jurisprudence from the European Court of Human Rights and the Court of Justice of the European Union. Secondary sources comprise academic literature, policy analysis, and human rights reports produced by NGOs, EU agencies, and international organisations.

The empirical dimension of the thesis is grounded in secondary data, including documented practices from the Central, Eastern, and Western Mediterranean routes. These cases are used to illustrate how legal and technological structures are experienced by migrants in practice, and how they affect the exercise of fundamental rights.

Structure

This thesis is structured into five chapters, each contributing to a layered understanding of how the EU's maritime border regime produces and sustains (im)mobility through the interplay of law, technology, and governance. The structure follows both a conceptual and analytical progression, moving from a socio-legal and theoretical foundation to a more applied and empirical analysis of contemporary border practices. This design allows the reader to trace the normative, legal and infrastructural mechanisms through which the digital border is constructed and operationalised, ultimately reflecting on the human consequences of these structural processes.

Chapter 1 introduces the core themes and research questions of the thesis, situating the study within the legal and geopolitical context of the EU's digitalised maritime border. It outlines the socio-legal methodology and presents the conceptual frameworks drawn from critical migration studies and legal anthropology.

Chapter 2 lays the theoretical groundwork by exploring how mobility is legally and politically constructed as (im)mobility. Through concepts such as legal subjectivity, (dis)protection, and the

techno-borderscape, the chapter reframes the maritime border as a space of digital governance shaped by legal stratification and geopolitical inequality.

Chapter 3 analyses the legal and technological infrastructure that sustains the EU's maritime border regime. It maps the regulatory framework, institutional actors, and operational technologies involved in surveillance and identification, showing how these tools not only monitor but actively structure exclusion through law and data.

Chapter 4 follows the migrant journey through three phases — at sea, upon arrival, and within the system — to reveal how protection is fragmented, delayed, or denied. Using secondary empirical evidence, the chapter demonstrates how surveillance, biometric capture, and digital profiling transform legal safeguards into conditional and often inaccessible rights.

Chapter 5 synthesises the thesis' findings, reflecting on the broader implications of the EU's maritime techno-border. It calls for a reorientation of legal and technological governance towards accountability, care, and human dignity in migration policy.

Chapter 2 – The Construction of (Im)mobility at the Maritime Techno-Borderscape

2.1. Introduction

"We hear much talk of roots… Of the roots of our societies and historic communities. Of our deep-rooted traditions in particular geographical areas since the dawn of time…

But Man is not a tree—he has no roots; he has feet, he walks. Since the time of Homo erectus he has moved about in search of pastures, more benign climates, or places where he can seek shelter from inclement weather and the brutality of his fellow men." —Juan Goytisolo[11]

We often speak of human movement as an exception, an interruption to the norm of rootedness. Yet, as Goytisolo reminds us, mobility is not the deviation; it is the condition. From the earliest migrations of *Homo erectus* to today's perilous crossings of the maritime routes, human history has been shaped by the impulse, and often the necessity to move. However, this universality of movement stands in stark contrast with the contemporary legal and political regimes that govern mobility as a stratified and conditional right. Some move with passports, protections, and presumed legitimacy. Others are rendered hypervisible yet unwanted, their trajectories obstructed by legal filters, technological scrutiny, and bureaucratic opacity.

This chapter examines how such conditions are structurally embedded in what scholars describe as global regime of (im)mobility. To unfold this argument**,** Section 2.2 lays the theoretical foundation by unpacking the concept of (im)mobility, examining how movement is governed through legal categorisation and how this process simultaneously produces (dis)protection**.** Section 2.3 turns to the maritime border, tracing its transformation from a physical line into a space distributed across jurisdictions, technologies, and delegated sovereignties: the techno-borderscape**.** Section 2.4 will explore the politics of (in)visibility at play in digital border governance, framing contemporary maritime control as part of a broader colonial logic of extraction and erasure**.** The chapter will finish with general conclusions in Section 2.5**.**

[11] Juan Goytisolo, *Metáforas de la migración* (Marco Kunz ed, Editorial Verbum 2003) [translated by author].

2.2. (Im)mobility as a Legal and Political Structure

2.2.1. Understanding (Im)mobility in the Global Politics of Movement

What does it mean to move? Why is it that for some, movement feels effortless framed as freedom, as right, as opportunity, while for others, it is met with detention, suspicion, or death? The answer to this asymmetry reveals the profound inequalities that structure access to movement today. It is precisely this paradox— between the universality of movement as a human condition and the politically stratified reality of who gets to move—that lies at the heart of the concept of (im)mobility**.**

Coined and popularised by mobility studies, the term *(im)mobility* captures the simultaneous production of movement and stasis within the same global regime of circulation.[12] Mobility is not simply about moving, it is about how movement is socially, politically, and legally constructed, enabled or restricted.[13] The hyphenation *(im)* signals this tension, emphasising that mobility and immobility are not opposites but co-constitutive forces within what scholars refer to as regimes of (im)mobility**.**

Regimes of (im)mobility refer to the intersecting state, legal, economic, and technological mechanisms that differentiate between legitimate and illegitimate movement[14]. As Mimi Sheller elaborates, we live in an era where "mobility justice" must be understood as the unequal distribution not only of the right to move, but also of the right to remain, to stay put, or to seek refuge without being criminalised.[15] The *global politics of movement*, therefore, entails a shift away from methodological nationalism and toward a relational understanding of how movement is governed and experienced across racialised, gendered, classed and geopolitical lines.[16]

In this thesis, we adopt the term *(im)mobility* not merely as a descriptor of physical movement or border-crossing, but as an analytical lens to interrogate the politico-legal production of differential access to mobility**.** This lens allows us to challenge liberal assumptions that treat mobility as an individual right, and instead examine the conditions under which legal systems confer or deny that

[12] Noel B Salazar and Nina Glick Schiller (n 6), 183.
[13] Mimi Sheller, (n 6) 35; Nina Glick Schiller and Noel B Salazar (n 6).
[14] Salazar and Schiller (n 6)
[15] Sheller (n 6)
[16] Martina Tazzioli, *The Making of Migration: The Biopolitics of Mobility at Europe's Borders* (SAGE 2020) 5–9.

right. As Cresswell argued, mobility is never just about getting from point A to point B; it is imbued with meaning, shaped by power, and always situated within broader normative frameworks.[17]
From an anthropological perspective, mobility is not a universal freedom but a *regulated practice*. In Salazar's words, it is "imagined, narrated, and governed" in ways that reinforce global hierarchies.[18] Some movements are welcomed—tourists, investors, digital nomads—while others are criminalised—refugees, undocumented migrants, racialised bodies crossing the Mediterranean. These legal classifications are not neutral; they reproduce colonial logics of who may move freely and who must be stopped.

Moreover, the very language of migration law encodes these hierarchies. As Spijkerboer provocatively observes, the term *mobility* is often reserved for desirable forms of movement (students, expatriates), while *migration* is invoked to signal deviance or undesirability. Migration, then, becomes "the annoying little sibling of mobility".[19] This rhetorical distinction reflects deeper structural exclusions embedded in global migration governance.

Finally, legal systems do not merely reflect these regimes, they *produce* them. Law configures mobility not only by setting conditions of entry or exit, but also by constructing the very subjectivities of those who move. Whether someone is seen as a migrant, a refugee, or an intruder is not a matter of fact but of legal categorisation, imbued with racialised and postcolonial meanings. The "migrant" emerges, then, not just as someone who moves, but as someone whose movement is rendered problematic through legal governance.

Thus, understanding *(im)mobility* within the global politics of movement is essential to grasp how borders work—not just as physical spaces of control, but as legal and ideological architectures that filter, classify, and hierarchies' human movement. This theoretical grounding sets the stage for the next section, which examines how these legal constructions shape migrant subjectivity at the border.

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[17] Tim Cresswell, 'The Right to Mobility: The Production of Mobility in the Courtroom' (2006) 38(4) *Antipode* 735.
[18] Noel B Salazar, 'Mobility and Migration: An Overview' in Noel B Salazar and Kiran Jayaram (eds), *Anthropological Takes on Mobility* (Berghahn 2016) 2.
[19] Thomas Spijkerboer, 'Bifurcation of Mobility, Bifurcation of Law: Externalization of Migration Policy before the EU Court of Justice' (2018) 31(2) *Journal of Refugee Studies* 216, 218.

2.2.2. The Legalisation of (Im)mobility and the Production of (Dis)protection

The law does not encounter migrants as whole persons but as potential legal figures awaiting classification: are they a refugee under the 1951 Convention?[20] A beneficiary of subsidiary protection under EU law?[21] An "irregular migrant" under national immigration statutes? A stateless person under the 1954 Convention?[22] Or simply "inadmissible"? These legal identities operate as filters, shaping the conditions under which recognition is either granted or denied. Yet this process often flattens the complexity of migratory trajectories. Rather than engaging with lived realities, it demands legible narratives—stories that match pre-established legal templates.[23]

This section explores how such legal filters are not merely bureaucratic necessities, but key instruments in what this thesis terms the *legalisation of (im)mobility*: the process by which law does not simply regulate movement, but actively produces, legitimises, and normalises unequal access to it. As Mimi Sheller argues, (im)mobility is "a structuring condition of global injustice," embedded in systems that govern who can move, how, and under what conditions.[24] In this light, the law legitimises immobility, not by excluding people from legal protection outright, but by embedding conditionality through categorisation, procedural requirements, and technological mediation.[25] Legal norms thus create mobility for some, while rendering others immobile, invisible, or inadmissible.

The legalisation of (im)mobility, as proposed in this thesis, signals a shift in the function of law: from safeguarding the right to move, to managing and filtering mobility within a stratified regime. Rather than acting merely in response to migration, the law becomes a constitutive force, generating legal subjectivities according to the logics of sovereignty, securitisation, and risk assessment.[26] In this context, protection is no longer a right to be claimed, but a status to be earned, often through performative compliance with complex legal and biometric procedures.[27]

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[20] Convention Relating to the Status of Refugees (adopted 28 July 1951, entered into force 22 April 1954) 189 UNTS 137.
[21] Directive 2011/95/EU (Qualification Directive) [2011] OJ L337/9.
[22] Convention Relating to the Status of Stateless Persons (adopted 28 September 1954, entered into force 6 June 1960) 360 UNTS 117.
[23] See Ayten Gündoğdu, *Rightlessness in an Age of Rights: Hannah Arendt and the Contemporary Struggles of Migrants* (Oxford University Press 2015) 26–30; Jacqueline Bhabha, 'Internationalist Gatekeepers?: The Tension Between Asylum Advocacy and Human Rights' (2002) 15 *Harvard Human Rights Journal* 155, 157–160.
[24] Sheller, (n 6) 18.
[25] For related critiques of law as a producer of exclusionary mobility regimes, see Gündoğdu, (n 23); Spijkerboer, (n 19), 216; Sheller (n 6).
[26] Bigo, (n 26), 63-87
[27] Martina Tazzioli, (n 16), 92–97.

As Nandita Sharma reminds us, legal categories are not neutral; they reproduce national and racialised imaginaries of who belongs and who does not, producing what she calls "state subjects of mobility" whose rights are allocated or denied according to postcolonial hierarchies.[28] Didier Bigo complements this by identifying a "logic of suspicion" within contemporary migration governance, whereby individuals are treated not as rights-holders, but as potential threats to be filtered before any entitlement to protection is considered.[29]

This securitised rationality enables what Mann has described as *legal liminality*: a state of suspended legal responsibility, where obligations are strategically avoided through spatial and procedural ambiguity, particularly in the maritime context, via third-country arrangements or the delegation of rescue responsibilities.[30] Migrants are thus not protected as subjects of rights, but managed as administrative objects through externalisation, surveillance, and algorithmic pre-classification. These dynamics converge at the EU's maritime borders, where instruments like the SBC EURODAC Regulation and CEAS[31] operationalise a regime that does not eliminate protection, but transforms it into a fragmented, biometric, and conditional possibility. What this thesis terms a regime—or architecture—of (dis)protection refers to this systemic transformation: protection is not absent, but increasingly contingent upon legal legibility, digital traceability, and geopolitical acceptability. This regime is marked not by the *absence* of law, but by its *overproduction*. As Ayten Gündoğdu has shown, rightlessness today emerges not from a lack of legal norms, but from the multiplication of requirements that restrict access to them.[32] The paradox is that people are not excluded from law altogether, they are governed so intensely that access to rights becomes structurally unattainable. As this section has argued, the legalisation of (im)mobility reveals a deeper shift in the role of law within the EU's migration regime: it no longer merely mediates movement, but actively structures its (im)possibility through categories, procedures, and biometric infrastructures that normalise inequality. Far from being absent, law saturates the governance of migration, creating a regime of (dis)protection: one in which the language of rights remains, but the reality of access is increasingly deferred.

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[28] Nandita Sharma, *Home Rule: National Sovereignty and the Separation of Natives and Migrants* (Duke University Press 2020) 116–120.
[29] Bigo (n 26).
[30] Itamar Mann, *Humanity at Sea: Maritime Migration and the Foundations of International Law* (CUP 2016) 152–157.
[31] See Regulation (EU) 2016/399 (Schengen Borders Code); Regulation (EU) 603/2013 (EURODAC); and the instruments under the Common European Asylum System.
[32] Gündoğdu, (n 23), 27–28.

2.3. The Maritime Techno-Borderscape

2.3.1. From Borders to Techno-Borderscapes

European borders are no longer confined to physical lines of territorial demarcation. Instead, they operate as dynamic processes, enacted through legal, technological, and operational practices that extend well beyond traditional cartographic representations. As scholars have argued, the border is not a static site, but a "bordering practice": a performative and relational space where state power, mobility, and identity are continuously negotiated.[33] This spatial reconceptualisation has given rise to the concept of the *borderscape*, a term that captures the diffuse, multilayered, and often contradictory geographies of migration governance in the contemporary EU regime.

The notion of *borderscape*, first articulated by Rajaram and Grundy-Warr,[34] and later developed by Brambilla, Mezzadra, Neilson and Campesi, shifts the analytical lens away from the border as a territorial threshold, and towards the lived, visual, and infrastructural processes that sustain the EU's border regime.[35] In the case of Europe's maritime frontiers, this means recognising that the sea is not a legal void or merely a passageway between nations, it is a heavily governed, fragmented, and stratified space where border practices are enacted through a combination of surveillance, legal dispersal, and delegated enforcement.

Building on this, recent scholarship has proposed the term *techno-borderscape* to capture how digital infrastructures increasingly mediate bordering processes. Godin and Donà define techno-borderscapes as "hybrid configurations where borders are enacted through technologies that sort, monitor, and discipline bodies-in-transit."[36] In this framing, technology does not merely support migration control, but it constitutes it. Drones, satellites, biometric databases, and algorithmic risk assessments are not neutral tools: they are socio-technical assemblages that produce and legitimise exclusion, often under the guise of innovation or humanitarianism.[37]

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[33] Chiara Brambilla, 'Exploring the Critical Potential of the Borderscapes Concept' (2015) 20(1) *Geopolitics* 14; Sandro Mezzadra and Brett Neilson, *Border as Method, or, the Multiplication of Labor* (Duke University Press 2013).
[34] Rajaram, Prem Kumar, and Carl Grundy-Warr (2007) "Introduction." In *Borderscapes: Hidden Geographies and Politics atTerritory's Edge.* Edited by Rajaram Prem Kumar and Carl Grundy-Warr. Minneapolis: University of Minnesota Press. ix–xl.
[35] Brambilla (n 33); Mezzadra and Neilson (n 33); Giuseppe Campesi, *Policing Mobility Regimes: Frontex and the Production of the European Borderscape* (Routledge 2022)
[36] Marie Godin and Giorgia Donà, 'Rethinking Transit Zones: Migrant Trajectories and Transnational Networks in Techno-Borderscapes' (2020) *Journal of Ethnic and Migration Studies*
[37] ibid; Didier Bigo, (n 26) 63.

The maritime border, in particular, has become a key laboratory for this techno-political transformation. The Central and Eastern Mediterranean, the Atlantic route, and the Aegean Sea function as digital corridors, crisscrossed by surveillance data, predictive mapping, and delegated rescue responsibilities. These routes are not governed through singular jurisdictions but through overlapping zones of operational competence, such as Search and Rescue (SAR) regions, Frontex mandates, and third-country partnerships. This spatial and legal complexity enables the EU to exercise *remote control* exerting power without direct accountability, a logic that Trauttmansdorff and Papachristodoulou describe as "bordering at a distance."[38]

Moreover, the techno-borderscape reflects deeper shifts in the ontology of the border itself. As Dijstelbloem and Meijer argue, the border has become "technological" in its very operation, relying on data infrastructures to enact legal decisions, filter mobilities, and pre-empt movement before it reaches the EU's physical territory.[39] Sovereignty is no longer exercised only through physical interdiction, but through anticipatory governance: the prediction, categorisation, and deferral of mobility through algorithmic suspicion.

In this sense, the techno-borderscape functions as a key component in the legalisation of (im)mobility discussed in the previous section. It enables the reproduction of stratified access to movement by encoding legal thresholds into technological system, like risk scoring models, biometric matching protocols, and digital databases. These infrastructures work not merely to register or detect movement, but to classify and pre-empt it. Migrants are rendered visible as data, while their legal subjectivity remains suspended or conditional.

Crucially, the techno-borderscape is not simply a spatial extension of state power, but a *colonial continuity*. As Sheller and Ricaurte argue, digital infrastructures often reproduce racialised hierarchies of control, reactivating logics of classification and disposability rooted in colonial governance.[40] In this context, the EU's digital border regime does not only filter movement, but it also enacts a form of technocolonialism that manages life through asymmetrical visibility, data extraction, and algorithmic

[38] Aphrodite Papachristodoulou, 'The Exercise of State Power over Migrants at Sea through Technologies of Remote Control: Reconceptualizing Human Rights Jurisdiction' (2024) 73(4) *International and Comparative Law Quarterly* 805, 810.
[39] Dijstelbloem (n 9) 5.
[40] Sheller (n 6) 36-39; Paola Ricaurte, 'Data Epistemologies, Coloniality of Power, and Resistance' (2019) 20(1) *Television & New Media* 1.

regulation. Thus, the transition from borders to techno-borderscapes is not merely semantic. It signals a transformation in the materiality, temporality, and legality of border governance. The border is no longer where the state meets the outsider; it is where the logic of control is encoded into technologies that operate across space and time, before, during, and after the crossing. As we explore in the next section, this transformation is especially acute at sea, where the EU's maritime frontier becomes a digitally governed space of filtering, fragmentation, and procedural abandonment.

2.3.2. The Sea as a Digital Frontier

While the concept of the *techno-borderscape* reveals how migration governance extends through digital infrastructures, it is at sea where this logic crystallises most acutely. The maritime border is not merely a shifting jurisdictional line, but a digital frontier, a fluid, datafied space where mobility is governed not only through physical interdiction but through anticipatory algorithms, satellite surveillance, and delegated decision-making. Here, the sea becomes both a site of movement and a laboratory for remote control.

This digital frontier is constructed through a proliferation of overlapping systems: EUROSUR, Frontex's aerial surveillance, and predictive AI projects, among others better explored in the next Chapter. These systems do not merely observe movement; they seek to pre-empt it. Anticipatory governance functions by detecting patterns, assigning risk scores, and triggering interventions long before a vessel reaches EU territory. This marks a shift from "territorial" to "informational" bordering, where data replaces geography as the primary medium of control.[41]

The legal threshold to claim protection, therefore, becomes increasingly displaced into digital territory. In this seascape, visibility does not correspond to physical presence, but to technological legibility. Migrants must appear as detectable, classifiable data objects in order to be recognised by the system. Those whose movement defies prediction—whose boat takes an irregular path, or whose identity resists biometric matching—risk not only interception, but complete erasure from legal space.[42]

Moreover, the notion of jurisdiction at sea becomes fractured by design. The delegation of Search and Rescue (SAR) responsibilities to third countries like Libya or Tunisia, often coordinated through

[41] Dennis Broeders, 'A European "Border" Surveillance System under Construction' in Huub Dijstelbloem and Albert Meijer (eds), *Migration and the New Technological Borders of Europe* (Palgrave Macmillan 2011). 44
[42] Basaran, T. (2008). Security, law, borders: Spaces of exclusion. *International Political Sociology*, *2*(4): 339–354.

European command centres, allows the EU to exert effective control without legal accountability.[43] This is what Papachristodoulou calls "remote jurisdiction": the use of technological infrastructures to extend sovereignty beyond territorial limits while avoiding direct obligations.[44] Migrants intercepted under such arrangements are frequently framed not as asylum seekers, but as "objects of rescue," to be returned to unsafe zones under the guise of legal neutrality.

Importantly, the sea as a digital frontier is not a void of law but an intensification of it. It is governed through layers of intersecting legal norms—UNCLOS, SOLAS, SAR conventions, EU regulations, bilateral agreements—all interacting with technological systems whose opacity resists scrutiny.[45] Legal certainty is not absent; it is dispersed. As Moreno-Lax argues, this fragmentation is not incidental but strategic: it creates a regime of non-entanglement in which protection obligations are diffused across actors, zones, and systems.[46]

This thesis argues that the digital governance of the sea performs more than surveillance. Here, decision-making is increasingly embedded in code: vessels are prioritised for interception based on risk categories; biometric traces determine admissibility; AI-generated trajectories anticipate movement and allocate institutional response. These decisions, while framed as neutral or technical, embody normative judgements about who is deemed a threat, who is eligible for protection, and who may be left to drift unnoticed.

Thus, the sea is no longer only a frontier in the geographical sense; it is a frontier of legal subjectivity, visibility, and personhood. Migrants at sea are not merely crossing borders, they are also navigating a regime of digital pre-classification that often renders their protection claims inaudible before they can be spoken. The following section turns to the politics of digital (in)visibility to unpack the racialised, colonial, and techno-legal logics that govern these processes.

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[43] Violeta Moreno-Lax, 'The Architecture of Functional Jurisdiction: Unpacking the Legal and Political Structures of the European Border Regime' (2020) 27(1) *International Journal of Refugee Law* 15.
[44] Papachristodoulou, 'The Exercise of State Power over Migrants at Sea through Technologies of Remote Control: Reconceptualizing Human Rights Jurisdiction' (2024) 73 *International and Comparative Law Quarterly* 679, 681–684.
[45] Thomas Gammeltoft-Hansen and Tanja E Aalberts, 'Sovereignty at Sea: The Law and Politics of Saving Lives in Mare Liberum' (2017) 86 *Nordic Journal of International Law* 461, 463–469.
[46] Moreno-Lax (n 43) 27–30.

2.4. Techno-Politics of (In)visibility

2.4.1. Digital Colonialism at the Border

The technological governance of borders in the EU echoes what Ann Laura Stoler has called "colonial durabilities": forms of power and epistemologies that persist beyond the formal end of empire, shaping present inequalities and legitimising asymmetrical modes of governance.[47] Focusing on digital colonialism at the maritime border, this section explores how digital technologies do not merely reproduce the physical functions of border control but rearticulate them in ways that perpetuate imperial logics. These include modes of classification, surveillance, and data extraction that specifically target mobile populations from the Global South.

At the heart of digital colonialism lies a reconfiguration of control over bodies, knowledge, and infrastructure. As Stoler observes, emergent terms such as “technocolonialism”, “data colonialism”, and “digital colonialism” attempt to grasp the enduring asymmetries that structure access to and governance of technological systems, particularly at sites of intensified bordering like the EU’s maritime frontier.[48] These technologies do not operate neutrally but are embedded within regimes of knowledge that have historically racialised and hierarchised mobility.

As Madianou notes, in the humanitarian context, technologies such as biometric registration and predictive analytics have become tools of technocolonial ordering, substituting human testimony with data-driven authority.[49] At sea, this logic is intensified: people on the move are not just intercepted but translated into algorithmic categories, biometric templates, and risk scores.
This translation is not innocent. As Giorgia Donà argues, the digitalisation of border control reactivates the coloniality of power, materialising the techno-borderscapes.[50] Biometric recognition, drone surveillance, AI-based profiling, and interoperability frameworks construct the border not only as a line of control, but as a site of data extraction and epistemic violence.

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[47] Ann Laura Stoler, *Interior Frontiers: Colonial Refractions in (Il)Liberal Times* (Zone Books 2023) 280–281
[48] Ibid.
[49] Mirca Madianou, ‘Technocolonialism: Digital Innovation and Data Practices in the Humanitarian Response to Refugee Crises’ (2019) 5(3)
[50] Giorgia Donà, ‘The Coloniality of Power in Techno-Borderscapes’ (2024) *IWMPost* 131.

Following Paola Ricaurte, data colonialism should be understood not only as a matter of surveillance capitalism, but as a broader epistemological project whereby bodies and territories of the South are rendered knowable, governable, and exploitable through data infrastructures built elsewhere.[51] In the EU maritime context, the outsourcing of data processing, the imposition of interoperability rules, and the transnational extraction of biometric data mirror extractive colonial enterprises.

This condition is reinforced by neocolonial alliances between EU agencies, humanitarian actors, and private technology firms. As Singler and Babalola show, the co-production of digital borders and privacy legislation in postcolonial contexts like Nigeria reveals how Northern norms and technical standards are re-embedded through digital infrastructure.[52] What appears as legal harmonisation often constitutes the epistemic imposition of foreign governance models over local conceptions of rights, mobility, and protection.

The coloniality of smart borders is not merely about historical continuities, but it is also about how experimentation is enacted upon racialised others. Pfeifer's analysis of dialect recognition software used in German asylum procedures illustrates this point poignantly: migrants become test subjects in algorithmic classification systems built upon epistemologies rooted in colonial-era linguistic taxonomies.[53] The logic of control is transposed from the colonial sound archive to the machine learning model. In this sense, the digital border acts as a laboratory where the governance of mobility is recalibrated under the sign of progress, security, and humanitarianism. The result is a technopolitical regime that normalises visibility without recognition, surveillance without protection, and categorisation without rights.

To understand the EU maritime techno-borderscape is to confront these layered colonialities. The border becomes a space where imperial formations are reactivated, now coded in algorithms and inscribed in data flows. Recognition is displaced by prediction; testimony by biometrics; protection by categorisation. This is not the end of empire, but its digital mutation.

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[51] Ricaurte, (n 40), 20.
[52] Samuel Singler and Olumide Babalola, 'Digital Colonialism Beyond Surveillance Capitalism? Coloniality of Knowledge in Nigeria's Emerging Privacy Rights Legislation and Border Surveillance Practices' (2024)
[53] Michelle Pfeifer, 'The Coloniality of "Smart Borders"' (Heinrich Böll Stiftung, 2024) https://www.gwi-boell.de/en/2024/09/09/die-kolonialitaet-von-smart-borders-erst-das-verstaendnis-der-historie-heutiger accessed 5 July 2025.

2.4.2. The (In)visibility of the Migrant Body

In the context of the EU's maritime techno-borderscape, to be seen is not necessarily to be recognised, and to be recognised is not always to be protected. This section explores the paradox of visibility at the border, arguing that new technologies of surveillance and categorisation render migrant bodies hyper-visible as objects of control while simultaneously erasing their political subjectivity and human rights claims. What emerges is a regime of visibility without rights, where migrants are seen as risk, as data, or as logistical problems to be solved, but rarely as subjects of dignity, law, or justice.[54]

As Tazzioli and Walters argue, visibility is not simply a matter of being seen or unseen, but a form of governmentality, a way of organising what kinds of lives become intelligible, knowable, and governable.[55] Migrants are often rendered visible only in the terms set by surveillance apparatuses, captured by thermal imagery, biometric sensors, or drone footage, but this visibility does not entail recognition or protection. Instead, as Brighenti notes, visibility is an ambivalent medium of power: it may empower, expose, or erase.[56] At the maritime border, to be made visible by technological systems often means to be reduced to a risk score, a suspect trajectory, or a biometric trace.

This techno-visibility strips away the complex human, legal, and political dimensions of displacement. It turns the right to seek asylum into a logistical challenge of detectability and categorisation. De Genova reminds us that the figure of the migrant is often produced through a "spectacle of illegality," a visibility that criminalises and dehumanises.[57] This spectacle is central to what Mezzadra, and Neilson call the *differential inclusion* of migrants into systems of control: visible enough to be intercepted, invisible enough to be denied rights.[58]

The interplay of visibility and invisibility is not accidental. It is structured by racialised, postcolonial logics of border enforcement. As Topak has shown, the deployment of facial recognition, iris scanning,

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[54] Martina Tazzioli and William Walters, 'The Sight of Migration: Governmentality, Visibility and Partial Politics' (2016) 18(4) *Global Society* 397, 399.
[55] Ibid, 681
[56] Andrea M. Brighenti, *The New Politics of Visibility: Spaces, Actors, Practices and Technologies in the Visible* (Intellect Books 2022).
[57] Nicholas De Genova, 'Spectacles of Migrant "Illegality": The Scene of Exclusion, the Obscene of Inclusion' (2013) 36(7) Ethnic and Racial Studies 1180
[58] Mezzadra and Neilson (n 33), 171–172.

and gait analysis at EU borders reinscribes colonial assumptions about the legibility of non-European bodies.[59]

These technologies claim to read truth from the body, bypassing testimony or context. In this regime, the legal subjectivity of the migrant is foreclosed. The right to move—as a condition for other rights—is undermined not only by physical barriers but by the epistemic infrastructures that render movement illegible. The border thus becomes a site where the right to have rights is suspended through the management of appearance. Sheller reminds us that mobility justice must address not only the ability to move but also the right to be recognised within visual regimes that have historically excluded racialised and colonised populations.[60] These dynamics are spatially and materially anchored in the techno-borderscape of the sea.

Ultimately, the (in)visibility of the migrant body at sea must be understood not as an incidental failure of protection but as a structural feature of digital bordering. The migrant is simultaneously hyper-visible and radically unseen—a figure produced by layers of law, technology, and racialised surveillance that secure the border while voiding legal responsibility.

2.5. Conclusions

This chapter has argued that the governance of mobility at the EU's maritime borders cannot be understood as a collection of technical measures or isolated legal failures. Rather, it constitutes a coherent regime in which law, technology, and visibility coalesce to structure who may move, under what conditions, and at what cost. The concepts of (im)mobility, borderscapes, legal subjectivity, (ds)protection and (in)visibility have helped us expose how legal categories and digital infrastructures operate not to protect, but to differentiate, delay, and deny.

What becomes visible through this lens is the emergence of what Ronen Shamir describes as a "single global mobility regime" one that, rather than correcting inequality, works to preserve and reproduce it under a façade of normative universality.[61] As he argues, this regime does not malfunction; it functions

[59] Emre S. Topak, 'The Biopolitical Border in Practice: Surveillance and Death at the Mediterranean Sea' (2014) 20(1) Geopolitics 124.
[60] Sheller, (n 6)
[61] Ronen Shamir, 'Without Borders? Notes on Globalization as a Mobility Regime' (2005) 23(2–3) Sociological Theory 197, 199.

by design. The result is a deeply unequal order in which the law no longer serves as a shield for the vulnerable, but as a gatekeeper of legibility. Legal protection becomes stratified and proceduralised; visibility is stripped of political recognition; mobility is conditional upon digital traceability and geopolitical desirability. In this regime, the migrant is not simply excluded, but managed, categorised, suspended. And at the heart of this process lies not the failure of law, but its success as a tool of stratified governance.

The next chapter will examine how this logic is operationalised through the EU's legal infrastructure at sea. Understanding the techno-legal production of (im)mobility is essential not only to diagnose the current border regime, but to expose the legal scaffolding that sustains it. It is only by politicising this scaffolding, its rules, its technologies, its assumptions, that we can begin to imagine a different architecture: one in which rights are not filtered through suspicion but affirmed through solidarity.

Chapter 3 – The EU's Technological Border: A Legal Architecture of (Dis)protection?

3.1. Introduction

"Keeping Schengen going and growing is made possible only by building cooperation and effective border protection." – declared Commissioner Virkkunen on the 40th anniversary of the Schengen Agreement, marking four decades of free movement across European internal border, but underpinned by the simultaneous reinforcement of its external ones.[62]

This paradox encapsulates a core tension of the EU border regime: the freedom of movement for some is contingent on the (im)mobilisation of others. This chapter explores how the EU's maritime frontier is transformed into a digitally governed legal space, what may be called a *technological border*. It investigates how law operates not as a neutral framework, but as an active infrastructure of (im)mobility, one that legitimises surveillance, enables risk scoring, and facilitates externalisation practices while obscuring responsibility. The question posed is not merely how technology is regulated, but how law and technology co-constitute a bordering apparatus that controls, categorises, and sometimes abandons people on the move at sea.

The chapter is structured in three analytical layers. Section 3.2 lays the foundation by examining the legal infrastructure behind technological control, Section 3.3 moves to the governance of the maritime external border, mapping the institutional actors, decentralised EU agencies, and the legal instruments that enable border control to be delegated, privatised, and diffused. Section 3.4 focuses on the technological tools themselves, from aerial surveillance systems and biometric registration units to interoperable data infrastructures, highlighting how they operate through and within the law to materialise control at the edge of European territory.

[62] Henna Virkkunen, cited in *ETIAS Newsroom*, 'EU Celebrates 40 Years of Schengen Agreement Amidst Challenges to Free Movement' (ETIAS, 14 June 2025) https://etias.com/articles/eu-celebrates-40-years-of-schengen-agreement-amidst-challenges-to-free-movement accessed 6 July 2025.

3.2. The Legal Infrastructure Behind Technological Control

3.2.1. Understanding the Logic of the Technological Border

When President Joe Biden announced the end of Title 42 in early 2023, the world expected a return to rights-based asylum procedures at the US–Mexico border. Instead, access to international protection was channelled into a mobile phone application: *CBP One*. The app quickly became the primary—and in practice, often the only—channel for scheduling asylum appointments at official ports of entry.[63] Those without smartphones, internet access, or the ability to navigate biometric and language requirements were simply excluded.[64] Although the system was dismantled in 2025 following Donald Trump's return —amid a sweeping expansion of hardline migration policies that have raised alarm among human rights organisations[65]—, its brief existence revealed the growing reliance on technological infrastructures in migration governance and how such important shift can be unfolded without serious public debate, robust legal scrutiny, or safeguards to ensure equality and accessibility.

This logic—the delegation of access to asylum to remote and opaque infrastructures— forms part of what has been conceptualised as the *smart, digital,* or *technological border*:

- The *smart border* is typically framed in policy discourse as a mechanism to enhance procedural efficiency and streamline mobility through automation and biometrics. However, scholars have interrogated this seemingly neutral language. Amoore, Marmura and Salter argue that the label *smart* operates as a legitimising euphemism, concealing the securitised logics underpinning new enclosures of mobility.[66] Leese explores how smart borders embody the facilitation/security nexus, producing subjects of interest based on perceived risk.[67]

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[63] American Immigration Council**,** *CBP One: An Overview* (24 March 2025) https://www.americanimmigrationcouncil.org/fact-sheet/cbp-one-overview accessed 10 June 2025.
[64] Amnesty International, *USA: 'CBP One' App Denies Rights to Asylum Seekers* (7 February 2024) AMR 51/7985/2024, 7 https://www.amnesty.org/en/documents/amr51/7985/2024/en/ accessed 10 June 2025.
[65] See Human Rights Watch, *Human Rights Watch chief says Trump's return threatens freedoms* (16 January 2025) https://www.reuters.com/world/human-rights-watch-chief-says-trumps-return-threatens-freedoms-2025-01-16 accessed 10 June 2025; Amnesty International USA, *Reaction to Trump's first executive actions* (20 January 2025) https://www.amnesty.org/en/latest/news/2025/01/states-throughout-americas-must-not-play-a-part-in-trumps-harmful-policies-against-people-seeking-safety/ accessed 10 June 2025.
[66] Louise Amoore, Stephen Marmura and Mark B Salter, 'Editorial: Smart Borders and Mobilities: Spaces, Zones, Enclosures' (2008) 5(2) *Surveillance & Society* 96
[67] Matthias Leese, 'Exploring the Security/Facilitation Nexus: Foucault at the "Smart" Border" (2016) 30(3) *Global Society* 412

- The *digital border* extends this transformation by shifting control away from territorial demarcations and into *data infrastructures*. As Broeders first argued, the EU's digital border operates through interconnected databases that profile and track individuals long before and beyond their physical arrival.[68] More recent work by Glouftsios and Trauttmansdorff explores how this infrastructure is outsourced to private actors and governed through opaque transnational arrangements.[69] Within this digital ecosystem, decision-making is increasingly *delegated to algorithms.* This has prompted the concept of the **algorithmic border**, which captures the growing use of AI and predictive technologies to filter, score, and even pre-empt access to asylum.[70]

- Finally, **the technological border,** offers a broader analytical lens. As theorised by Dijstelbloem, it draws attention to the *material and institutional assemblages* that constitute the contemporary border as an infrastructural form: from drones and databases to legal regimes and policy narratives. Dijstelbloem reveals how borders do not simply regulate flows but materialise political thought through a dispersed infrastructure of control[71]. From this perspective, the border becomes a site where politics is enacted spatially and technologically, where migration governance unfolds through complex interactions between humans, institutions, and machines. Building on Dijstelbloem's framework, this thesis contends that the instability of the technological border is not merely political or operational, but deeply legal.

The evolution of the border historically has been shaped by the political construction of a European "Us" in opposition to a racialised, mobile "Them", where non-Europeans become framed as threats to the internal order of the Union.[72] This bifurcation between internal inclusion and external exclusion became structurally embedded with the Schengen Agreement. Signed in 1985, Schengen marked a historic move toward the abolition of internal borders and the establishment of a common area of free

[68] Dennis Broeders, 'The New Digital Borders of Europe: EU Databases and the Surveillance of Irregular Migrants' (2007) 22(1) *International Sociology* 71
[69] Georgios Glouftsios, 'Designing Digital Borders: The Visa Information System (VIS)' in Marijn Hoijtink and Matthias Leese (eds), *Technology and Agency in International Relations* (Routledge 2019) 164–187; Trauttmansdorff, (n 9) 107
[70] Benjamin Batte, 'Algorithmic Borders: The Role of Artificial Intelligence in Immigration Control and Refugee Protection' (2025) SSRN
[71] Dijstelbloem, (n 9).
[72] Bridget Anderson, *Us and Them? The Dangerous Politics of Immigration Control* (OUP 2013) chs 1–2.

movement. However, this unprecedented openness within the EU was never matched by a similar integration at its external frontiers.

MS retain primary responsibility for the control of their external borders[73]. This national sovereignty remains a foundational constraint to the construction of a genuinely common border policy. The result is a paradox: while it was politically and legally feasible to dismantle internal borders through cooperation and trust, the external border has instead become a site of duplication, fragmentation, and technological fortification. It is precisely in this void, between national sovereignty and supranational ambition, that the technological border of the EU takes shape.[74]

Since the creation of the EU (1993)[75] until today we have been witnessing:

Crises	Reactions[76]
1990-1995: post-cold war crises in the Mediterranean[77]	**1995: Barcelona Declaration[78].** Laid the groundwork for addressing these issues from a regional security perspective, especially against terrorism and irregular migration.[79] **1997: Dublin Convention[80].** Laid the foundations for future EU asylum policy.

[73] See Treaty on the Functioning of the European Union (TFEU) art 4(2)(j) and art 72; see also European Parliament, 'Management of the external borders' (Fact Sheets on the European Union, 2024) https://www.europarl.europa.eu/factsheets/en/sheet/153/management-of-the-external-borders accessed 9 June 2025.
[74] Didier Bigo, Sergio Carrera, Ben Hayes, Nicholas Hernanz and Julien Jeandesboz, *Justice and Home Affairs Databases and a Smart Borders System at EU External Borders: An Evaluation of Current and Forthcoming Proposals* (CEPS Papers in Liberty and Security in Europe No 52, 18 December 2012) https://ssrn.com/abstract=2198802 accessed 10 June 2025.
[75] Treaty on European Union (Maastricht Treaty) [1992] OJ C191/1.
[76] While each "Response" is chronologically associated with a crisis event, this framework does not imply a direct causality between them. Several measures reflect ongoing policy trends or result from earlier crises (e.g. the 2020 Pact proposal reflects 2015 migration dynamics), illustrating the cumulative and overlapping nature of EU border governance responses.
[77] In the aftermath of the Cold War, migration by sea from North Africa and the Middle East towards southern Europe increased significantly, driven by political instability, economic hardship and regional conflicts. See Stephen Blank, 'The Mediterranean and Its Security Agenda' (2000) 11(1) *Mediterranean Quarterly* 24–48 https://muse.jhu.edu/article/20773 accessed 10 June 2025; see also See Valeria Bello, 'The Mediterranean Crises: How Many and For How Long?' (openDemocracy, 17 July 2017) https://www.opendemocracy.net/en/mediterranean-journeys-in-hope/mediterranean-crises-how-many-and-for-how-long/ accessed 10 June 2025.
[78] Council of the European Union, *Barcelona Declaration adopted at the Euro-Mediterranean Conference* (Barcelona, 27–28 November 1995) https://eeas.europa.eu/archives/docs/euromed/docs/bd_en.pdf accessed 10 June 2025.
[79] Dijstelbloem, (n 9) 90.
[80] See Convention determining the State responsible for examining applications for asylum lodged in one of the Member States of the European Communities (Dublin Convention) [1997] OJ C254/1. For the current framework, see Regulation (EU) No 604/2013 of the European Parliament and of the Council of 26 June 2013 establishing the criteria and mechanisms for determining the Member State responsible for examining an application for international protection (recast) [2013] OJ L180/31.

	1999: Tampere Summit.[81] Established the AFSJ with an 'external dimension'.[82]
2001: **9/11 attacks in the USA**	**2001: Laeken European Council**.[83] Prompted the EU political narratives to securitise the external borders to combat terrorism **2002: Facilitator's Package**.[84] Materialisation the securitisation of the external borders
2004-2005: **Madrid and London terrorists' attack**	**2004: Frontex creation**[85]. European Agency for the Management of Operational Cooperation at the External Borders of the MS of the EU. **2004: SIS II**[86]**.** Redesign of the EU's core border data system to include biometric identifiers (fingerprints, photos). Laid the groundwork for interoperability with other migration databases (EURODAC, VIS), marking a key shift towards digital border governance. **2008: Smart Borders Package announced**[87]**.** Initiatives including EES, VIS, PNR; pre-screening and tracking of travellers using biometrics.
2010-2011: Arab Spring	**2013: Launch of EUROSUR**[88]**.** Integrated surveillance system using drones, satellites, and risk analysis tools.
2015-2016: 'Migration crisis',	**2015: European Agenda on Migration**[89]**.** Accelerated implementation of hotspots, expansion of Frontex, and biometric control mechanisms.

[81] European Council, *Presidency Conclusions – Tampere European Council, 15–16 October 1999* (Council of the European Union, 1999) https://www.europarl.europa.eu/summits/tam_en.htm accessed 10 June 2025.
[82] Alex Balch and Andrew Geddes, 'The EU Migration and Asylum Regime' in Huub Dijstelbloem and Albert Meijer (eds), *Migration and the New Technological Borders of Europe* (Palgrave Macmillan 2011) 30–32.
[83] European Council, *Presidency Conclusions of the Laeken European Council (14 and 15 December 2001)* SN 300/1/01 REV 1, 6–7.
[84] Consists of two legislative instruments adopted by the Council of the EU in 2002: one directive defining the facilitation of unauthorised entry, transit and residence, and one decision aimed at strengthening the penal framework for such acts. See Council Directive 2002/90/EC defining the facilitation of unauthorised entry, transit and residence [2002] OJ L328/17; and Council Framework Decision 2002/946/JHA on the strengthening of the penal framework to prevent the facilitation of unauthorised entry, transit and residence [2002] OJ L328/1.
[85] Regulation (EC) No 2007/2004 of the Council of 26 October 2004 establishing a European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union [2004] OJ L349/1.
[86] Council Regulation (EC) No 2252/2004 of 13 December 2004 on standards for security features and biometrics in passports and travel documents issued by Member States [2004] OJ L385/1.
[87] European Commission, *Communication on preparing the next steps in border management in the European Union – COM (2008) 69 final* (Brussels, 13 February 2008).
[88] European Parliament and Council, *Regulation (EU) No 1052/2013 establishing the European Border Surveillance System (EUROSUR)* [2013] OJ L295/11.
[89] European Commission, *A European Agenda on Migration* COM(2015) 240 final, Brussels, 13 May 2015.

Paris and Brussels terrorists' attacks	**2016: EU-Turkey Statement**[90]. This marked the deepening of the externalisation of border management to third countries, containment, and data exchange. **2016: PNR Directive adopted**[91]. Obliges airlines to transfer passenger data to EU authorities for all flights entering or leaving the EU to combat terrorism. **2017: Proposal for interoperability of EU databases**[92]**.** Proposed the creation of a shared "interoperability architecture" to link existing migration and security databases (SIS II, VIS, Eurodac, EES, ETIAS, ECRIS-TCN), allowing real-time identity checks and automated cross-referencing. **2019: New Frontex regulation**[93]. Expanded mandate, more funding, and enhanced surveillance technologies.[94] **2019: Integrated Border Management Framework**[95]**.** IBM formalises EU border control through biometric data use, interoperability between databases, and AI-driven risk analysis under Frontex coordination.
2020-2025: COVID-19 pandemic, War in Ukraine & ongoing	**2022: Pilot phase of the Entry/Exit System (EES)**[96]**.** Its operational launch is scheduled for October 2025[97]. The system will register biometric data of third-country nationals to automate identity checks and detect overstayers.

[90] Council of the EU, *EU-Turkey Statement, 18 March 2016* https://www.consilium.europa.eu/en/press/press-releases/2016/03/18/eu-turkey-statement/.
[91] Directive (EU) 2016/681 on the use of passenger name record (PNR) data for the prevention, detection, investigation and prosecution of terrorist offences and serious crime [2016] OJ L119/132.
[92] European Commission, *Proposal for a Regulation of the European Parliament and of the Council on establishing a framework for interoperability between EU information systems (borders and visa)* COM (2017) 793 final, 12 December 2017
[93] Regulation (EU) 2019/1896 of the European Parliament and of the Council of 13 November 2019 on the European Border and Coast Guard and repealing Regulations (EU) No 1052/2013 and (EU) 2016/1624 [2019] OJ L295/1.
[94] Sergio Carrera and Leonhard den Hertog, *A European Border and Coast Guard: What's in a name?* (CEPS Paper in Liberty and Security in Europe No 88, March 2016) https://www.ceps.eu/ceps-publications/european-border-and-coast-guard-whats-name/ accessed 10 June 2025.
[95] Regulation (EU) 2019/1896 of the European Parliament and of the Council of 13 November 2019 on the European Border and Coast Guard [2019] OJ L295/1, art 3(1)**.**
[96] Although legally adopted in 2017, EES entered into a pilot phase in the wake of the Ukraine crisis. See Regulation (EU) 2017/2226 establishing an Entry/Exit System [2017] OJ L327/20.
[97] European Commission, *Revised Timeline for the EES and ETIAS* (14 April 2025)

2024: AI Act adopted.[98] Establishes the first EU-wide legal framework for the use of artificial intelligence in high-risk fields, including border technologies such as facial recognition and predictive analytics.

2024: New Pact on Migration and Asylum:[99] Introduced a mandatory pre-entry screening procedure for all non-EU nationals, standarising biometric and risk checks across MS reinforcing centralised coordination of border controls.

2026: ETIAS scheduled operational launch[100]. Expected to become operational by the end of 2026. It will require visa-exempt third-country nationals to obtain prior travel authorisation through biometric pre-screening, thus enhancing pre-entry risk analysis and integrating with other EU border databases.

From this timeline, we can observe that the technological reinforcement of Europe's borders arises within a longer genealogy of security thinking that associates non-EU human mobility with risk and potential harm. In this context, it becomes evident what Guild identifies as a fundamental tension between the collective security and individual security: in the name of protecting the collective, states frequently adopt measures that restrict the rights of individuals, particularly when those are foreigners[101].

The first enduring pattern that emerges in this chronology focuses on security in the name of counterterrorism. From the 9/11 attacks to the tragedies in the European capitals, acts of political violence have systematically triggered border policy transformations. However, while terrorist violence is by definition criminal, the legal and technological responses to it have increasingly conflated border control with the management of suspicion. As Bigo argues, this securitisation drift follows a pre-emptive rationale, where technologies are not merely reactive but operate under a regime of

[98] Regulation (EU) 2024/1058 of the European Parliament and of the Council laying down harmonised rules on artificial intelligence (AI Act) [2024] OJ L150/1.
[99] European Commission, 'Pact on Migration and Asylum: A common EU system to manage migration' (Migration and Home Affairs, 21 May 2024) https://home-affairs.ec.europa.eu/policies/migration-and-asylum/pact-migration-and-asylum_en accessed 10 July 2025.
[100] Legally adopted in 2018. See Regulation (EU) 2018/1240 of the European Parliament and of the Council establishing a European Travel Information and Authorisation System (ETIAS) [2018] OJ L236/1; European Commission, *Revised Timeline for the EES and ETIAS* (14 April 2025)
[101] Elspeth Guild, *Security and Migration in the 21st Century* (Polity 2009) 6–7.

anticipation[102]. However, such premises often distort the empirical landscape they claim to govern. According to the Danish Institute for International Studies, most terrorist attacks committed in the EU by 2017 were perpetrated by European citizens, not third-country nationals, neither refugee[103]. This renders the constant technological upgrading of external border controls in the name of counterterrorism not only questionable in effectiveness but conceptually misplaced.

A second consistent thread is the struggle against so-called 'irregular migration'. Legislative and technological responses have systematically framed third-country mobility as a threat to be intercepted, filtered, or deterred. Yet, such measures disproportionately affect asylum seekers and individuals in need of protection, as access to EU territory has become a precondition for accessing asylum, an access increasingly obstructed by design. As Gammeltoft-Hansen and Tan observe, deterrence-based policies have not only failed to reduce displacement but have redirected it toward more dangerous and less visible routes, producing harm rather than protection[104]. At the same time, the dominant narrative around "irregularity" often overlooks the fact that the majority of such cases stem from visa overstays and administrative barriers within the asylum system, not unauthorised border crossings[105]. In this context, administrative irregularity is treated, and policed, as if it were criminality, revealing what Carrera calls the productive function of EU law in "creating irregularity"[106].

Ultimately, the table of crises and responses does not merely reflect reactive policymaking; it exposes the architecture of a political project; one that has been deeply shaped by external influences, most notably the US. Following the Arab Spring, EU–US cooperation intensified, reinforcing a logic in which external instability justifies internal fortification. But beyond policy convergence, both regimes are embedded in what Todd Miller calls the *border industrial complex*: a powerful nexus of private security actors, tech corporations and state agencies profiting from surveillance and deterrence

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[102] Bigo (n 26) 63, 69.
[103] Danish Institute for International Studies, *European citizens – not refugees – behind most terrorist attacks in Europe* (DIIS, 2017) https://www.diis.dk/en/research/european-citizens-not-refugees-behind-most-terrorist-attacks-in-europe accessed 10 June 2025.
[104] Thomas Gammeltoft-Hansen and Nikolas F Tan, 'The End of the Deterrence Paradigm? Future Directions for Global Refugee Policy' (2017) 49(4) *Journal of Migration and Refugee Studies* 537, 540.
[105] European Parliamentary Research Service, *Measuring Irregular Migration and Returns in the EU* (Briefing, PE 767.210, January 2025) 3–5 https://www.europarl.europa.eu/RegData/etudes/BRIE/2025/767210/EPRS_BRI(2025)767210_EN.pdf accessed 10 June 2025.
[106] Sergio Carrera, *Irregularising Human Mobility: EU Migration Policies and the European Commission's Role* (Springer 2024) Chapter 2.

infrastructures[107]. This political–corporate alignment has materialised through vast financial investments. Between 2014 and 2022, the EU allocated over €250 million to 49 border-related projects focused on surveillance, biometric tracking, and AI-based profiling[108]. Simultaneously, Europe's digital border systems have been directly modelled on US precedents. The ETIAS scheme, for example, openly draws inspiration from the US ESTA system.[109] Both operate as pre-travel authorisation mechanisms targeting visa-exempt travellers, embedding risk-based pre-screening into the very act of mobility. Additionally, the EU's practices on signing deals with third countries to externalise migrant containment, mirrors earlier US practices in Central America[110].

What emerges, then, is not a coherent strategy of protection, but a reactive and uneven architecture of control that reinforces suspicion over solidarity, and technological fix over structural understanding. The very logic of the technological border seems less grounded in evidence than in anxiety: responding to threats that are often internal by fortifying the external. It claims to ensure security but ends up distributing insecurity selectively. In reproducing logics of counterterrorism, criminalisation of migration, and externalisation, often mirroring U.S. practices, the EU's digital border regime operates more as a self-justifying apparatus than a solution to human displacement.

3.2.2. Mapping the Legal Infrastructure

The EU's maritime external border is design as a complex legal and institutional space shaped by overlapping regulatory regimes, technological infrastructures, and administrative actors. This subchapter unpacks the normative foundations that govern maritime border control in the EU, with particular attention to the legal instruments and frameworks that enable the digital governance of human mobility at sea.

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[107] Todd Miller, *Empire of Borders: The Expansion of the US Border Around the World* (Verso 2019) ch 1.
[108] Statewatch and TNI, *Europe's Techno Borders: Data-Driven Migration Control* (2022) 6–8 https://www.statewatch.org/media/2824/statewatch-tni-europe-techno-borders-report-11-2022.pdf.
[109] European External Action Service (EEAS), 'Travelling to Europe: ETIAS – European Travel Information and Authorisation System' https://www.eeas.europa.eu/delegations/united-states-america/travelling-europe-etias_en accessed 10 June 2025.
[110] Migration Policy Institute, *Comparing the US and EU Immigration Systems* (2011) https://www.migrationpolicy.org/sites/default/files/publications/US-EUimmigrationsystems-finalreport.pdf accessed 10 June 2025

At the heart of this legal framework lies the Schengen Borders Code[111], which defines *external borders* as land and sea borders, ports, and airports, that they are not internal borders, marking, thus, the edge of the Schengen Area.[112]. These external borders trigger a legal regime that justifies identity checks, risk assessments, and surveillance measures not applicable within internal EU borders. However, the delineation of the Schengen Area is not coterminous with EU membership, as some MS are not fully integrated in the Schengen Area (e.g., Cyprus expected to be integrated in 2026; Ireland), while certain Schengen countries (e.g. Norway, Iceland, Switzerland, Liechtenstein)[113] remain outside the EU.

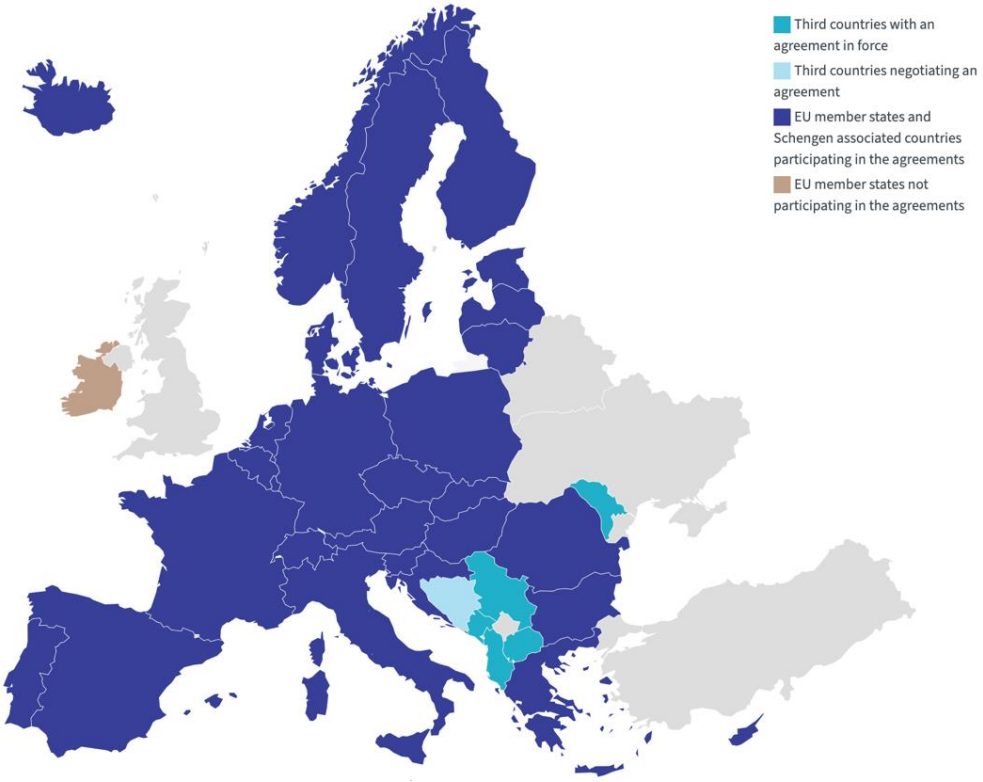

Figure 1. The Schengen Area and Third Countries Participating through Bilateral Agreements.[114]

In legal terms, the EU's competences over border management derive from Article 77 TFEU.[115] However, the scope of this supranational authority is not unlimited. Article 72 TFEU[116] expressly

[111] Regulation (EU) 2016/399 of the European Parliament and of the Council of 9 March 2016 on a Union Code on the rules governing the movement of persons across borders (Schengen Borders Code) [2016] OJ L77/1.
[112] Regulation (EU) 2016/399 (Schengen Borders Code), art 2(2).
[113] European Commission, 'Schengen Area' (Migration and Home Affairs) https://home-affairs.ec.europa.eu/policies/schengen/schengen-area_en accessed 10 June 2025.
[114] Council of the European Union, 'Map of Countries Participating in Schengen Cooperation', in 'Strengthening the EU's External Borders' https://www.consilium.europa.eu/en/policies/strengthening-external-borders/ accessed 10 June 2025.
[115] Consolidated Version of the Treaty on the Functioning of the European Union [2016] OJ C202/1, art 77
[116] Ibid, art 72

safeguards MS' responsibility for maintaining public order and internal security, thereby preserving core elements of national sovereignty.

While the broader EU legal order also addresses transnational crime, trafficking, and security cooperation, this thesis focuses specifically on the legal infrastructure governing the movement of people in the maritime context. As discussed in Chapter 2, the governance of human mobility is not merely a matter of managing flows; it is a deeply political and legal operation that produces regimes of (im)mobility by defining who is entitled to move, under what conditions, and with what legal recognition.[117] EU law plays an active role in this process not only through its normative content but also through the infrastructural design of rights, responsibilities, and exclusions. The legal architecture is thus both vertical (supranational and national) and horizontal (across agencies, systems, and instruments), generating zones of overlapping authority, ambiguous accountability, and legal grey areas, especially in maritime operations conducted beyond EU territorial waters.

The constitutional basis for a common border migration policy is provided by EU primary law. The Treaties (TEU, TFEU) establish the legal mandate for a common Area of Freedom, Security and Justice (AFSJ)[118] and define the Union's responsibility to uphold fundamental rights. The CFREU provides explicit protections, notably Articles 18 and 19 on asylum and non-refoulement.[119] However, these provisions are often subordinated to securitised logics and operate more as rhetorical commitments than enforceable guarantees. It is interesting to highlight that the objective of establishing an AFSJ - Article 3(2) TEU, when says the Union "shall offer its citizens an AFSJ without internal frontiers, in which the free movement of persons is ensured"[120] -, reveals an institutional distinction between those entitled as *citizens* and free to move, versus those whose movement is *restricted,* framing mobility a privilege rather than a right. The same way, the TFEU, apparently establishing provisions that suggest a commitment to harmonised protection and rights-based migration governance, often reflects a contradictory logic when legitimises filtering mechanisms that distinguish between 'desirable' and 'undesirable' mobilities, consequently embedding a hierarchy of movement into EU law[121].

[117] See Chapter 2.2.1 and 2.2.2 of this thesis; see also Sharma N, *Home Rule: National Sovereignty and the Separation of Natives and Migrants* (Duke University Press 2020) 51–52.
[118] Consolidated Version of the Treaty on the Functioning of the European Union [2016] OJ C202/1, art 4(2)(j).
[119] Charter of Fundamental Rights of the European Union [2012] OJ C326/391, arts 18–19.
[120] Ibid art 3(2)
[121] Nandita Sharma (n 27) 69–70.

The operationalisation of EU border governance is sustained by a dense and evolving legal architecture, encompassing a broad set of secondary legal instruments. As of, the key normative pillars include:

- **Schengen Borders Code** (Regulation (EU) 2016/399, as amended),[122]
- **EUROSUR Regulation** (Regulation (EU) 2019/1896),[123]
- **Frontex Regulation** (Regulation (EU) 2019/1896),[124]
- **Eurodac Regulation** (Recast, Regulation (EU) 2024/1358),[125]
- **Interoperability Regulations** (Regulations (EU) 2019/817 and 2019/818),[126]
- **Screening Regulation** (Regulation (EU) 2024/1347),[127]
- **Asylum Procedures Regulation** (Regulation (EU) 2024/1348),[128]
- **Qualification Regulation** (Regulation (EU) 2024/1349),[129]
- **Reception Conditions Directive** (Directive (EU) 2024/2236),[130]
- **Asylum and Migration Management Regulation** (AMMR) (Regulation (EU) 2024/1356),[131]
- **Crisis and Force Majeure Regulation** (Regulation (EU) 2024/1357),[132]
- **Artificial Intelligence Act** (Regulation (EU) 2024/1194),[133]

[122] Regulation (EU) 2016/399 of the European Parliament and of the Council of 9 March 2016 on a Union Code on the rules governing the movement of persons across borders (Schengen Borders Code) [2016] OJ L77/1.
[123] Regulation (EU) 2019/1896 of the European Parliament and of the Council of 13 November 2019 on the European Border and Coast Guard (EUROSUR Regulation) [2019] OJ L295/1.
[124] Ibid.
[125] Regulation (EU) 2024/1358 of the European Parliament and of the Council of 14 May 2024 on the establishment of 'Eurodac' for the comparison of biometric data [2024] OJ L150/1.
[126] Regulation (EU) 2019/817 of the European Parliament and of the Council of 20 May 2019 on the interoperability between EU information systems in the field of borders and visa, and Regulation (EU) 2019/818 on interoperability in the field of police and judicial cooperation [2019] OJ L135/27 and OJ L135/85.
[127] Regulation (EU) 2024/1347 of the European Parliament and of the Council of 14 May 2024 establishing a screening mechanism at the external borders [2024] OJ L150/22.
[128] Regulation (EU) 2024/1348 of the European Parliament and of the Council of 14 May 2024 establishing common procedures for international protection in the Union (Asylum Procedures Regulation) [2024] OJ L150/65.
[129] Regulation (EU) 2024/1349 of the European Parliament and of the Council of 14 May 2024 on standards for the qualification of third-country nationals or stateless persons as beneficiaries of international protection (Qualification Regulation) [2024] OJ L150/117.
[130] Directive (EU) 2024/2236 of the European Parliament and of the Council of 11 June 2024 laying down standards for the reception of applicants for international protection (Reception Conditions Directive) [2024] OJ L173/3.
[131] Regulation (EU) 2024/1356 of the European Parliament and of the Council of 14 May 2024 on asylum and migration management (Asylum and Migration Management Regulation) [2024] OJ L150/187.
[132] Regulation (EU) 2024/1357 of the European Parliament and of the Council of 14 May 2024 addressing situations of crisis and force majeure in the field of migration and asylum (Crisis Regulation) [2024] OJ L150/225.
[133] Regulation (EU) 2024/1194 of the European Parliament and of the Council of 13 March 2024 laying down harmonised rules on artificial intelligence (Artificial Intelligence Act) [2024] OJ L118/1.

- **Interoperability and data governance frameworks**, including SIS II, EES, VIS, and ETIAS.[134]

This comprehensive legal framework has been significantly reshaped under the New Pact on Migration and Asylum (PMA), formally adopted in 2024 and entering into force progressively between 2024 and 2026. These legislative reforms aim to harmonise asylum procedures, strengthen border management and enhance data interoperability across Member States. Notably, the recast of the Eurodac Regulation introduces extensive biometric data collection and expanded purposes for data use such as returns and law enforcement cooperation. Meanwhile, the AMM Regulation replaces the Dublin III Regulation, introducing a new model of "solidarity contributions", yet still structurally prioritises containment over redistribution.[135]

Together, these instruments form the legal core of the CEAS**,** now fully converted into a regulatory regime based on mandatory data-sharing, accelerated border procedures, and differentiated rights. While presented as a response to the shortcomings of the 2015 "refugee crisis", these reforms have been met with strong critiques by scholars and civil society actors. Concerns include the normalisation of fast-track asylum processing at borders, the externalisation of protection responsibilities to third countries, and the expansion of risk-based biometric surveillance**.**[136] Rather than creating a more protective and humane system, the legal reforms risk entrenching a logic of exclusion that prioritises security and efficiency over fundamental rights.

However, this legal and operational framework is consolidated by the EIBM[137], developed through the Commission's multiannual policy cycle (2023-2027). It identifies 15 policy components, including technological innovation, returns, third country cooperation, and risk analysis, and is implemented through the European Border and Coast Guard composed of Frontex and national authorities. In its

[134] See: Regulation (EU) 2018/1861 on the use of the Schengen Information System (SIS II); Regulation (EU) 2017/2226 establishing the Entry/Exit System (EES); Regulation (EC) No 767/2008 on the Visa Information System (VIS); Regulation (EU) 2018/1240 establishing ETIAS.
[135] Council of the European Union, 'Migration and Asylum Pact: New Rules for a Fairer, More Efficient and More Sustainable System' (Council of the EU, 14 May 2024) https://www.consilium.europa.eu/en/policies/asylum-migration-management/ accessed 9 July 2025.
[136] See Elspeth Guild and Valsamis Mitsilegas, *EU Migration Management and the Rule of Law* (Routledge 2025) 82–109; Sergio Carrera, 'WHOSE PACT? The Cognitive Dimensions of the New Pact on Migration and Asylum" (CEPS 2020/22, September 2020) https://www.asileproject.eu/wp-content/uploads/2020/09/PI2020-22-New-EU-Pact-on-Migration-and-Asylum.pdf accessed 9 July 2025.
[137] European Commission, 'Effective Management of the EU's External Borders' (n 2).

2024 implementation report, the European Commission underscored that the IBM now functions as a "digital and strategic layer" of the border regime, notably at the maritime frontier

This mapping allows us to visualise how the sea becomes not a space of protection, but of conditional access—where legal thresholds are structured by technological systems, institutional mandates, and fragmented sovereignty. In this system, the right to seek asylum is not denied outright, but made inaccessible through infrastructural design.

3.3. The Governance of the Maritime External Border

3.3.1. Institutional Actors

The governance of the EU's maritime external border is anchored in a complex interplay between European institutions, national authorities, and intergovernmental bodies that provide the political mandate, legislative framework, and funding mechanisms that shape the structure and logic of the maritime border regime.[138]

The European Commission plays a central role in setting the strategic direction of EU migration and border control policies[139]. Through its Directorate-General for Migration and Home Affairs (DG HOME), it drafts legislative proposals, oversees implementation, and manages key funding instruments like the Asylum, Migration and Integration Fund (AMIF) and the Internal Security Fund (ISF). The Commission also coordinates the external dimension of migration via partnership frameworks and the EU Border and Coast Guard Regulation. Scholars have noted the Commission's influence in consolidating a securitised and technology-driven model of border governance, even as accountability structures remain fragmented and opaque.[140]

The European Parliament is formally involved in the co-decision process for legislation affecting migration and borders[141]. It has repeatedly advocated for stronger oversight of Frontex and other

[138] European Commission, 'Effective Management of the External Borders' (Migration and Home Affairs) https://home-affairs.ec.europa.eu/policies/schengen/effective-management-external-borders_en and Frontex, 'EU Institutions' https://www.frontex.europa.eu/our-partners/eu-institutions/ both accessed 4 June 2025.
[139] European Commission, 'Migration and Asylum' (Migration and Home Affairs) https://home-affairs.ec.europa.eu/policies/migration-and-asylum_en accessed 4 July 2025.
[140] Sergio Carrera, (n 106) Ch. 8.
[141] European Parliament, 'Migration' https://www.europarl.europa.eu/topics/en/topic/migration accessed 6 June 2025.

agencies, calling for the protection of fundamental rights and greater democratic accountability.[142] Although often marginalised in practice, its role is crucial in scrutinising the budgetary allocations and regulatory frameworks that underpin surveillance technologies and operational mandates.[143]

The Council of the EU represents MS and has historically pushed for an intergovernmental model of border control that protects national sovereignty. It has supported the expansion of Frontex's powers while ensuring that MS retain control over key operational decisions.[144] The Council also plays a pivotal role in framing the EU's response to migration crises and authorising external agreements with third countries, including those that involve joint operations at sea.[145]

The European External Action Service (EEAS) contributes to the externalisation of border control through diplomatic engagement and the coordination of migration compacts with countries of origin and transit.[146] The EEAS, led by the High Representative for Foreign Affairs, ensures coherence between migration policy and EU foreign policy objectives, particularly in regions like North Africa and the Sahel.[147] Its strategic partnerships and informal agreements with countries such as Libya significantly influence interception and return practices at sea.[148]

The Justice and Home Affairs Agencies Network (JHAAN) facilitates inter-agency coordination among entities like Frontex, Europol, Eurojust, and the EUAA.[149] It promotes information sharing and

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[142] Lucas J Ruiz Díaz, 'The European Parliament's Oversight of the Agencies of the Area of Freedom, Security and Justice. Where Are We Now and Where Are We Heading?' (2022) (44) *Cuadernos Europeos de Deusto* 159

[143] Sergio Carrera, Nicholas Hernanz and Joanna Parkin, *The 'Lisbonisation' of the European Parliament: Assessing Progress, Shortcomings and Challenges for Democratic Accountability in the Area of Freedom, Security and Justice* (CEPS Paper in Liberty and Security in Europe No 58, Centre for European Policy Studies, 9 September 2013).

[144] European Commission, *Proposal for a Council Regulation establishing a European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union* COM(2003) 687 final, 11 November 2003 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52003PC0687 accessed 6 July 2025.

[145] Council of the European Union, 'EU Migration Policy' https://www.consilium.europa.eu/en/policies/eu-migration-policy/ accessed 6 June 2025.

[146] European External Action Service, 'Migration, Mobility and Forced Displacement' https://www.eeas.europa.eu/eeas/migration-mobility-forced-displacement_en accessed 6 June 2025.

[147] Alexandra Porumbescu, 'The European Institutional Actors in Handling Migration' (2018) 1 *Sociology and Social Work Review* 41.

[148] European Center for Constitutional and Human Rights (ECCHR), *Situation in Libya – Commission of Crimes Against Migrants and Refugees: Interceptions at Sea as Crimes Against Humanity* (Redacted Article 15 Communication to the ICC, 2022) https://www.ecchr.eu/fileadmin/Redacted_Article_15_Communication_to_the_ICC__Situation_in_Libya_Interceptions_of_Migrants_and_Refugees_at_Sea_as_Crimes_Against_Humanity.pdf accessed 6 June 2025.

[149] Europol, 'About the Justice and Home Affairs (JHA) Agencies Network' https://www.europol.europa.eu/publications-events/publications/about-justice-and-home-affairs-jha-agencies-network accessed 6 June 2025.

joint planning, reinforcing a security-based governance model that extends beyond national borders. The JHA Council also drives coordination between these agencies and the Commission, especially in the context of the Area of Freedom, Security and Justice (AFSJ).[150]

National Authorities – including border and coast guards, police forces, and asylum offices – remain the frontline implementers of EU border policy.[151] Their cooperation with EU agencies is governed by joint operations, standing corps deployments, and interoperability standards. While nominally under national command, these actors increasingly operate within an EU-coordinated infrastructure where sovereignty is shared, and surveillance is standardised.[152]

Judicial Institutions, particularly the **CJEU**[153] and the **ECtHR**[154]**,** play a vital role in interpreting the legality and limits of EU border measures.[155] The CJEU ensures that secondary legislation and agency actions comply with EU law, while the ECtHR has reviewed the compatibility of EU-coordinated maritime operations with human rights obligations under the ECHR, particularly the principle of non-refoulement.[6] Their jurisprudence shapes the normative boundaries of border enforcement and determines the scope of protection for migrants intercepted at sea. However, both courts have struggled to fully address the accountability gaps that arise from the EU's digitalised and externalised maritime border regime. The CJEU has only marginally engaged with Frontex's role in fundamental rights violations, with limited case law clarifying its direct legal responsibility, due in part to the fragmentation of competences between EU and national authorities.[156] The ECtHR, in contrast, has taken a more active role in shaping the extraterritorial human rights obligations – recognising non-refoulement applies when States exercise effective control at sea, in *Hirsi* case[157] –, although recent

[150] European Union Agency for Fundamental Rights (FRA), 'The Justice and Home Affairs Agencies Network (JHAAN)' https://fra.europa.eu/en/cooperation/eu-partners/eu-agencies/jhaan-network#:~:text=The%20Justice%20and%20Home%20Affairs,ensuring%20respect%20for%20fundamental%20rights accessed 6 June 2025.
[151] David Fernández-Rojo, *EU Migration Agencies: The Operation and Cooperation of FRONTEX, EASO and EUROPOL* (Edward Elgar Publishing 2023) 170–171
[152] Reg. (EU) 2019/1896, art 54(1), art 55, art 82(2); Treaty on European Union [2016] OJ C202/13, art 4(2).
[153] Treaty on European Union [2016] OJ C202/13, arts 19–21.
[154] ECHR, art 19.
[155] European Student Think Tank, 'A Tale of Two Courts: The Relationship between the Court of Justice of the European Union and the European Court of Human Rights' (19 March 2025) https://esthinktank.com/2025/03/19/a-tale-of-two-courts-the-relationship-between-the-court-of-justice-of-the-european-union-and-the-european-court-of-human-rights/ accessed 6 June 2025.
[156] See David Fernández-Rojo (n 151); Lisa Heschl, *Protecting the Rights of Refugees beyond European Borders: Establishing Extraterritorial Legal Responsibilities* (Intersentia 2021) 172–174.
[157] *Hirsi Jamaa and Others v Italy* App no 27765/09 (ECtHR, 23 February 2012) paras 73–80.

rulings have shown a regressive position on this interpretations,[158] raising up a big risk on legitimizing pushbacks and complicity in rights violations against migrants at sea, as scholars have noted.[159]

3.3.1. Decentralised EU agencies

The governance of the EU's maritime border regime is shaped by a constellation of decentralised EU agencies that, despite their thematic differences, converge in enabling and operationalising the digital and increasingly securitised control of human mobility at sea.

A. FRONTEX

The **Frontex**[160] is the most prominent actor in the governance of the EU's maritime borders. Originally tasked with coordination and support functions, Frontex has become a *de facto* executive agency, operating aerial and maritime surveillance assets, managing EUROSUR, and deploying standing corps across MS and beyond. Its mandate now includes return operations, liaison with third countries, and situational awareness.[161] Scholars have described Frontex as a "superagency" whose legal structure blurs accountability, particularly in operations involving asylum seekers intercepted at sea.[162]
Alongside Frontex, three additional EU agencies support MS in performing coast guard functions under a framework of inter-agency cooperation:[163]

- The **European Maritime Safety Agency (EMSA),** aerial surveillance capacities provider.
- The **European Fisheries Control Agency (EFCA)** contributes vessels and expertise within joint operations.
- The **European Space Agency (ESA),** through satellite cooperation frameworks (e.g., Copernicus), indirectly contributes to border surveillance via earth observation data used in Frontex and EUROSUR operations.

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[158] *N.D. and N.T. v Spain* App nos 8675/15 and 8697/15 (ECtHR, 13 February 2020); *S.S. and Others v Italy* App no 21660/18 (ECtHR, 12 June 2025).
[159] See Sergio Carrera, 'The Strasbourg Court Judgement N.D. and N.T. v. Spain: A Carte Blanche to Push Backs at EU External Borders?' (2021) EUI Working Paper RSCAS 2021/20; Violeta Moreno-Lax, '*S.S. and Others v. Italy* – or Doubling Down on Banković' (EJIL:Talk!, 19 June 2025) https://www.ejiltalk.org/ss-and-others-v-italy-or-doubling-down-on-bankovic/ accessed 6 July 2025.
[160] Council Regulation (EC) No 2007/2004 of 26 October 2004 establishing a European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union [2004] OJ L349/1.
[161] Lisa Heschl, (n 158) 167–171.
[162] Valentina Meissner, 'The European Border and Coast Guard Agency FRONTEX after the Migration Crisis: Towards a "Superagency"?' in Johannes Pollack and Peter Slominski (eds), *The Role of EU Agencies in the Eurozone and Migration Crisis: Impact and Future Challenges* (Palgrave Macmillan 2021) 157–158.
[163] Frontex, 'EU's Coast Guard Cooperation' https://www.frontex.europa.eu/what-we-do/operations/eu-s-coast-guard-cooperation/ accessed 6 July 2025.

At sea, Frontex's role is ambiguous and heavily contested. While the agency possesses aerial and maritime surveillance capabilities, it does not have a formal SAR mandate. This legal gap has generated confusion and criticism. In practice, Frontex conducts real-time aerial surveillance over the Central Mediterranean and shares coordinates of detected vessels with MS, as well as third-countries authorities.[164]

Frontex has been implicated in multiple and escalating allegations of fundamental rights violations. Among the most significant legal actions is the ongoing litigation led by front-LEX and Refugees in Libya, which accuses the agency of aiding and abetting crimes against humanity through its aerial surveillance operations in the Central Mediterranean.[165] According to the claim, Frontex has systematically transmitted the geolocation of refugee boats to the Libyan Coast Guard, knowing that such data enables unlawful interceptions and forced returns to Libya.[166] Between 2021 and 2023, Frontex allegedly shared over 2,200 surveillance emails with Libyan actors, triggering what the claimants describe as a pattern of "pullbacks by proxy". The application accuses Frontex of violating Article 46(4) of its founding Regulation by failing to suspend the transmission of data that enables crimes against humanity.[167]This is the first time a CJEU court has agreed to consider the substance of such a claim brought by a victim of the agency's activities, signalling a critical moment in the struggle to ensure legal accountability for EU border practices. The Court reserved judgment on the plea of inadmissibility, meaning that Frontex must now formally defend itself against the charges.[168]

Despite this, the European Commission and the Council have signalled their intention to expand Frontex's operational and technological capacities, framing the agency as central to the EU's integrated

[164] Human Rights Watch (n 3); see also Statewatch, 'To SAR or Not to SAR, Part 1: Why is Frontex Expected to Save Lives at Sea?' (2021) https://www.statewatch.org/analyses/2021/to-sar-or-not-to-sar-part-1-why-is-frontex-expected-to-save-lives-at-sea/ accessed 10 July 2025.
[165] front-LEX and Refugees in Libya, 'Challenging the Complicity of Frontex's Aerial Surveillance Activities in Crimes Against Humanity' (front-LEX, May 2024) https://front-lex.eu/litigation/challenging-the-complicity-of-frontexs-aerial-surveillance-activities-in-crimes-against-humanity/ accessed 10 July 2025.
[166] Ibid.
[167] front-LEX, 'Update: FM v. Frontex – A Case of Airborne Complicity' (October 2024) https://front-lex.eu/litigation/challenging-the-complicity-of-frontexs-aerial-surveillance-activities-in-crimes-against-humanity/ accessed 10 July 2025.
[168] Ibid; Digital Freedom Fund, 'Unlawful Surveillance and Data Sharing of Asylum Seekers by the European Border and Coast Guard Agency' (Digital Freedom Fund, 10 May 2023) https://digitalfreedomfund.org/unlawful-surveillance-and-data-sharing-of-asylum-seekers-by-the-european-border-and-coast-guard-agency/ accessed 10 July 2025.

approach to migration and border control.[169] Yet, as noted by Front-Lex and others, this expansion takes place at the cost of legal clarity, accountability, and the rights of people on the move**.**

B. EUAA

The **European Union Agency for Asylum (EUAA),**[170] formerly EASO, plays a relevant role in the governance of maritime borders in contexts involving disembarkation, reception, and asylum processing. While not directly involved in interception, the EUAA contributes operational and technical support in hotspot areas and participates in Joint Operations coordinated by Frontex, particularly where there is a high number of asylum seekers arriving by sea.[171]

C. EU-LISA

EU-LISA,[172] the agency managing large-scale IT systems (SIS II, VIS, Eurodac, EES, ETIAS), forms the digital infrastructure underpinning the biometric and algorithmic governance of maritime borders. It enables real-time identity checks and risk profiling of intercepted individuals and is a key driver of interoperability across migration control databases.[173]

D. EUROPOL

Europol[174]**,** although not a border agency per se, has seen its mandate expanded to process large datasets involving third-country nationals, including those with no established link to crime. Its involvement in the datafication of migration and risk categorisation has raised concerns among civil society and academics. The "Protect Not Surveil" coalition has denounced the reform for legitimising discriminatory surveillance and criminalising migrants and solidarity actors.[175]

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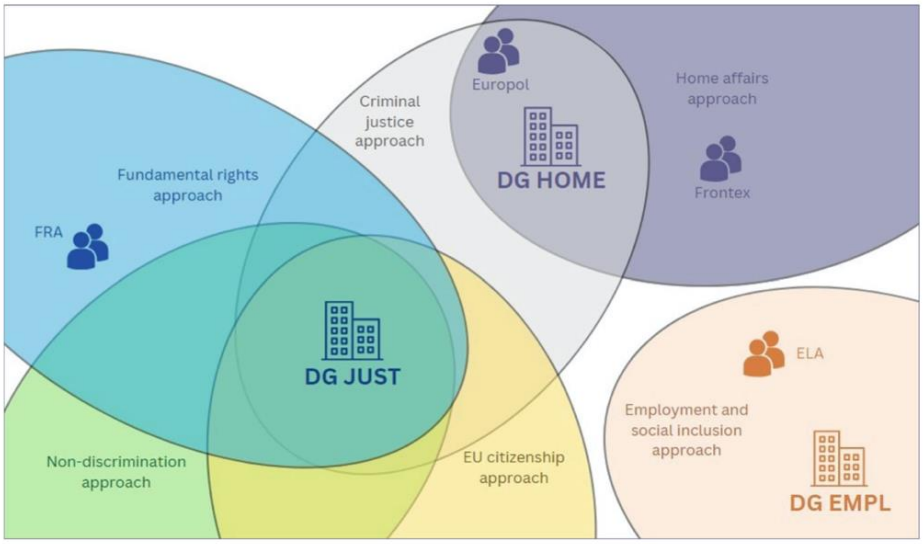
[169] Alexandra Brzozowski, 'Commission Promises Frontex Role Review for 2026, Implementation Cash for Member States' (*Euractiv*, 10 April 2024) https://www.euractiv.com/section/politics/news/commission-promises-frontex-role-review-for-2026-implementation-cash-for-member-states/ accessed 10 July 2025.
[170] Regulation (EU) 2021/2303 of the European Parliament and of the Council of 15 December 2021 establishing a European Union Agency for Asylum and repealing Regulation (EU) No 439/2010 [2021] OJ L468/1.
[171] Fernández-Rojo (n 151) 97–101.
[172] Bigo, (n 26), 64–66.
[173] Paul Trauttmansdorff and Ulrike Felt, 'Between Infrastructural Experimentation and Collective Imagination: The Digital Transformation of the EU Border Regime' (2021) *Science, Technology, & Human Values*
[174] Regulation (EU) 2016/794 of the European Parliament and of the Council of 11 May 2016 on the European Union Agency for Law Enforcement Cooperation (Europol) and replacing and repealing Council Decisions 2009/371/JHA, 2009/934/JHA, 2009/935/JHA, 2009/936/JHA and 2009/968/JHA [2016] OJ L135/53.
[175] David Fernandez-Rojo (n 153)

E. SATCEN

The European Union Satellite Centre (SatCen)[176], originally designed to serve Common Foreign and Security Policy objectives, now contributes to EU border control through high-resolution satellite imagery that feeds into EUROSUR and other situational awareness platforms.[177]

Taken together, these agencies constitute a multi-nodal, digitally embedded, and operationally dispersed border governance regime. While formally decentralised, their coordination under DG HOME and DG JUST reveals how migration control at sea is primarily driven by logics of home affairs and criminal justice. A visual representation of this fragmentation is provided in Figure 2, which illustrates how key agencies like Frontex, and Europol fall under the Home Affairs and Criminal Justice approaches (DG HOME), while the fundamental rights and social inclusion dimensions remain structurally peripheral.

Figure 2 – Fragmentation of EU migration governance through decentralised agencies and Commission DGs (2025).[178]



[176] Council Joint Action 2001/555/CFSP of 20 July 2001 on the establishment of a European Union Satellite Centre [2001] OJ L200/5.
[177] Irma Słomczyńska and Paweł Frankowski, 'Patrolling Power Europe: The Role of Satellite Observation in EU Border Management' in Helena Carrapico and Raphael Bossong (eds), *EU Borders and Shifting Internal Security: Technology, Externalization and Accountability* (Springer 2021) 65–80.
[178] Sergio Carrera and Davide Colombi, 'Problematising Irregularised Human Mobility in the Commission: A Home Affairs and Criminalisation Approach in Competition with Other Relevant Policy Approaches' in *Irregularising Human Mobility* (SpringerBriefs in Law 2025) 70

3.3.3. Legal Externalisation: Formal and Informal Instruments of Border Delegation

The EU's externalisation of migration control has become a defining feature of its border governance strategy. While the notion of controlling migration beyond EU territory is not novel, its formalisation and normalisation through both formal treaties and informal arrangements have become more prominent since the early 2000s, as observed in Section 3.2.1. Externalisation entails the delegation of border control functions to third countries through a range of legal instruments that shift the spatial, legal, and political boundaries of EU migration management.[179]

As Gammeltoft-Hansen explains, the externalisation model emerged as a response to legal and political constraints faced by MS in forcibly removing non-nationals.[180] By shifting enforcement extraterritorially, states could escape the reach of human rights obligations, creating what Moreno-Lax calls "meta-borders": legally engineered systems of "contactless control" where the EU avoids not only territorial jurisdiction but also legal responsibility, by designing delegated, technologically-mediated forms of enforcement that fall outside the reach of effective judicial oversight.[181]

Informal agreements, such as Memoranda of Understanding[182], joint statements, and technical protocols,[183] have become a preferred tool of migration diplomacy. These arrangements are deliberately kept outside the scope of Article 218 TFEU[184], which requires parliamentary involvement in international treaties, and are thus immune to effective judicial or democratic scrutiny.[185] The EU–Turkey Statement (2016)[186], often cited as a paradigmatic example, was presented as a political declaration, yet produced legal effects such as forced returns and refugee resettlements. In *NF v*

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[179] Thomas Spijkerboer, 'The Global Mobility Infrastructure: Reconceptualising the Externalisation of Migration Control' (2018) 20(4) *European Journal of Migration and Law* 452.
[180] Thomas Gammeltoft-Hansen, *Access to Asylum: International Refugee Law and the Globalisation of Migration Control* (Asylkoordination Österreich 2011).
[181] Violeta Moreno-Lax, 'Meta-Borders and the Rule of Law: From Externalisation to "Responsibilisation" in Systems of Contactless Control' (2024) 10(1) *Comparative Migration Studies* 11.
[182] European Commission, 'Memoranda of Understanding' (European Commission, 2024) https://competition-policy.ec.europa.eu/international-relations/legislation/memoranda-understanding_en accessed 4 July 2025.
[183] Amnesty International et al., 'Joint Statement: Asylum Externalisation Undermines Fundamental Rights and Refugee Protection' (3 July 2024) https://www.amnesty.nl/content/uploads/2024/07/Joint-Statement-Asylum-Externalisation.pdf accessed 4 July 2025.
[184] TFUE [2016] OJ C202/1, art 218. 7
[185] Santos Vara, 'Soft International Agreements on Migration Cooperation with Third Countries: A Challenge to Democratic and Judicial Controls in the EU' in S Carrera, J Santos Vara and T Strik (eds), *Constitutionalising the External Dimensions of EU Migration Policies in Times of Crisis* (Edward Elgar 2019) 21–37
[186] Council of the European Union, 'EU–Turkey Statement, 18 March 2016' (Consilium, 18 March 2016) https://www.consilium.europa.eu/en/press/press-releases/2016/03/18/eu-turkey-statement/ accessed 4 July 2025.

European Council,[187] the General Court declined to rule on its legality, arguing it was not attributable to the EU, a position heavily criticised for allowing legal evasion under the guise of informality.[188] Informal cooperation also includes working arrangements between Frontex and third-country authorities, allowing the exchange of surveillance data and coordination of joint operations without the transparency or safeguards required under EU law (e.g. financial support, training of border officials, inter alia). As Heschl warns that such practices risk undermining the EU's normative framework by outsourcing coercive powers while avoiding responsibility.[189]

Alongside informal tools, the EU employs legally binding agreements to formalise externalisation. These include Readmission Agreements (EURAs),[190] Mobility Partnerships,[191] and Migration Compacts[192]**.** While these instruments are embedded in international law, their content often reflects power asymmetries. Readmission Agreements, for instance, require third countries to accept not only their own nationals but sometimes also third-country nationals who transited through their territory.[193] Although presented as mutually beneficial, they are often negotiated under pressure, with the EU offering conditional incentives such as visa facilitation or development aid.

Mobility Partnerships and Common Agendas on Migration and Mobility**,** though formally non-binding, are embedded within broader legally binding association agreements. The EU–Jordan and EU–Lebanon Compacts represent more recent iterations, linking trade concessions and development funding to hosting refugees. Panizzon argues that such compacts commodify refugee hosting by tying it to trade advantages, effectively displacing Europe's protection obligations onto neighbouring states.[194]

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[187] Case T-192/16 *NF v European Council* [2017] ECLI:EU:T:2017:128.
[188] Santos Vara (n 189)
[189] Heschl, (n 158) 120–122.
[190] European Parliamentary Research Service, *The EU External Migration Policy* (Briefing, European Parliament 2015) PE 554.212 https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2015)554212 accessed 4 July 2025.
[191] European Migration Network, 'Mobility Partnership' (European Commission, 2024) https://home-affairs.ec.europa.eu/networks/european-migration-network-emn/emn-asylum-and-migration-glossary/glossary/mobility-partnership_en accessed 4 July 2025.
[192] European External Action Service, *Migration Partnership Framework: A European Union Approach to Managing Migration* (Factsheet, European Commission 2016, updated 2024) https://www.eeas.europa.eu/sites/default/files/factsheet_ec_format_migration_partnership_framework_update_2.pdf accessed 4 July 2025.
[193] Katharina Eisele, 'The EU's Readmission Policy: Of Agreements and Arrangements' in Sergio Carrera, Juan Santos Vara and Tineke Strik (eds), *Constitutionalising the External Dimensions of EU Migration Policies in Times of Crisis: Legality, Rule of Law and Fundamental Rights Reconsidered* (Edward Elgar Publishing 2019) 135–157.
[194] M Panizzon, 'The EU–Jordan Compact in a Trade Law Context: Preferential Access to the EU Market to "Keep Refugees in the Region"' in Carrera, Santos Vara and Strik (n 3) 220–237.

Despite their formal legality, these agreements often lack enforceable rights provisions and bypass effective parliamentary and judicial control. Santos Vara notes that mixed agreements involving both the EU and its Member States further complicate accountability, particularly when their legal basis is unclear or contested.[195]

Thus, externalisation, whether formal or informal, raises serious legal, political and ethical questions. Consequently, the UN Special Rapporteur on the Human Rights of Migrants have criticised these practices for undermining the right to asylum and violating the principle of non-refoulement,[196] especially through its cooperation with third countries such as Libya.[197]

3.4. The Technological Tools of Surveillance and Control at Sea

3.4.1. Detection and Surveillance Technologies

The first layer in the production of (dis)protection at sea begins with the capacity to detect and monitor human presence before any legal claim or physical contact is made. The first step in the digital governance of EU maritime borders is the remote detection and tracking of vessels and individuals attempting to approach European territory.

A. Aerial Surveillance

Among the first lines of surveillance in the EU's maritime border regime lies the deployment of Remotely Piloted Aircraft Systems (RPAS), commonly known to as drones.[198] These technologies are instrumental in detecting, monitoring, and tracking vessels, even long before they reach EU jurisdiction.

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[195] Santos Vara (n 189) 34–36.
[196] UN Human Rights Council, 'Report of the Special Rapporteur on the Human Rights of Migrants, Felipe González Morales' (12 May 2022) UN Doc A/HRC/50/31.
[197] Office of the United Nations High Commissioner for Human Rights, *Detained and Dehumanised: Report on Human Rights Violations against Migrants in Libya* (UN OHCHR 2022) https://www.ohchr.org/sites/default/files/Documents/Countries/LY/LibyaMigrationReport.pdf; Human Rights Watch, *No Escape from Hell: EU Policies Contribute to Abuse of Migrants in Libya* (21 January 2019) https://www.hrw.org/report/2019/01/21/no-escape-hell/eu-policies-contribute-abuse-migrants-libya both accessed 5 July 2025
[198] See SKYbrary, 'Introduction to Remotely Piloted Aircraft Systems (RPAS)' (SKYbrary Aviation Safety) https://skybrary.aero/articles/introduction-remotely-piloted-aircraft-systems-rpas accessed 3 June 2025; European Maritime Safety Agency (EMSA), 'Remotely Piloted Aircraft Systems (RPAS)' https://www.emsa.europa.eu/rpas-systems.html accessed 3 June 2025.

Since 2018, Frontex has contracted Medium Altitude Long Endurance (MALE) drones, notably the *Heron 1* (Israel Aerospace Industries) and the *Predator B/SeaGuardian* (General Atomics), to carry out long-range aerial patrols. These drones are capable of flying up to 20 hours without interruption and are equipped with electro-optical and infrared sensors, enabling vessel detection in low visibility conditions such as night-time or poor weather scenarios. Their payloads also include synthetic aperture radars (sar) and Aumatic Identification System (AIS) receivers, enhancing detection over large maritime areas, regardless of whether vessels use active transponders [199]

Some platforms also incorporate Signals Intelligence (SIGINT) capabilities**,** enabling the interception of radio, satellite, and mobile transmissions. These inputs are transmitted in real time to operational coordination centres, forming a critical part of the EU's Situational Awareness architecture and feeding into systems such as EUROSUR and CIRAM 3.0 for risk assessment and intervention planning**.**[200]

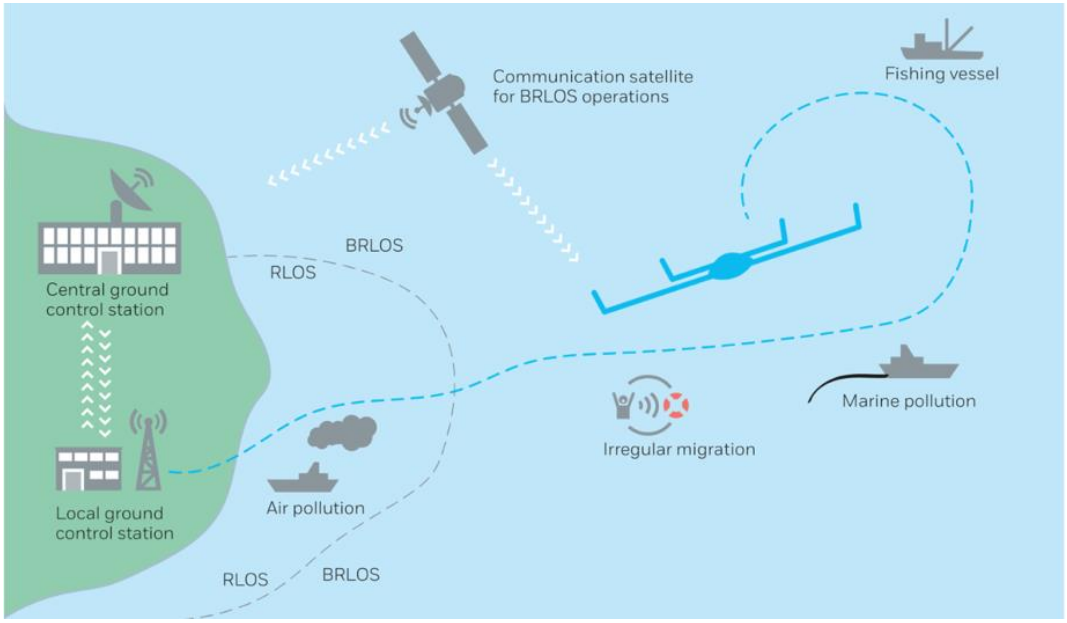

Figure 3 – RPAS architecture and operational flow for multi-purpose maritime surveillance.[201]

[199] See Statewatch, 'Drones for Frontex: Unmanned Migration Control at Europe's Borders' (22 July 2021) https://www.statewatch.org/analyses/2020/drones-for-frontex-unmanned-migration-control-at-europe-s-borders/ and European Parliament, 'Multiannual Financial Framework' (Fact Sheets on the European Union)https://www.europarl.europa.eu/factsheets/en/sheet/29/multiannual-financial-framework both accessed 3 June 2025.
[200] Frontex, 'Monitoring and Risk Analysis' https://www.frontex.europa.eu/what-we-do/monitoring-and-risk-analysis/monitoring-and-risk-analysis/ accessed 3 June 2025.
[201] European Maritime Safety Agency (EMSA), 'Remotely Piloted Aircraft Systems (RPAS)' https://www.emsa.europa.eu/rpas-systems.html accessed 3 June 2025.

As shown in Figure 3**,** the EMSA operates a fleet of RPAS through contracted providers.[202] These systems were originally designed for civil maritime tasks are now increasingly delegated to Frontex and MS Coast Guards for maritime border enforcement, including over international waters.[203]

By 2024, aerial surveillance reached an unprecedented scale: a total of 4,993 drone flight hours were registered in the Mediterranean, an increase of over 50% from 2023 figures.[204] This expansion reflects the EU's increasing reliance on aerial surveillance to control human mobility at sea. The most active surveillance zones were located in Malta (2,137 hours) and Crete (2,856 hours)**,** where operational platforms are stationed under renewed high-budget contracts.[205]

Also, a key operational framework is the Multipurpose Aerial Surveillance (MAS) programme. MAS integrates various aerial platforms—manned and unmanned—into a multi-mission logic that officially includes SAR**,** environmental protection, and border control. Public narratives surrounding MAS frequently highlight life-saving capabilities. However, this narrative has been contested by human rights organisations and investigative reports, which demonstrate that many of these "rescues" consist in the early detection and notification of third-country authorities**,** who then carry out so-called "pullback" operations.[206]

B. Satellite Monitoring

In recent years, the EU has developed a comprehensive space-based surveillance ecosystem to support maritime border control, combining civil, military, and commercial satellite data under the framework of its *EU Space Programme.*[207] Central to this ecosystem is the Copernicus Earth Observation

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[202] *Ibid* 140.
[203] Frontex, 'Last Month in the Field – April 2025' (10 May 2025) https://www.frontex.europa.eu/media-centre/news/news-release/last-month-in-the-field-april-2025-UefM7k accessed 3 June 2025.
[204] Digitale Freiheit, 'Frontex Significantly Expands Drone Operations: Number of Flight Hours Increases by 50 Percent' (digit.site36.net, 14 April 2025) https://digit.site36.net/2025/04/14/frontex-significantly-expands-drone-operations-number-of-flight-hours-increases-by-50-per-cent/ accessed 8 July 2025.
[205] Ibid.
[206] See HRW, 'EU's Drone Is Another Threat to Migrants and Refugees' (1 August 2022) https://www.hrw.org/news/2022/08/01/eus-drone-another-threat-migrants-and-refugees; Human Rights Watch, 'Rights Group Urges EU Border Agency to Facilitate Timely Rescue by Aerial Surveillance' (Jurist, 14 April 2025) https://www.jurist.org/news/2025/04/rights-group-urges-eu-border-agency-to-facilitate-timely-rescue-by-aerial-surveillance/ accessed 8 July 2025.
[207] See European Commission, 'EU Space Programme: More Satellites and New Services Underway' (30 January 2025) https://defence-industry-space.ec.europa.eu/eu-space-programme-more-satellites-and-new-services-underway-2025-01-30_en accessed 3 June 2025

Programme**,** managed jointly by the ESA. Originally intended for environmental monitoring, Copernicus has evolved into a dual-use programme that now includes Security Services expressly designed to support border and maritime surveillance under the *EUROSUR Fusion Services* system.[208]

In parallel, the SatCen contributes advanced image intelligence by integrating military-grade data sources, including very high resolution optical images.[209] These contributions enable EUROSUR to access imagery with sub-metre resolution, essential for identifying small-scale vessels typically used by migrants, as official information provided by Copernicus noted.[210] However, technical limitations persist, as it has been demonstrated that even with advanced sensors, it remains extremely difficult to detect vessels smaller than 20 metres length, precisely the type of boats used in many migrant crossings.[211]

Moreover, new strategic initiatives have expanded the EU's satellite capacity. Most notably, the IRIS² (Infrastructure for Resilience, Interconnectivity and Security by Satellite) constellation, launched in December 2024, aims to secure EU communications and surveillance capabilities with enhanced encryption and low-latency communication for maritime and security operations.[212]

Additionally, Frontex itself contracts commercial satellite providers to enhance its operations, particularly in areas where EU public satellite coverage proves insufficient. These partnerships include collaborations with private aerospace and geospatial intelligence firms whose optical imaging capabilities are used to track small, fast-moving maritime targets outside regular patrol zones.[213] For example, Frontex has begun testing HAPS at the edge of space (20 km altitude) and offer persistent coverage over specific maritime regions. In 2024, a HAPS research programme supported by the EU

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[208] Frontex, 'Copernicus Programme' https://www.frontex.europa.eu/what-we-do/copernicus-programme/; ESA, 'Security Services' (ESA) https://www.esa.int/Applications/Observing_the_Earth/Copernicus/Security_services bot accessed 3 June 2025.
[209] EU Satellite Centre (SatCen), 'Copernicus' https://www.satcen.europa.eu/page/copernicus accessed 3 June 2025.
[210] Copernicus, 'Security' (Copernicus EU) https://www.copernicus.eu/en/copernicus-services/security accessed 3 June 2025.
[211] Kanjir, Urska. (2019). Detecting migrant vessels in the Mediterranean Sea: Using Sentinel-2 images to aid humanitarian actions. Acta Astronautica, 155, 45-50
[212] European Commission, 'IRIS² – Secure Connectivity' https://defence-industry-space.ec.europa.eu/eu-space/iris2-secure-connectivity_en accessed 3 July 2025.
[213] Frontex, 'The European Border Intelligence Service' https://digit.site36.net/2018/09/08/the-european-border-intelligence-service/ ; see also Frontex, 'EU Research and Innovation Projects: Commercial Satellite Use in Border Surveillance' (2023) https://www.frontex.europa.eu/what-we-do/research-and-innovation/ both accessed 3 June 2025.

explored their potential use for migration control in the Canary Islands region**,** where surveillance gaps persist due to the vastness of the Atlantic.[214] Paradoxically, in May 2025, three young girls and four women died after a *cayuco* carrying around 150 people capsized near the island of El Hierro.[215] Despite the EU's increasingly sophisticated surveillance arsenal, such tragedies reveal the stark limits of a system that prioritises detection and deterrence over rescue and protection. The deployment of pseudo-satellites above Atlantic waters may offer impressive technical coverage, but it has not prevented the recurrence of maritime deaths that are both foreseeable and preventable.

C. Coastal Sensors and Detection Systems

In complement to aerial and satellite assets, the EU's maritime border infrastructure is supported by a complex web of coastal sensors and detection systems**.** These include fixed shore-mounted radar**,** thermal imaging cameras**,** Automatic Identification Systems (AIS)**,** sonobuoys, and increasingly mobile units embedded on ships, aircraft, and autonomous systems. Positioned at strategic locations, these technologies serve as the EU's first line detection enhancing low-altitude, short-range situational awareness in key maritime corridors.[216]

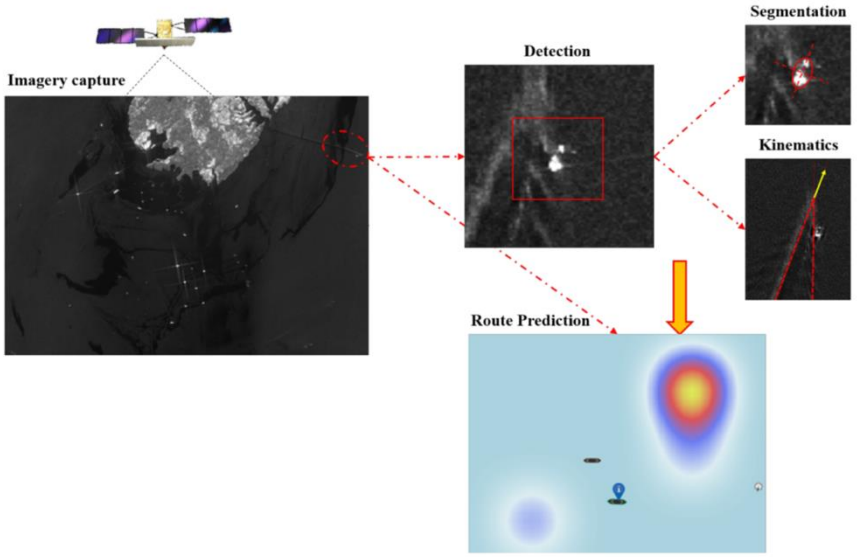

Figure 4 – Coastal surveillance architecture integrating radar and sonobuoy sensors. (2023)[217]

[214] Frontex, 'Research Study on High Altitude Pseudo-Satellites – First Take-Aways' (2024) https://www.frontex.europa.eu/innovation/eu-research/news-and-events/research-study-on-high-altitude-pseudo-satellites-first-take-aways-MsHsdO; Estrella Digital, 'Frontex prueba pseudosatélites para vigilar la inmigración en Canarias' (20 April 2025) https://www.estrelladigital.es/articulo/seguridad-defensa/frontex-pseudosatelites-inmigracion-canarias/20250420103718430378.html both accessed 3 June 2025.

[215] Óscar López-Fonseca, 'Tres niñas y cuatro mujeres mueren tras volcar un cayuco en El Hierro con unas 150 personas a bordo' *El País* (Madrid, 28 May 2025) https://elpais.com/espana/2025-05-28/vuelca-un-cayuco-en-el-hierro-con-decenas-de-personas-a-bordo.html accessed 3 June 2025.

[216] Marco Reggiannini and others, 'Remote Sensing for Maritime Prompt Monitoring' (2023) https://iris.cnr.it/retrieve/71bc4dad-bc21-420d-846a-97f9696e3781/prod_403959-doc_140684.pdf accessed 4 June 2025.

[217] Ibid, 2.

As illustrated in Figure 4, these sensors are typically arranged in a layered configuration, combining land-based radars**,** surveillance receivers**,** and communication centers, forming what defence analysts call a *sensor fusion architecture*[218]. In combination**,** thermal sensors and electro-optical cameras also play a critical role in the identification of heat signatures and movement. As demonstrated in Frontex's aerial operations, these cameras enable high-resolution zooming, providing a direct visual narrative of search, rescue or interception missions.[219]

Another essential element is the repurposing of AIS. These are deployed to monitor ship movement but also to identify "dark vessels", those that disable their transponders to avoid detection.[220] Such behaviours are algorithmically flagged as suspicious and cross-analysed sing satellite imagery, radar data and open-source intelligence (OSINT) within the EUROSUR Fusion Services.[221]

It is important to note that, from a legal perspective, all this sensor network is part of the broader IBM strategy of the EU, enshrined in the EUROSUR Regulation, which obliges MS to share surveillance data and coordinate responses via Frontex[222].

However, while these sensor technologies are undeniably effective in detecting vessels under adverse conditions—such as night-time, fog, or heavy cloud cover—they also raise profound ethical and legal dilemmas when applied indiscriminately in migration contexts. Projects like COPKIT, originally designed for counterterrorism and organised crime prevention**,** offer sophisticated tools for predictive analytics and early-warning interventions[223]. Yet, when such technologies are repurposed to track overcrowded, unseaworthy boats carrying people fleeing war, poverty or persecution, we must ask: are we truly addressing threats, or are we criminalising human survival strategies?

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[218] Ibid.
[219] Frontex, 'Eyes in the Sky: Monitoring the Mediterranean' (Frontex, 30 October 2023) https://www.frontex.europa.eu/media-centre/news/news-release/eyes-in-the-sky-monitoring-the-mediterranean-17Gg1W accessed 4 July 2025.
[220] Alexandros Sfyridis, Tao Cheng and Michele Vespe, 'Detecting Vessels Carrying Migrants Using Machine Learning' (2017) IV-4/W2 ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences 53.
[221] Marco Reggiannini and others (n 156).
[222] Georgios Orfanidis and others, 'Border Surveillance Using Computer Vision-Enabled Robotic Swarms for Semantically Enriched Situational Awareness' in Babak Akhgar and others (eds), *Technology Development for Security Practitioners* (Springer 2021) 244.
[223] Raquel Pastor and others, 'COPKIT: Technology and Knowledge for Early Warning/Early Action-Led Policing in Fighting Organised Crime and Terrorism' in Babak Akhgar and others (eds), *Technology Development for Security Practitioners* (Springer 2021) 232.

D. Situational Awareness Systems

Situational awareness refers to the ability of authorities to detect, identify, track, analyse and respond to real-time developments within a specific area of interest, notably the external borders of the EU. In the context of maritime surveillance, this implies the continuous fusion of sensor data, satellite imagery, risk indicators, and intelligence inputs into operational platforms that enable predictive decision-making.[224] At the centre of this architecture lies EUROSUR**:** an integrated framework combining operational cooperation, information exchange, and layered situational pictures to enhance the EU's reaction capabilities. Its dual purpose is the fight against irregular migration and cross-border crime, while also contributing to the protection and saving of migrants' lives.[225] EUROSUR was designed to integrate the surveillance capacities of MS through National Coordination Centres (NCCs)**.** These centres feed into the EUROSUR Communication Network (ECN)**,** which provides access to the European Situational Picture (ESP) and the Common Pre-Frontier Intelligence Picture (CPIP)**.** Through this architecture, Frontex's Situation Centre can monitor layered maritime zones: national, regional, and "pre-frontier" areas extending beyond EU jurisdiction but under EU surveillance and influence.[226]

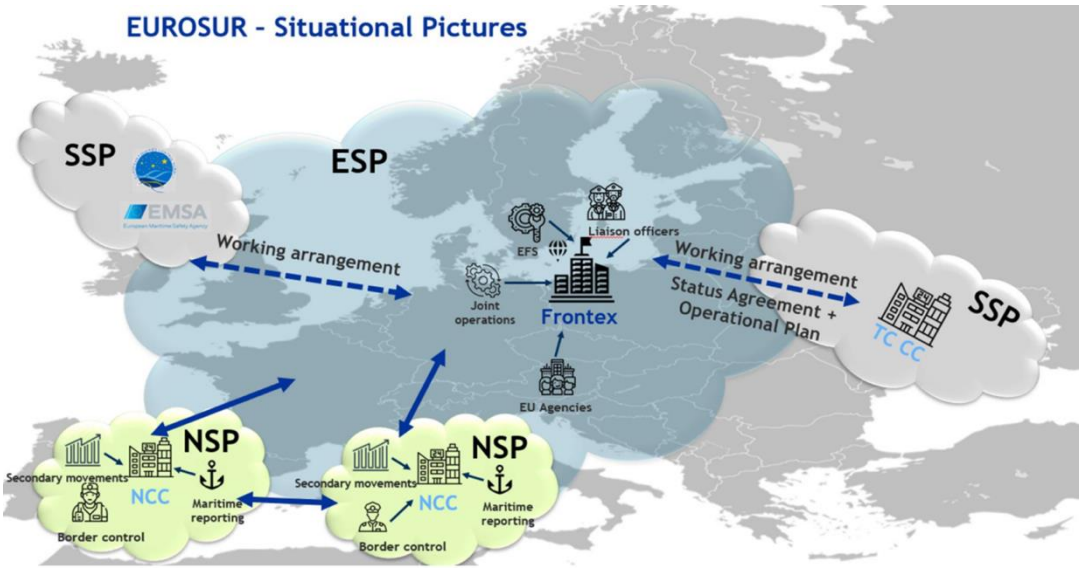

Figure 5 – Operational structure of the EUROSUR Situational Awareness system. (2024)[227]

[224] Georgios Orfanidis and others, 'Border Surveillance Using Computer Vision-Enabled Robotic Swarms for Semantically Enriched Situational Awareness' in Babak Akhgar and others (eds), *Technology Development for Security Practitioners* (Springer 2021) 243–244.
[225] Regulation (EU) 2019/1896 of the European Parliament and of the Council on the European Border and Coast Guard [2019] OJ L295/1, art 18(2).
[226] D Papadaki and M Markellou, 'Legal and Ethical Challenges for Technology-Aided Maritime Border Surveillance Operations' in Babak Akhgar and others (eds), *Technology Development for Security Practitioners* (Springer 2021) 300–303.
[227]Frontex, 'EUROSUR Situational Awareness at External Borders' (Presentation, 20 July 2024) https://media.frag-den-staat.de/files/foi/821089/8-fx-eurosur-situational-awareness-at-external-borders-red.pdf accessed 4 June 2025

Figure 5 visually represents how situational awareness is constructed through inter-agency cooperation and digital infrastructure. NCCs are responsible for collecting national data (such as secondary movements or maritime reports) and feeding it into the ESP. Frontex, based in Warsaw, integrates this information and collaborates with other EU agencies (e.g., EMSA, EFCA) and third countries (under working arrangements and operational plans) to establish a shared, real-time understanding of border dynamics. As shown, the system extends surveillance beyond the EU's territory, incorporating *pre-frontier zones* and engaging partners like the EMSA and third-country contact centres (TC CCs).

In operational terms, EUROSUR is also the foundation for the deployment of CIRAM (Common Integrated Risk Analysis Model), a system used by Frontex to categorise risks and identify "hotspots" where surveillance assets should be intensified. CIRAM processes information from multiple sources, including aerial and satellite feeds, AIS data, open-source intelligence (OSINT), and local reports. Based on this model, Frontex determines which actors, behaviours, or routes pose "risk", thus guiding where and when drones, patrol vessels, or border guards are deployed[228].

E. Research Projects and Technological Development

Over the past decade, a broad spectrum of EU-funded research and development (R&D) projects have been instrumental in reshaping the border control architecture into a digitally mediated data-driven apparatus. These initiatives contribute to the normalisation of civil–military convergence**,** facilitating the integration of experimental surveillance tools into operational frameworks with limited legal and ethical scrutiny.

One of the earliest large-scale initiatives was PERSEUS (2011-2015). It connects national infrastructures to supranational platforms. System of Systems" by linking national infrastructures to supranational platforms. With €43.6 million in funding, PERSEUS focused on detecting "non-collaborative vessels", automating anomaly detection, and enabling real-time data fusion through live exercises across the Mediterranean and Atlantic. It introduced the logic of pre-frontier control**,** supporting predictive monitoring well beyond EU jurisdiction.[229]

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[228] Frontex, 'Common Integrated Risk Analysis Model (CIRAM)' (Frontex) https://www.frontex.europa.eu/what-we-do/monitoring-and-risk-analysis/ciram/ accessed 4 June 2025.
[229] European Commission, 'PERSEUS: Protection of European seas and borders through the intelligent use of surveillance' https://cordis.europa.eu/project/id/261748 accessed 4 June 2025.

Similarly, the MARISA project (2017-2020) introduced semantic enrichment algorithms and integrated data fusion techniques to identify behavioural anomalies in maritime flows.[230] This model of AI-enhanced behavioural patterning was further operationalised by OCEAN2020 (2018-2021), which integrated unmanned aerial, surface, and underwater vehicles (UAVs, USVs, UUVs) into joint command and control chains during naval exercises in the Mediterranean. OCEAN2020 helped institutionalise multi-domain interoperability across surveillance assets, foreshadowing the deployment of autonomous systems in future border operations.[231]

3.4.2. Identification and Categorisation Technologies

The second layer of (dis)protection at sea unfolds the moment interception occurs: the act of identifying, recording, and categorising human beings through a technologically mediated apparatus. Once a migrant vessel has been detected and intercepted, the next phase of EU maritime border control involves the identification, registration, and classification of the individuals on board. This process is no longer handled through traditional means such as verbal interviews or document checks alone.

A. Biometric Systems

Three principal EU databases govern this biometric infrastructure: EURODAC, VIS, and the EES. Each plays a role in linking human bodies to data profiles.

Originally developed to support Dublin Regulation by storing the fingerprints of asylum seekers and irregular border-crossers, EURODAC,[232] determine the MS responsible for processing the claim. However, its scope has since been expanded to include facilitation of returns and police access for crime prevention and investigation. It now allows for the fingerprinting of children as young as six, raising significant ethical concerns regarding consent and proportionality.[233]

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[230] European Commission, 'Final Report Summary – MARISA (Maritime Integrated Surveillance Awareness)' (CORDIS, 2021) https://cordis.europa.eu/project/id/740698/reporting accessed 4 June 2025.
[231] European Defence Agency, 'OCEAN2020 – Maritime Defence Research Project' https://eda.europa.eu/what-we-do/all-news/2020/02/24/ocean2020-sea-demonstration accessed 4 June 2025.
[232] Regulation (EU) No 603/2013 of the European Parliament and of the Council of 26 June 2013 on the establishment of 'Eurodac' [2013] OJ L180/1.
[233] Niovi Vavoula, 'The Transformation of Eurodac from an Asylum Tool into an Immigration Database' (EU Migration Law Blog, 16 October 2024) https://eumigrationlawblog.eu/the-transformation-of-eurodac-from-an-asylum-tool-into-an-immigration-database/ accessed 4 June 2025.

Established by Regulation (EC) No 767/2008 and amended by Regulation (EU) 2019/1155[234], VIS collects fingerprints and facial images from short-stay visa applicants. While does not commonly apply for migrants arriving by sea, it forms part of the broader interoperable architecture of biometric data, accessible by border guards and law enforcement agencies across the EU. Same situation with the EES**,** governed by Regulation (EU) 2017/2226[235], aims to replace manual passport stamps for non-EU travellers with biometric and alphanumeric entries, including fingerprints and facial images. Though primarily designed to identify overstayers, it contributes to the construction of risk profiles and long-term mobility tracking.[236]

B. Mobile Biometric Units and On-Site Screening

Frontex and various Member States have equipped border teams with Mobile Biometric Units (MBUs) that allow authorities to collect, verify and process biometric data directly in disembarkation zones, hotspots and other operational theatres. These units are equipped with fingerprint scanners, facial recognition cameras and secure data transmission tools that feed into centralised EU databases, particularly EURODAC**,** VIS**,** and, prospectively, EES.[237]

Unlike fixed infrastructure, MBUs are deployed directly at the edge of EU jurisdiction—on ships, in ports or on-site during operations—where officers can register individuals within minutes of interception. The collected biometric profiles are cross-checked in real time against EU systems, facilitating rapid identity verification, detection of previous entries, and potential matches with law enforcement alerts. This allows for immediate categorisation of individuals into procedural tracks: asylum applicants, returnees, or irregular entrants requiring detention or deportation.[238]

The interoperability of these systems, enabled by recent regulatory reforms, means that identification is not a standalone event, but part of a wider continuum of categorisation already embedded in the

[234] Regulation (EC) No 767/2008 of the European Parliament and of the Council of 9 July 2008 concerning the Visa Information System (VIS) [2008] OJ L218/60; amended by Regulation (EU) 2019/1155 [2019] OJ L188/25.
[235] Regulation (EU) 2017/2226 of the European Parliament and of the Council of 30 November 2017 establishing the Entry/Exit System (EES) [2017] OJ L327/20.
[236] Open Society Foundations, 'No Good Reason for the Schengen Entry/Exit System' (Open Society Foundations, 17 July 2017) https://www.opensocietyfoundations.org/voices/no-good-reason-schengen-entryexit-system accessed 4 June 2025.
[237] Frontex, *Frontex sees mobile biometric identification as a solution to EU border checks: Report* (Biometric Update, 17 July 2023) https://www.biometricupdate.com/202307/frontex-sees-mobile-biometric-identification-as-a-solution-to-eu-border-checks-report accessed 4 June 2025.
[238] Statewatch, *Frontex and Interoperable Databases: An Emerging EU Surveillance Framework* (April 2022) 6–9 https://www.statewatch.org/media/3725/frontex-and-interoperable-databases-report.pdf accessed 4 June 2025.

detection logic described in Section 3.4.1. The same technologies used to locate vessels via thermal imagery or drones are now complemented by handheld biometric scanners that finalise the legal identity construction of intercepted individuals. Frontex has actively promoted the use of these systems in the context of growing border pressures. In its 2023–2024 strategic outlook, the agency referred to mobile biometric screening as "key for managing large flows of irregular arrivals and reducing delays in identification procedures" at the external borders.[239]

While the operational efficiency of mobile biometric technologies is widely recognised, applying such instruments to individuals arriving by sea, who are often traumatised, disoriented and unaware of their legal entitlements, risks undermining fundamental principles of human dignity and due process. But also, these practices can create significant asymmetries of power, particularly where language barriers and the absence of legal counsel critically affect procedural fairness.

C. Data Interoperability Systems

Adopted in 2019, the Interoperability Regulations[240] created a shared legal framework to interlink six core EU databases: EURODAC**,** VIS**,** SIS**,** EES**,** ETIAS**,** and ECRIS-TCN. While originally conceived for distinct purposes—such as asylum, visas, law enforcement, or criminal records—these systems now operate as a single interoperable ecosystem accessible by national and EU authorities, including Frontex and law enforcement agencies.

The new architecture includes four main components: The European Search Portal (ESP)**,** which enables simultaneous queries across all systems; The Common Identity Repository (CIR)**,** which consolidates biometric and alphanumeric identity data of third-country nationals; The Biometric Matching Service (BMS)**,** which conducts cross-database comparisons of fingerprints and facial images; and the Multiple Identity Detector (MID)**,** which flags inconsistencies or duplicate identities.

[239] Frontex (n 240)
[240] See Regulation (EU) 2019/817 of the European Parliament and of the Council of 20 May 2019 on establishing a framework for interoperability between EU information systems in the field of borders and visa, [2019] OJ L135/27; Regulation (EU) 2019/818 of the European Parliament and of the Council of 20 May 2019 on establishing a framework for interoperability between EU information systems in the field of police and judicial cooperation, asylum and migration, [2019] OJ L135/85.

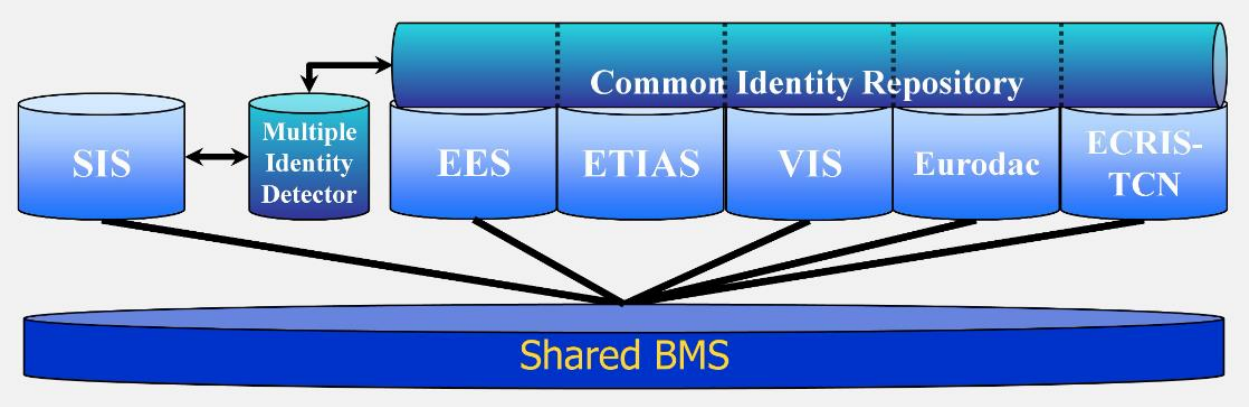

Figure 6 – Architecture of Interoperable Databases in the EU: Link Between SIS, CIR, BMS and the Multiple Identity Detector (MID).[241]

In practice, this means that when a person is intercepted at sea, biometric data collected via mobile units or at disembarkation points is automatically compared against the CIR using the BMS. Any match or inconsistency—whether a previous asylum application, criminal record, or visa rejection—can immediately affect the treatment of that individual. Figure 6 illustrates how identity links are established across systems, enabling retrospective and predictive identification processes at sea and beyond EU territory boundaries. This reinforces a system of identity-based filtering, where past data, rather than present needs or risks, determine access to protection or prompt return procedures.

As Statewatch warns, interoperability enables automated decisions based on partial or decontextualised data**,** with little space for human discretion or procedural safeguards. Moreover, the consolidation of identity records into a single EU-wide profile facilitates not only border control but also criminalisation, surveillance and predictive analysis of migration trajectories[242]. In the maritime context, these risks transforming the point of rescue into a site of real-time biometric risk management, where control is a priority over protection.

[241] European Commission, 'Impact Assessment Accompanying the Proposal for a Regulation on Interoperability' SWD(2017) 473 final, 12 December 2017, Figure 12 https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52017SC0473 accessed 4 June 2025.
[242] Statewatch, *Frontex and Interoperable Databases: Knowledge as Power?* (July 2021) https://www.statewatch.org/media/3725/frontex-and-interoperable-databases-report.pdf accessed 4 June 2025, 8–12.

D. Risk Scoring Algorithms

The EU is also adopting algorithmic risk scoring tools to assess and pre-filter individuals before and after arrival. One of the most significant developments is the ETIAS, governed by Regulation (EU) 2018/1240.[243] Scheduled to become operational in 2026, ETIAS will automatically screen visa-exempt travellers against EU security and migration databases. It will generate a risk score based on pre-set criteria (e.g., nationality, travel history, age), which determines whether a traveller requires further review.[244] Although ETIAS does not apply to migrants or asylum seekers arriving irregularly, particularly those rescued at sea or disembarking after unauthorised crossings, it exemplifies the EU's commitment to anticipatory governance**,** where data-driven assessments increasingly determine the right to move or stay.

A more relevant instrument in the context of maritime migration is Frontex's Common Integrated Risk Analysis Model (CIRAM)**.** As previously discussed in section 3.4.1.D, CIRAM forms the analytical core of EUROSUR's situational awareness capabilities. However, beyond its operational role in detecting "hotspots", CIRAM functions as a strategic mapping tool that categorises entire nationalities, routes, or behaviours as "risky", thereby shaping deployment decisions for aerial surveillance, patrol assets, and externalised interventions. Unlike ETIAS, which generates risk profiles at the individual level, CIRAM constructs structural hierarchies of threat that operate collectively. This distinction is critical: while biometric or identity-based risk scores target individuals, CIRAM encodes risk into geography and demography, operationalising what Ellebrecht describes as *anticipatory governance*.[245]

E. AI-Based Tools

Another strategic tool for identity verification, behavioural analysis, and anomaly detection in border governance is the increasingly reliance of AI. With AI-Based tools, risk is assessed not only from biometric matches or travel records, but from behavioural cues and inferred intent. Several EU-funded pilot projects have served as testing grounds for these innovations

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[243] Regulation (EU) 2018/1240 of the European Parliament and of the Council of 12 September 2018 establishing a European Travel Information and Authorisation System (ETIAS) [2018] OJ L236/1, art 20.
[244] European Commission, 'European Travel Information and Authorisation System (ETIAS)' (European Union, 2024) https://travel-europe.europa.eu/etias_en accessed 4 June 2025
[245] Sabrina Ellebrecht, *Mediated Bordering: The Production of Security and Insecurity in EU External Border Management* (Transcript 2022) 113.

One example is the iBorderCtrl (2016–2019), a controversial pilot project, sought to implement a virtual border guard system that combines facial recognition, voice analysis, and AI-driven micro-expression detection to assess credibility during automated interviews. Based on the system's real-time "truthfulness" score, individuals were either cleared or referred for further inspection While not deployed in practice, the project exemplifies the growing interest in emotion-based surveillance and algorithmic deception detection. It has raised substantial concerns about pseudoscientific premises, discriminatory biases, and the erosion of procedural safeguards in migration contexts.[246]

Another project was PROMENADE (2020–2023), focused on maritime surveillance by applying AI and machine learning to anomaly detection in vessel trajectories. It enabled the automatic classification of navigation patterns to predict suspicious behaviours at sea. The system relies on fused data from AIS, radar, and satellite inputs, and was tested in operational scenarios simulating migration events in the Mediterranean.[247]

More recently, the i-SEAMORE project (2023-2025) has represented a critical step in cross-domain integration of surveillance systems**.** Its final demonstrations linked AI-based threat detection tools with the new IRIS² satellite constellation and HAPS for low-latency, encrypted transmission of real-time maritime data. This infrastructure enabled coordinated risk analysis across space, air, and surface platforms, reinforcing anticipatory governance while bypassing traditional legal triggers for rescue obligations.[248]

Another flagship initiative is ROBORDER (2021-2027)**,** that developed autonomous surveillance systems using drones (UAVs), underwater vehicles (UUVs), and ground sensors, integrated with AI analytics to identify and classify border-crossing events in real-time. With partners including Frontex and security contractors, the project was designed explicitly to support EUROSUR and was aligned with the EU's IBM strategy.[249]

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[246] European Parliamentary Research Service, *The Use of Artificial Intelligence in Border Control, Migration and Security: Legal and Ethical Considerations* (EPRS, 2021) 25–26 https://www.europarl.europa.eu/RegData/etudes/IDAN/2021/690706/EPRS_IDA(2021)690706_EN.pdf accessed 5 June 2025.

[247] European Commission, *PROMENADE Project Summary – Maritime Integrated Surveillance Awareness* https://cordis.europa.eu/project/id/883286 accessed 5 July 2025

[248] I-SEAMORE Project, 'Boosting Maritime Security with Uncrewed Systems' https://iseamore-project.eu/boosting-maritime-security-with-uncrewed-systems/ accessed 4 June 2025.

[249] European Commission, *ROBORDER Project Summary – Autonomous Border Surveillance System* https://cordis.europa.eu/project/id/740593 accessed 4 June 2025.

Despite their experimental status, these initiatives signal the increasing incorporation of AI into border regimes not merely for surveillance, but for *automated decision-making*. The implications are far-reaching. As noted by the European Council in 2025, space data, AI and autonomous systems are increasingly being integrated into border and crisis management without meaningful transparency.[250] Moreover, Amnesty International, noted that AI tools risk amplifying existing inequalities in migration control by encoding bias into opaque systems, undermining access to protection and the right to non-discrimination.[251] Emotion detection, risk scoring, and automated surveillance not only risk misidentifying vulnerable individuals but also shift the very foundations of legal protection—from procedural safeguards to algorithmic suspicion. In this sense, the deployment of AI in migration management illustrates the danger of replacing complex human realities with binary machine classifications, thereby undermining the fundamental right to dignity and fair treatment at the border.[252]

3.4.3. Data Infrastructure and Information Systems

The third layer in the architecture of (dis)protection at sea lies not in the less visible, yet foundational, digital infrastructures that organise, process, and govern the flow of data. These systems—composed of institutional networks, interoperable databases, and situational analysis platforms—form the backbone of EU maritime border control. They enable real-time coordination between national authorities, EU agencies and private actors, generating actionable intelligence and predictive modelling. Crucially, this infrastructure actively shapes the very possibilities of detection, classification, and intervention by embedding a logic of automation, centralisation, and anticipatory governance deep into the governance of human mobility at sea.

A. National Coordination Centres and the Frontex Situation Centre

At the core of EUROSUR's functioning are the National Coordination Centres (NCCs)**,** which serve as the national nerve centres for collecting, standardising and transmitting surveillance data to Frontex through the EUROSUR Communication Network (ECN)**.** These data inputs—ranging from aerial feeds to radar detections and coast guard alerts—are processed into layered situational pictures**,** which are

[250] Council of the European Union, 'Council Calls for a Better Use of Space Data to Enhance Crisis Management' (23 May 2025) https://www.consilium.europa.eu/en/press/press-releases/2025/05/23/council-calls-for-a-better-use-of-space-data-to-enhance-crisis-management/ accessed 4 June 2025.
[251] Human Rights Implications for Migrants and Refugees (February 2024) https://www.amnesty.de/sites/default/files/2024-02/Amnesty-Briefing-Migration-Schutzsuchende-Ueberwachung-digitale-Technologien-Februar-2024.pdf accessed 4 June 2025.
[252] Alberto Rinaldi and Sue Anne Teo, 'The Use of Artificial Intelligence Technologies in Border and Migration Control and the Subtle Erosion of Human Rights' (2025) *European Journal of Risk Regulation*

then integrated into a common operational framework at the Frontex Situation Centre in Warsaw, as already observed in Section 3.4.1.D. It is worth unpacking here its structural implications from the perspective of digital infrastructure. The NCCs are not merely intermediaries; they function as nodes in a federated network of data fusion**,** where national and supranational actors become embedded in a continuous exchange of surveillance intelligence. This exchange enables the real-time production of ESP and Pre-Frontier Situational Picture (PFSP), not only informing but effectively guiding the direction and scope of maritime interventions.[253]

The Frontex Situation Centre, which operates 24/7, not only aggregates data but produces actionable intelligence by interlinking national contributions with satellite imagery, risk profiles, and algorithmic modelling (e.g. CIRAM). Its interoperability systems further expands its reach, allowing data from biometric interceptions at sea to feed directly into a centralised architecture of mobility governance.[254] In this regard, the Situation Centre acts as a data hub**,** translating raw detection into predictive intervention and classification across the EU border regime.

B. EUROSUR Fusion Services

Unlike traditional data repositories, these services function as dynamic processing units capable of transforming raw data into operational intelligence. Through its integration with the EU's Copernicus Earth observation programme, Frontex receives high-resolution satellite imagery and anomaly alerts, which are then cross-referenced with radar signals, AIS (Automatic Identification System) tracks, and open-source data to produce predictive insights, as has been shown in Section 3.4.1.D.
From a data infrastructure perspective, this system exemplifies what Rijpma and Vermeulen describe as the emergence of a *"system of systems"*, where border surveillance is no longer about detecting unauthorised crossings, but about *pre-empting movement altogether* through automated targeting and predictive modelling.[255] In this sense, Fusion Services do not simply support border operations; they transform the very nature of how borders are governed by embedding algorithmic logics deep into the core of EUROSUR's functioning.

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[253] Frontex, *EUROSUR Handbook: Situational Awareness at the External Borders* (2023), 7–10.
[254] European Parliament, *Frontex Consolidated Annual Activity Report 2023* (PE 753.654, 2024) https://www.europarl.europa.eu/cmsdata/286387/Frontex%20CAAR%202023.pdf accessed 4 June 2025.
[255] Jorrit J Rijpma and Mathias Vermeulen, 'EUROSUR: Saving Lives or Building Borders?' (2015) 20(4) *European Journal of Migration and Law* 454, 455–460.

C. Common Identity Repository (CIR) and Biometric Matching Service (BMS)

As explored in Section 3.4.2.C, the CIR is a centralised database that consolidates biometric and alphanumeric identity data of third-country nationals previously stored in EURODAC, VIS, EES, ETIAS, SIS and ECRIS-TCN systems. Together with the BMS, this architecture enables the automatic comparison of fingerprints and facial images across all linked systems, allowing for real-time identity verification at borders, including maritime interception points . Importantly, the BMS also integrates MID, a tool designed to flag inconsistencies or duplicates across identity records. This risk-based automation mechanism, as visualised in official Commission documentation, constructs identity links that may prompt alerts or legal consequences without any new misconduct or change in individual circumstances .[256] Unlike isolated databases, this system operates in a synchronised, predictive manner. Once biometric data is captured—often under vulnerable or stressful conditions—it is immediately processed through CIR and BMS, triggering alerts or classifications that follow the individual across systems and jurisdictions . This process reflects not merely a search for accuracy, but a broader shift in which the accumulation and mobilisation of biometric data becomes a tool of power, projecting control before legal or humanitarian evaluations are conducted.[257]

D. Centralisation, Interoperability, and Governance Implications

From a governance standpoint, the construction of interoperable infrastructures such as CIR and BMS represents more than just enhanced efficiency, it consolidates control. Interoperability, also explored in Section 3.4.2.C, aims to “ensure the seamless operation” of security and migration databases. However, in doing so, it reshapes the very terrain of migration governance by enabling the remote, algorithmic, and anticipatory management of individuals intercepted at sea.

This data ecosystem centralises decision-making in institutions far from the maritime frontier. Border control thus becomes a transnational, digital process, stretching from biometric capture on the deck of a rescue vessel to data screening in Warsaw, Strasbourg or Brussels. As Statewatch critically observes, this model gives rise to what can be described as digital pre-bordering**,** where decisions about identity,

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[256] European Commission, ‘Impact Assessment Accompanying the Proposal for a Regulation on Interoperability’ SWD(2017) 473 final, 12 December 2017, Figure 12 https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52017SC0473 accessed 4 June2025.

[257] Statewatch, *Frontex and Interoperable Databases: Knowledge as Power?* (July 2021) 8–12 https://www.statewatch.org/media/3725/frontex-and-interoperable-databases-report.pdf accessed 4 June 2025.

access, and removal are made automatically on the basis of pre-existing data patterns, not individual circumstances .[258]

3.5. Conclusions

The analysis of the EU's digital and legal maritime border governance reveals a complex assemblage of technologies, actors, and legal frameworks that do not merely regulate mobility, but fundamentally structure (im)mobility. What emerges is not a failure of migration governance, but its precise design: an architecture of exclusion, in which rights are selectively distributed, borders are digitally extended, and legal responsibility is systematically outsourced. As shown throughout Chapter 3, these infrastructures serve as invisible walls that filter, sort and (im)mobilise individuals on the move, according to biometric legibility, perceived risk, and administrative categorisation.[259]

The Schengen regime exemplifies this logic. Although it ostensibly guarantees internal freedom of movement, it does so by reinforcing the closure and digital fortification of its external frontier. This trade-off—mobility for some at the cost of immobility for others—exposes the inherent asymmetry of the EU legal order.[260] Schengen operates not just as a legal framework but as a socio-technical infrastructure that actively redistributes rights, power, and access. The infrastructure itself categorises and ranks human movement: tourists and business travellers are filtered through low-friction corridors, while asylum seekers, especially those arriving by sea, are intercepted, registered, and immobilised.[261]

This legal and technological sorting reproduces racialised hierarchies and embeds what Spijkerboer calls a "global mobility infrastructure", through which law becomes both the instrument and the outcome of structural exclusion.[262] But also by responsibilising third countries and outsourcing core sovereign functions like search and rescue or refugee screening, the EU effectively dislocates the site of

[258] Ibid, 10–11.
[259] Trauttmansdorff and Felt, (n 173)
[260] Thomas Gammeltoft-Hansen and William Hamilton Byrne, 'Virtual Borders: International Law and the Elusive Inequalities of Algorithmic Association' (2024) *European Papers*
[261] Dennis Broeders, 'The Digital Surveillance of Migrants in the EU: From Dataveillance to Social Sorting' (2007) 14(3) *Journal of Ethnic and Migration Studies* 389
[262] Thomas Spijkerboer, 'The Global Mobility Infrastructure: Reconceptualising the Externalisation of Migration Control' (2018) 20(4) *European Journal of Migration and Law* 452.

control while avoiding direct legal accountability.[263] This distributed architecture is built upon political choices that prioritise containment over protection, and deterrence over dignity.

Infrastructural experimentation has transformed the maritime border into a testing ground where rights are conditional and accountability diffuse, consequently creating a border that is not a fixed line anymore, but a dynamic site of contestation between competing rationalities: humanitarianism, security, commerce, and governance.[264] The border regime thus reflects not only institutional logics but deeper societal anxieties about race, mobility, and sovereignty. A fundamental problem exposed by this chapter is that the EU's border governance is designed around the figure of the "threat", a figure into which all irregularised mobility—including asylum seekers—is subsumed. This logic of generalised suspicion has eroded the normative separation between the asylum regime and criminal law, collapsing protection needs into security risks. It demonstrates how the very legal frameworks meant to guarantee asylum have been retooled to prevent it.

[263] Violeta Moreno-Lax, 'Meta-Borders and the Rule of Law: From Externalisation to "Responsibilisation" in Systems of Contactless Control' (2024) 10(1) *Comparative Migration Studies* 11.
[264] Trauttmansdorff and Felt (n 173)

Chapter 4 – Legalising (Im)mobility at Sea? Tracing Structural (Dis)protection along the Migrant Journey

4.1. Introduction

"The moon is in Duala and my destiny in knowledge."[265]

This is the title that Sani Ladan gave to his personal journey when, at the age of fifteen, he crossed the African continent – from Cameroon to Spain – with the sole purpose of studying. His path led him across multiple African borders and through the vast Sahara Desert, exposing him to the brutal consequences of the EU's externalised border regime, delegated to African authorities to block movement long before it reaches European soil. He hid for weeks in the forests of northern Morocco, waiting for a chance to cross into Melilla, where a six-metre wall topped with barbed wire and spikes stood as a symbol of exclusion. "Even goods have more rights to cross than we do", he later said, after witnessing people fall, suffer, and die while police fired rubber bullets to keep them out. After several failed attempts, he finally reached Spain by swimming to Ceuta. But it was one night in the desert, uncertain where this path would lead him, when he looked up at the moon and thought of his mother back in Duala. She used to place a bucket of water outside their home to watch the moon's reflection. He imagined her doing the same, and through that shared sky, he reminded himself that his destiny was in knowledge.[266]

Ladan's personal journey mirrors the structural patterns of the EU's external maritime border regime, directly reflecting on the architecture of (dis)protection that this research seeks to unveil. Building on the theoretical frameworks developed in Chapter 2 and the legal-technological infrastructures mapped in Chapter 3, this chapter traces the *migrant journey* across three spatial–juridical thresholds: at sea (Section 4.3)**,** upon arrival (Section 4.4)**,** and within the system (Section 4.5**.)**. Section 4.2 will outline the methodological lens that guides this analysis, based on critical legal theory and engaging with empirical reports in case examples. The Chapter will end with general conclusions included in Section 4.6.

[265] Sani Ladan, *La luna está en Duala y mi destino en el conocimiento* (Plaza & Janés 2023). [Translated from Spanish by the author].
[266] Ibid.

4.2. Methodological Note

This chapter is grounded in a socio-legal methodology that combines structural analysis with selected case examples, aiming to expose how law and technology interact to produce (im)mobility and (dis)protection along the migrant journey. Empirically, the analysis is based on secondary sources, including human rights reports**,** legal documents**,** investigative journalism**,** EU policy instruments**,** and academic literature across critical border, surveillance and migration studies.

Case examples are used not as isolated anomalies, but as illustrative of broader systemic practices. They reflect the normalised functioning of EU border infrastructures, from aerial surveillance to digital containment. While some examples (such as the EU–Libya surveillance nexus) are based on strong empirical documentation from field research and legal proceedings, others (such as the analysis of the EU AI Act) rely more on critical readings of legal texts and civil society reports warning of structural risks. This diversity of sources reflects the reality that many violations in the digital governance of migration remain underreported or inaccessible through conventional data.

4.3. Phase I – At Sea: Interception

4.3.1. Surveillance, Jurisdiction and the Fragmentation of Non-Refoulement

At sea, when a migrant vessel is intercepted, a complex web of legal regimes come into play:[267]

- International maritime law*: which imposes a duty to rescue persons in distress.*[268]
- Human rights law and International Refugee Law*: which prohibits torture, inhuman or degrading treatment, and guarantees access to asylum procedures and protection against return, better known as the principle of non-refoulement.*[269]

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[267] Itamar Mann, *'Interception at Sea'* (MOBILE Working Paper Series No 7, University of Copenhagen, 2023) https://mobilitylaw.ku.dk/working-papers/ accessed 3 July 2025

[268] *United Nations Convention on the Law of the Sea* (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 3, art 98.; *International Convention for the Safety of Life at Sea* (adopted 1 November 1974, entered into force 25 May 1980) 1184 UNTS 278, ch V, reg 33; *International Convention on Maritime Search and Rescue* (adopted 27 April 1979, entered into force 22 June 1985) 1405 UNTS 97, ch 2, paras 2.1.9–2.1.10.;

[269] *Convention Relating to the Status of Refugees* (adopted 28 July 1951, entered into force 22 April 1954) 189 UNTS 137, arts 31, 33; *European Convention on Human Rights* (adopted 4 November 1950, entered into force 3 September 1953) ETS No 5, art 3; Protocol No 4, art 4. See also *Hirsi Jamaa and Others v Italy* App no 27765/09 (ECtHR, 23 February 2012)

The following analysis unfolds in three interconnected layers: first, the surveillance infrastructure that enables detection without intervention; second, the legal ambiguity that surrounds jurisdiction and interception decisions; and third, the ways in which these practices contribute to the (dis)protection of the migrant at sea.

A. The Surveillance Architecture: Who Sees, Who Acts

The moment a migrant vessel is detected by aerial or satellite surveillance—what might be called *surveillance detection*[270]—constitutes a legally and politically significant threshold in the EU's maritime techno-borderscape. It is this moment when the presence of human life becomes known to an EU actor – whether a MS or Frontex – yet remains unaccompanied by an enforceable duty to protect. From this point, the architecture of (dis)protection materialises decisions are made as to whether to intervene or delegate.

Under the EUROSUR and Frontex Regulations,[271] EU border authorities are enabled and encouraged to carry out real-time surveillance far beyond the Union's territorial waters. Although surveillance technologies enable real-time monitoring, surveillance actors – whether Frontex or MS – argue that *detection does not entail jurisdiction.*[272] It must be noted at this stage that existing secondary law does not explicitly require action upon detection. EUROSUR's mandate focuses on "situational awareness"[273] and the Schengen Borders Code merely states that border controls must be conducted *in full respect of fundamental rights*[274] – a broad provision that leaves room for discretion without accountability.

Yet, as Mann and Papastavridis argue, awareness of distress at sea—when combined with operational capacity—should trigger obligations under international law.[275]

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paras 113–137; *Convention Against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment* (adopted 10 December 1984, entered into force 26 June 1987) 1465 UNTS 85, art 3.

[270] While the term is used in the field of security risk assessment to describe the detection of surveillance itself, this thesis adapts it to refer to the moment when the State detects a migrant vessel via surveillance, a legal threshold that prompts decisions with significant human rights implications. See e.g. *ScienceDirect*, 'Surveillance Detection' https://www.sciencedirect.com/topics/computer-science/surveillance-detection accessed 3 July 2025.

[271] EBCG Regulation (EU) 2019/1896

[272] Efthymios Papastavridis, *The Interception of Vessels on the High Seas: Contemporary Challenges to the Legal Order of the Oceans* (Hart Publishing 2014) 290

[273] EBCG Regulation (EU) 2019/1896, art 18

[274] Schengen Borders Code) [2016] OJ L77/1, Art 4.

[275] See Mann, *'Interception at Sea'* (n 230); Papastavridis (n 236).

This lack of legal obligation is reinforced by the fragmentation of roles between Frontex and MS. Frontex operates only under the operational control of a MS and is not authorised to initiate search and rescue (SAR) unless instructed.[276] However, under Art. 46 of its Regulation, it must suspend activities if serious fundamental rights violations occur, a safeguard that has rarely been invoked in practice.[277] Meanwhile, the SBC,[278] CFREU,[279] and Frontex's Fundamental Rights Strategy[280] require respect for *non-refoulement*, yet they offer no procedural guarantees tied to the moment of *surveillance detection*.

Moreover, the act of surveillance itself is not neutral. Targeting of vessels based on heat signatures, algorithmic filters, or pre-determined risk assessments enables forms of racialised filtering and discriminatory profiling.[281] This violates the right to privacy[282] and the principle of non-discrimination.[283] Consequently, the neutral regulation of surveillance becomes a mechanism to sort, exclude, and redirect. This paradox lies in its simultaneous surveillance hyper-visibility and legal invisibility: migrants are seen, but not protected; known, but not rescued yet.

B. Jurisdictional Crossroads: The Legal Consequences

If *surveillance detection* marks the entry point of the EU's maritime techno-borderscape, then the moment that follows – when a decision must be made to act, intervene, or transfer responsibility – constitutes the jurisdictional crossroads: the moment in which legal responsibility is triggered through surveillance-based awareness and operational capacity.

At this stage, the central legal question is: who holds jurisdiction once a migrant vessel has been detected but not yet intercepted? Under Article 1 ECHR,[284] States are obliged to secure the rights of individuals *within their jurisdiction*, a principle traditionally tied to territorial presence. However, the ECtHR has recognised that extraterritorial jurisdiction arises when a State exercises effective control,

[276] EBCG Regulation (EU) 2019/1896, arts 10(1), 37(4).
[277] Ibid, art. 46
[278] Reg (EU) 2016/399, art 4.
[279] **CFREU** [2012] OJ C326/391.**, art 19(2)**
[280] Frontex, *Fundamental Rights Strategy* (adopted 7 June 2021) https://prd.frontex.europa.eu/document/fundamental-rights-strategy/ accessed 9 July 2025, 10.
[281] Wilton Park, *Human Rights Law at Sea: Report of Wilton Park Conference WP3112* (January 2023) 3–4.
[282] *ECHR* adopted 4 November 1950, entered into force 3 September 1953) ETS No 5, art 8.; *CFREU*[2012] OJ C 326/391, art 7.
[283] Ibid, *ECHR*, art 14; Ibid, CFREU, art 21.
[284] Ibid, ECHR, art.1

either over a territory (as in *Loizidou v Turkey*)[285] or an individual (as in *Al-Skeini v UK*).[286] In maritime contexts, where borders are fluid and actors are remote, the latter—personal jurisdiction—is particularly relevant.

In the landmark case of *Hirsi Jamaa and Others v Italy*,[287] the ECtHR held that Italy had exercised jurisdiction by intercepting a migrant vessel on the high seas and transferring individuals onto Italian naval ships, thereby assuming control.[288] The Court made clear that jurisdiction is triggered not by geography but by factual control**,** and that this control activates obligations under the ECHR, including the prohibition of refoulement,[289] and the right not to be subject to collective expulsion.[290] Similarly, in *M.A. and Others v Cyprus*,[291] the Court recognised that even *surveillance-based awareness* and coordination of return, without physical interception, could be sufficient to establish jurisdiction.

Yet, despite this legal clarity, jurisdiction is often strategically denied**.** The current EU border regime allows for a fragmentation of legal responsibility between actors—between Frontex and the MS, between the detecting party and the intercepting one, and between operational awareness and formal legal recognition. As discussed in Chapter 3, this is a structural feature of the system, not a flaw. The very design of the EUROSUR system, the shared responsibility model of Frontex operations, and the externalisation of interception to third countries, enables what can be called "remote jurisdiction without rights"**.**

This fragmentation was starkly illustrated in the recent judgment *S.S. and Others v Italy* (2025),[292] where the ECtHR declined to find jurisdiction, despite Italy's clear operational coordination with Libyan authorities during the interception of a migrant vessel detected by EU surveillance assets. The Court's refusal to recognise Italian jurisdiction, even in the presence of evidence that Italian Maritime Rescue Coordination Centres (MRCCs) had guided the interception. This decision has been widely

[285] *Loizidou v Turkey* (1996) 23 ECtHR 513
[286] *Al-Skeini and Others v UK* [2011] ECtHR 1093.
[287] *Hirsi Jamaa and Others v Italy* [2012] ECtHR 183
[288] Ibid, paras 74-82.
[289] ECHR, art.3
[290] Protocol No 4 to the Convention for the Protection of Human Rights and Fundamental Freedoms [1963] ETS No 46, art 4.
[291] *M.A. and Others v Cyprus* App no 41872/10 (ECtHR, 23 July 2013) paras 102–111.
[292] *S.S. and Others v Italy* (dec), App no 21660/18 (ECtHR, 20 May 2025) [Section I] https://hudoc.echr.coe.int/eng?i=002-14474 accessed 9 July 2025.

criticised for undermining the principle of effective protection and allowing a policy of jurisdictional evasion through digital and institutional outsourcing.[293]

C. The Fragmentation of Non-Refoulement in Practice

After the legal–operational threshold, a series of pathways unfold—each with distinct consequences:

- The first possibility is intervention and rescue, followed by disembarkation in an EU port and access to procedures. While legally straightforward under international maritime and refugee law, this scenario is increasingly rare in practice. MS frequently postpone authorisation for disembarkation, citing capacity constraints or political sensitivities.[294] Meanwhile, Frontex lacks a legal mandate to assume responsibility for rescued persons, and instead operates in support of MS authorities.[295]

  This dynamic is further complicated by recent legislative developments under the AMMR**.** The Regulation clarifies that disembarkation following a SAR operation does not constitute irregular entry**,** and that the MS where disembarkation occurs assumes responsibility for examining protection claims for a period of 12 months**.**[296] While this provision was introduced to close previous jurisdictional gaps and promote legal clarity, its practical impact is constrained by the limited scope of mandatory solidarity. The Regulation introduces the notion of "migratory pressure" as a condition triggering support from the EU's Annual Solidarity Pool,[297] but the activation of such mechanisms remains largely discretionary and politically mediated.[298]

- A second possibility involves delegating the interception and post-detection response to a third country**,** such as through formal cooperation frameworks **or** informal maritime coordination**.** This practice has long been used, but it is now explicitly codified and encouraged in the

[293] Itamar Mann, 'S.S. and Others v Italy: Killing by Omission, Confirmed by Design' (EJIL:Talk!, 19 June 2025) https://www.ejiltalk.org/s-s-and-others-v-italy-killing-by-omission-confirmed-by-design/; Violeta Moreno-Lax, 'S.S. and Others v Italy – Or Doubling Down on Banković' (EJIL:Talk!, 19 June 2025) https://www.ejiltalk.org/ss-and-others-v-italy-or-doubling-down-on-bankovic/ both accessed 9 July 2025.
[294] Papastravridis (n X), 299-300.
[295] DeBorder Collective, 'Systemic Unaccountability at the EU's External Border: Missed Opportunities of the European Ombudsperson's Decision on Frontex's SAR Role and Obligations in the Aegean Region' (DeBorder Collective, 10 April 2024) https://debordercollective.org/updates/unaccountability-eu-borders-ombudsperson-frontex/ accessed 9 July 2025.
[296] Regulation (EU) 2024/1351 on Asylum and Migration Management [2024] OJ L1351, art 33.
[297] ibid art 2(24).
[298] ibid arts 58–61.

AMMR, which frames the external dimension of EU migration policy as a cornerstone of "comprehensive management."[299] Under Article 5 AMMR**,** MS and EU institutions are called to pursue "*tailor-made and mutually beneficial partnerships*" with third countries, including arrangements concerning returns, irregular migration control and capacity building.[300]

Crucially, the AMMR links this external engagement with internal mechanisms such as the assessment of migratory pressure under Article 10(2)(b), implying that the extent to which a MS cooperates with third countries may shape the support it receives through solidarity mechanisms.[301] This creates a perverse incentive structure**:** the more a State externalises, the more "solidarity" it may claim for itself, regardless of the human rights consequences. Although the Regulation insists on full respect for fundamental rights, it does not provide binding guarantees to ensure that returns coordinated with third countries comply with *non-refoulement* obligations or that migrants will have access to effective remedies, fair procedures, or humane treatment in the receiving State.[302]

- A third scenario involves non-intervention or strategic delay, often framed through operational limitations or jurisdictional ambiguity. Despite real-time detection through aerial and satellite systems, States may postpone action, awaiting another actor—whether the flag State, another Member State, or even a commercial vessel—to take responsibility. Under the **AMMR,** jurisdictional fragmentation is institutiosionalised, normalising externalisation and tying solidarity to discretionary triggers like 'migratory pressure'.[303] Although presented as a coherent legal framework, it leaves operational discretion unbounded**.**

All these pathways—rescue, delegation, delay—have one thing in common: they result from structural choices embedded in EU law. The **A**sylum Procedures Regulation[304] and the Return Border Procedures

[299] Ibid, art.5
[300] ibid art 10(2)(b).
[301] Ibid, Recital 12.
[302] Steve Peers, 'The New EU Asylum Laws: Taking Rights Half-Seriously' (2024) EU Law Analysis https://eulawanalysis.blogspot.com accessed 9 July 2025.
[303] Regulation (EU) 2024/1351 on Asylum and Migration Management [2024] OJ L1351, arts 5, 10(2)(b), 58–61; see Tsourdi, 'Funding the New Pact… Symbolic Politics or Structural Shifts' (Odysseus, 13 October 2024) https://eumigrationlawblog.eu/funding-the-new-pact-on-migration-and-asylum-symbolic-politics-or-structural-shifts-in-the-policies-implementation-design/ accessed 9 July 2025
[304] Regulation (EU) 2024/1348 establishing common procedures for international protection in the Union (Asylum Procedures Regulation) [2024] OJ L1348/1, arts 41–43

Regulation[305] now allow for accelerated refusal procedures and broader use of the safe third country concept, even at the border or during disembarkation.[306] Within this fragmented legal architecture, the principle of non-refoulement becomes operationally deactivated.

A final, often obscured, dimension of this fragmented architecture is the persistence of pushback practices—physical or operational actions aimed at preventing entry without individual assessment, often conducted without documentation or oversight.[307] These expulsions, carried out at sea or immediately upon arrival, frequently escape statistical reporting, thus becoming forms of invisible violence within a legal regime that prioritises deterrence over protection. As noted in various expert submissions and jurisprudential critiques, pushbacks not only deny access to asylum procedures**,** but often entail violations of Article 3 and Article 13 ECHR,[308] especially where there is no opportunity to seek redress or challenge removal.[309]

This invisibilisation is exacerbated by the digitalisation of borders: surveillance technologies enable detection without registering presence, while biometric systems at disembarkation may process individuals as 'illegal entrants' without ever recognising them as rights-holders.[310] In this context, pushbacks do not simply operate as isolated breaches—they are embedded in the techno-legal infrastructure of non-entrée**,** normalised through EU practices and left unaddressed by recent legislative reforms.[311] The border, once again, becomes a site where protection is rendered optional, and where (im)mobility is managed through expulsion rather than recognition.

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[305] Regulation (EU) 2024/1349 on return border procedures [2024] OJ L1349/1, arts 6–10.
[306] Regulation (EU) 2024/1348 establishing common procedures for international protection in the Union (Asylum Procedures Regulation) [2024] OJ L1348/1, arts 41–43; Regulation (EU) 2024/1349 on return border procedures [2024] OJ L1349/1, arts 6–10.
[307] European Parliamentary Research Service, *Pushbacks at the EU's external borders* (Briefing, European Parliament, March 2022) https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/738191/EPRS_BRI(2022)738191_EN.pdf accessed 10 July 2025.
[308] ECHR, art 3 and 13.
[309] N Magugliani and others, 'Submission to the UN Special Rapporteur on the Human Rights of Migrants' Report on Pushback Practices and Their Impact on the Human Rights of Migrants' https://www.ohchr.org/sites/default/files/Documents/Issues/Migration/pushback/Joint_ICHR_NUIG_GLAN_Submission.pdf accessed 10 July 2025; S Carrera, 'The Strasbourg Court Judgement N.D. and N.T. v Spain. A Carte Blanche to Push Backs at EU External Borders?' (2020) RSCAS 2020/21, European University Institute, 2.
[310] V Kapogianni, 'The Reverberations of the Rise of Fencing Border Regimes: Pushbacks, Detention and Surveillance Technologies' (International Law Blog, 21 November 2022) https://internationallaw.blog/2022/11/21/the-reverberations-of-the-rise-of-fencing-border-regimes-pushbacks-detention-and-surveillance-technologies/ accessed 10 July 2025.
[311] A Pijnenburg, 'From Italian Pushbacks to Libyan Pullbacks: Is Hirsi 2.0 in the Making in Strasbourg?' (2018) 20(4) *European Journal of Migration and Law* 396, 410.

4.3.2. Case Example: The EU-Libya Surveillance Nexus

Since 2017, the Central Mediterranean has become the epicentre of Europe's externalised border regime**.** The EU–Libya Surveillance Nexus exemplifies this configuration: a transnational system in which EU institutions and MS maintain control through data, aerial oversight and funding, while legal responsibility is systematically outsourced to a third State with a well-documented record of abuse.

The cooperation is underpinned by a series of formal and informal agreements, most notably the Italy–Libya Memorandum of Understanding, (MoU - 2017)[312] and EU funding schemes channelled through the Emergency Trust Fund for Africa (EUTF)[313] and, more recently, the NDICI – Global Europe instrument**.**[314] Between 2015 and 2025, the EU allocated over €500 million to migration-related activities in Libya, including border control infrastructure, training and equipment for the Libyan Coast Guard, and support for detention and return operations.[315] This financial and technological backing facilitated the operational deployment of EUROSUR, Frontex surveillance aircraft, satellite coordination systems, and real-time data-sharing protocols.[316]

Framed as humanitarian rescue, the actual practice reveals a more troubling logic: aerial assets operated by Frontex or national forces detect migrant vessels, but rescue coordination is delegated to Libyan authorities**,** who conduct interceptions and return people to detention centres. According to OHCHR (2024) and Amnesty International (2025), this coordination occurs even when Libya lacks a unified SAR capacity**,** and despite mounting evidence of systematic practices which includes torture, extortion, rape, and enforced disappearance **i**n Libyan detention centres, without access to a fair trial.[317]

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[312] *Memorandum d'intesa sulla cooperazione nel campo dello sviluppo, del contrasto all'immigrazione illegale, al traffico di esseri umani, al contrabbando e sul rafforzamento della sicurezza delle frontiere tra lo Stato della Libia e la Repubblica Italiana* (firmato il 2 febbraio 2017) https://www.governo.it/sites/governo.it/files/Libia.pdf accessed 9 July 2025.
[313] European Union Emergency Trust Fund for Africa (European Commission) https://trust-fund-for-africa.europa.eu/index_en accessed 9 July 2025.
[314] NDICI – Global Europe (European Commission) https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/programmes/ndici accessed 9 July 2025.
[315] European Commission, 'Libya – European Neighbourhood Policy' https://enlargement.ec.europa.eu/european-neighbourhood-policy/countries-region/libya_en accessed 9 July 2025.
[316] Frontex, 'Frontex's Response to the AI Report on Surveillance in Libya' (13 October 2020) https://www.statewatch.org/media/1399/frontex-response-ai-report-libya-surveillance-13-10-20.pdf accessed 9 July 2025.
[317] OHCHR, *Search and Rescue and the Protection of Migrants at Sea* (2024) 21–24 https://www.ohchr.org/en/documents/reports/search-and-rescue-and-protection-migrants-sea; Amnesty International, *Libya: Impunity Fuels Protracted Human Rights Crisis* (2025) MDE 19/9169/2025, 4. https://www.amnesty.org/en/documents/mde19/9169/2025/en/ both accessed 9 July 2025.

The consequences are staggering. Between 2017 and 2024, over 100,000 individuals were intercepted at sea and returned to Libya, where they faced arbitrary detention and abuse .[318] A policy paper from the Global Initiative Against Transnational Organised Crime revealed that 57.5% of migrants surveyed in Libya reported heightened risk of arbitrary arrest, while 47% expressed fear of indefinite detention in inhumane conditions**.**[319] *"Detainees were held in overcrowded, unsanitary conditions**,** often without access to toilets, clean water, or medical care**.** Facilities were infested with vermin, and many detainees reported being denied food, hygiene items and medical assistance for extended periods."*, reported ECCHR.[320]

Migrants intercepted at sea and returned to Libya face a systemic pattern of human rights violations. The prohibition of torture and inhuman or degrading treatment or punishment[321] is consistently breached through documented practices of beatings, sexual violence, extortion, and prolonged detention in unsanitary, overcrowded, and violent conditions. The right to liberty and security of the person[322] is violated through arbitrary arrest and indefinite detention without charge or trial**.** The lack of access to effective remedies and fair procedure**s**[323] further compounds these violations, as migrants have no legal recourse or procedural safeguards. The right to health and adequate conditions of detention[324] is undermined by the absence of clean water, food, medical care, and hygiene. Additionally, the principle of non-refoulement is circumvented through European coordination of returns to a country where individuals face a real risk of serious harm. Collectively, these practices amount to a regime of systematic (in)visibility, abandonment and abuse, operating through extraterritorialised control and delegated violence.

The gravity of the EU–Libya Surveillance Nexus is further underscored by recent developments at the ICC. On 18 January 2025, the Pre-Trial Chamber I issued an arrest warrant against Osama Elmasry

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[318] International Organization for Migration (IOM), *DTM Libya Migrant Report, Round 55: November–December 2024* (IOM 2025) 24–25 https://dtm.iom.int/reports/libya-—-migrant-report-55-november-december-2024 accessed 9 July 2025.
[319] Global Initiative Against Transnational Organized Crime, 'Libya: A Human Marketplace' (2022) cited in *Redacted Article 15 Communication to the ICC: Interceptions of Migrants and Refugees at Sea as Crimes Against Humanity* (ECCHR et al, 2023) 29 https://www.ecchr.eu/en/case/libya-crimes-against-humanity-icc/ accessed 9 July 2025.
[320] ECCHR and others, *Redacted Article 15 Communication to the ICC: Interceptions of Migrants and Refugees at Sea as Crimes Against Humanity* (2023) 31 https://www.ecchr.eu/en/case/libya-crimes-against-humanity-icc/ accessed 9 July 2025.
[321] ECHR, art 3; ICCPR, art. 7; CAT.
[322] ICCPR, art 4; ECHR, art. 5 ECHR
[323] ECHR, art. 6; ICCPR, art. 13
[324] ICESCR, art. 12; UN General Assembly, *United Nations Standard Minimum Rules for the Treatment of Prisoners (the Mandela Rules)* (adopted 17 December 2015) UN Doc A/RES/70/175.

Njeem, the former commander of Mitiga Prison in Tripoli, where thousands of migrants and detainees were subjected to systematic torture, rape, sexual violence, forced labour, and murder.[325]

4.4. Phase II – Upon Arrival: Identification

4.4.1. Hotspots and Biometric Sorting: Between Identification and the Suspension of Rights

The migrant's journey does not end upon arrival. After surviving interception at sea, a new stage of governance unfolds—one where territory is not synonymous with rights, and entry does not guarantee recognition. Upon disembarkation, individuals may encounter a humanitarian actor or a law enforcement officer, a rescue or a rejection. The legal and institutional ambiguity of the arrival moment has become a hallmark of the EU's external border regime, where the line between admission and exclusion is operationally blurred.

In some cases, migrants are supported by NGOs conducting Search and Rescue (SAR) operations, who provide initial medical care and assistance. However, in other instances, they may face immediate expulsion or informal refoulement practices. Notably, *pushbacks*—as mentioned in section 4.3.1.C—continue to occur along maritime and land borders. These practices are frequently undocumented, invisible in official data, and strategically externalised to obscure accountability.[326] The landmark judgment *N.D. and N.T. v. Spain*[327] illustrates the permissiveness of European jurisprudence in legitimising such practices. In 2020, the ECtHR Grand Chamber ruled that Spain's immediate return of two Sub-Saharan migrants from Melilla to Morocco did not violate the European Convention on Human Rights, arguing that the applicants had placed themselves in an unlawful situation. This decision has been widely criticised for endorsing the logic of border exceptionalism and undermining the prohibition of collective expulsions.[328]

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[325] ICC, *Corrected Warrant of Arrest for Mr Osama Elmasry / Almasri Njeem* (18 January 2025) ICC-01/11-149-US-Exp, including Dissenting Opinion of Judge Socorro Flores Liera (under seal, ex parte, only available to the Prosecution).
[326] N Magugliani and others, 'Submission to the UN Special Rapporteur on the Human Rights of Migrants' Report on Pushback Practices' https://www.ohchr.org/sites/default/files/Documents/Issues/Migration/pushback/Joint_ICHR_NUIG_GLAN_Submission.pdf accessed 9 July 2025.
[327] *N.D. and N.T. v. Spain* App no 8675/15 and 8697/15 (ECtHR, 13 February 2020).
[328] Sergio Carrera, 'The Strasbourg Court Judgement N.D. and N.T. v Spain: A Carte Blanche to Pushbacks at EU External Borders?' (Robert Schuman Centre EUI Working Paper RSCAS 2020/21).

For those not pushed back, arrival often means entry into the *hotspot* system: first reception facilities established under the 2015 European Agenda on Migration.[329] Located primarily in Greece and Italy, hotspots are designed as zones of identification, registration, and biometric data collection. Their purpose is ostensibly administrative, but in practice, they function as spaces of containment and categorisation. As Frances Webber argues, "crimes of arrival" are committed not only through acts of violence, but through bureaucratic regimes that strip people of their rights at the threshold.[330]

The recent case *J.A. and Others v. Italy*[331] before the ECtHR confirms these concerns. Tunisian sea migrants were detained for ten days in a hotspot under inhuman conditions, without access to legal information or judicial remedies. The Court found violations of Articles 3, 5 and 4 Protocol No. 4 of the ECHR, reaffirming that detention without legal basis and collective expulsions are incompatible with fundamental rights. Despite this ruling, systemic issues persist: overcrowded facilities, legal opacity, and the normalisation of "non-entry" zones where migrants remain legally invisible. "We feel in prison on the island", reported Amnesty international as a testimony of a migrant (im)mobilised in Samos hotspot.[332]

This architecture of invisibility is now reinforced by the *Screening Regulation*,[333] adopted in 2024 as part of the new PMA. The Regulation introduces a five-day pre-entry screening procedure at external borders, including preliminary health checks, identity verification, biometric registration (fingerprints and facial image), and security checks. While presented as a measure to streamline asylum and return procedures, the screening mechanism relies heavily on the legal fiction of non-entry, whereby migrants are physically present on EU territory but not considered to have legally entered. This fiction enables the suspension of procedural safeguards and facilitates accelerated border procedures with limited access to remedies.[334]

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[329] European Parliament, 'Hotspots at EU External Borders: State of Play' (Briefing, September 2020) https://epthinktank.eu/2020/09/29/hotspots-at-eu-external-borders-state-of-play/ accessed 9 July 2025.
[330] Frances Webber, *Crimes of Arrival: Immigrants and Asylum-Seekers in the New Europe* (Institute of Race Relations 2018).
[331] *J.A. and Others v. Italy* App no 21329/18 (ECtHR, 13 March 2023).
[332] Amnesty International, *Samos: "We Feel in Prison on the Island" – Unlawful Detention and Sub-standard Conditions in an EU-funded Refugee Centre* (EUR 25/8356/2024, 29 July 2024) https://www.amnesty.org/en/documents/eur25/8356/2024/en/ accessed 9 July 2025.
[333] Regulation (EU) 2024/1356 establishing a screening procedure at the external borders of the Union [2024] OJ L1356/1.
[334] Lyra Jakuleviciene, 'EU Screening Regulation: Closing Gaps in Border Control While Opening New Protection Challenges?' (Odysseus Blog, 28 June 2024) https://eumigrationlawblog.eu/eu-screening-regulation-closing-gaps-in-border-control-while-opening-new-protection-challenges/ accessed 9 July 2025.

The screening process affects not only adults but also minors. One of the most controversial changes under the revised *EURODAC Regulation*—also part of the Pact—is the reduction of the minimum age for biometric data collection from 14 to 6 years old.[335] While this is justified by the need to trace unaccompanied children and prevent trafficking, it raises serious concerns about proportionality, data protection, and child rights. Collecting sensitive biometric data from vulnerable minors—often without informed consent or adequate explanation—violates the principles of child-friendly justice and may expose them to future risks of surveillance, criminalisation, and misidentification. As Bianca-Ioana Marcu warns, the interoperability of EURODAC with other databases such as the SIS and the EES transforms the child from a subject of protection to an object of profiling.[336] As Rozakou notes, this is not simply a governance of presence, but a "ritual of bureaucratic purification", where legal subjectivity is processed through thresholds of suspicion.[337] For many, these procedures do not lead to protection but to exclusion, via inadmissibility decisions, Dublin transfers, or return procedures.[338]

Ultimately, the arrival phase of the migrant's journey is marked by a contradiction: while borders are technologically porous, rights are increasingly gated. Identification becomes a threshold of (dis)protection, and the legal architecture surrounding hotspots and screening facilities perpetuates structural (im)mobility.

2.4.1. Case Example. EU-funded HYPERION and CENTAUR Surveillance and Biometric Systems in Greece's Hotspots

The intensification of biometric and surveillance infrastructures across EU reception sites has reached unprecedented levels in recent years. Among the most controversial examples is the deployment of the *Hyperion* and *Centaur* systems in the so-called "Closed Controlled Access Centres" (CCACs) located in Leros, Samos and Kos, islands of Greece. These centres are well-known for being surrounded by an external NATO-type double security fences.[339]

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[335] European Commission, 'Amended Proposal for a Regulation on the Establishment of Eurodac' COM(2020) 614 final.
[336] Bianca-Ioana Marcu, 'Eurodac: Biometrics, Facial Recognition, and the Fundamental Rights of Minors' (EU Law Analysis, 2023) https://eulawanalysis.blogspot.com/2023/01/eurodac-biometrics-facial-recognition.html accessed 9 July 2025
[337] Heath Cabot and Konstantinos Rozakou, 'Rituals of Bureaucratic Purification: Asylum Screening and the Technologies of Suspension' in *Focaal–Journal of Global and Historical Anthropology*, vol 2021/90.
[338] Ibid.
[339] Refugee Support Aegean (RSA), 'In the Closed Controlled Access Centres (CCAC) on the Aegean Islands' https://rsaegean.org/en/ccac-aegean-islands-

Under the aegis of digitalising migration governance, *Hyperion* and *Centaur* were establish as surveillance system at CCAC. *Hyperion* functions as a centralised biometric and administrative database, recording extensive personal data from asylum seekers and migrants, including fingerprints, photographs, full names, nationalities, ages, and asylum file numbers, as well as their access to services such as food, healthcare, financial aid, and accommodation. The system also monitors entries and exits, medical records, and even diet, while a dedicated smartphone application delivers case-specific updates to migrants. *Centaur*, operates as a high-tech surveillance infrastructure, incorporating CCTV, thermal cameras, and drones**,** with footage potentially used to train behavioural AI algorithms. Although the full implementation of predictive analytics remains opaque, the system enables the real-time monitoring and profiling of individuals inside detention-like facilities.[340]

The financial origin of these technologies is intimately linked with EU support. Hyperion and Centaur were funded through the EU's Recovery and Resilience Facility and Internal Security Fund. Notably, €37 million were channelled from COVID-19 recovery funds into this surveillance architecture, raising questions about the EU's shifting priorities, allocating health and social recovery funding to biometric and carceral technologies at Europe's margins.[341] Yet the sophistication of these technologies has not translated into legal or ethical compliance. In April 2024, the Greek Data Protection Authority (DPA) imposed a record fine of €175,000 on the Ministry of Migration and Asylum for severe breaches of the General Data Protection Regulation (GDPR). The violations included the absence of a Data Protection Impact Assessment (DPIA), a lack of transparency in data processing practices, refusal to disclose processor contracts, and unclear explanations about system interoperability and the use of AI for behavioural analysis. These infringements not only exposed systemic irregularities but underlined the structural opacity in which surveillance is expanding within the EU's reception infrastructure.[342]

Consequently, the right to privacy, the protection of personal data, and the principle of dignity[343] have been exposed. The automation of access to shelter based on biometric verification can potentially result

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greece/#:~:text=In%20the%20Closed%20Controlled%20Access,assistance%2C%20medical%20care%20and%20interpretation. accessed 9 July 2025.

[340] Border Violence Monitoring Network, *Border Surveillance in Evros: Legality, Ethics and Human Rights* (April 2023) https://borderviolence.eu/uploads/document/file/437/Border-surveillance-in-Evros.pdf accessed 9 July 2025.

[341] Ibid.

[342] EDRi, 'Greek Ministry of Asylum and Migration Faces a Record-Breaking €175,000 Fine for the Border Management Systems Kentauros and Hyperion' (3 April 2024) https://edri.org/our-work/greek-ministry-of-asylum-and-migration-face-a-record-breaking-e175000-fine-for-the-border-management-systems-kentauros-hyperion/ accessed 9 July 2025.

[343] CFREU, art.7, 8, 1.

in exclusion, misidentification, and the loss of access to basic services in case of technical failure or data mismatch—particularly problematic for children, elderly migrants, or those with disabilities.

The physical architecture of the new CCACs—fences, turnstiles, remote locations, and barbed wire—reproduces carceral logics that blur the line between reception and detention. In the words of Médecins Sans Frontières' medical coordinator, "we are witnessing a deterioration of mental health linked to the chronic uncertainty, isolation, and hyper-surveillance of these environments".[344] Consequently, MSF has reported that many asylum seekers suffer from mental health problems and that their uncertain life situation in destination countries is the main contributing factor.[345]

As such, the Hyperion and Centaur mark a new frontier where visibility no longer ensures protection but produces exposure and control. Thus, the Greek hotspot model, underpinned by EU funding and legal indifference, exemplifies the shift from humanitarian reception to biometric containment. Migrants are no longer received—they are registered, profiled, tracked. In the name of security, the very act of seeking asylum is transformed into a biometric transaction, surrounded by walls, cameras, and algorithms. It is not only the right to move that is at stake, but the right to exist without being reduced to data.

4.5. Phase III – In the System: Bureaucratic Invisibility

4.5.1. Legal Uncertainty, Containment, Data Profiling

Once the asylum seeker is registered within the EU system, they enter a complex labyrinth of biometric control, predictive surveillance, and legal uncertainty. This stage of the journey is no longer characterised by physical barriers, but rather by a web of digital infrastructures that redefine mobility and protection through data. The revised Eurodac Regulation,[346] as part of the new PMA, transforms what was once an administrative database into a multifunctional tool for migration control, law enforcement, and security governance.

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[344] Médecins Sans Frontières (MSF), 'Sweden: Uncertain Life Situation Leads to Mental Health Distress among Asylum Seekers' (21 March 2024) https://www.msf.org/sweden-uncertain-life-situation-leads-mental-health-distress-among-asylum-seekers accessed 9 July 2025.
[345] Ibid.
[346] Regulation (EU) 2024/1358 of the European Parliament and of the Council of 10 April 2024 on the establishment of 'Eurodac'.

Upon entry, biometric data such as fingerprints and facial images are compulsorily collected, as we have previously observed. These data are no longer only used to determine the MS responsible for processing an asylum application under the Dublin III Regulation, but are now shared across an expanding web of interoperable EU-wide databases including SIS II, VIS, EES, and ETIAS.[347] Through this interoperability framework, Europol gains access to migrant data for the purposes of counter-terrorism and serious crime investigations, even when individuals have not committed any criminal offence.[348] The distinction between the asylum seeker and the suspect is dissolved within a digital system designed to pre-emptively identify threats through predictive profiling.

Again, this legal architecture gives rise to deep concerns about data protection, legal certainty, and the right to privacy.[349] The data extracted from asylum seekers are collected, processed and mobilised within what Canzutti and Aradau call "invisible data work," where individuals must perform bureaucratic tasks without transparency or adequate tools.[350] These data become building blocks of exclusion: determining access to protection, eligibility for services, and movement within EU territory. Misclassification, data errors, or misinterpretation of biometric or behavioural inputs can result in wrongful rejections or even forced returns.[351]

Moreover, the increased use of AI systems to automate aspects of asylum governance—including risk scoring, identity verification, and vulnerability assessments—raises critical concerns about discrimination and opacity.[352] The EU AI Act, was celebrated as a global milestone but has been widely criticised for exempting AI systems used in migration, law enforcement, and national security

[347] Niovi Vavoula, 'The Transformation of Eurodac from an Asylum Tool into an Immigration Database' (2024) EU Migration Law Blog https://eumigrationlawblog.eu/the-transformation-of-eurodac-from-an-asylum-tool-into-an-immigration-database/ accessed 9 July 2025
[348] Parliamentary Assembly of the Council of Europe (PACE), Recommendation 2298 (2024), para 6.3 https://pace.coe.int/en/files/31526/html.
[349] **(**EDPS), 'Opinion 4/2018 on the Proposals for two Regulations establishing a framework for interoperability between EU large-scale information systems' (2018**)** https://edps.europa.eu/data-protection/our-work/publications/opinions/opinion-interoperability-eu-information-systems_en accessed 9 July 2025
[350] Lucrezia Canzutti and Claudia Aradau, 'Collecting, Assembling, Ordering: Border Politics and the Invisible Data Work of Asylum' (2024) 42(7) *Security Dialogue*
[351] Valeria Ferraris and Eleonora Celoria, 'Eurodac Unmasked: The Dangerous Blurring of Asylum and Security' (2025) Border Criminologies Blog https://blogs.law.ox.ac.uk/border-criminologies-blog/blog-post/2025/03/eurodac-unmasked-dangerous-blurring-asylum-and-security accessed 9 July 2025
[352] FRA, 'Bias in Algorithms – Artificial Intelligence and Discrimination' (2022) 16–17 https://fra.europa.eu/en/publication/2022/bias-algorithms.

from key accountability mechanisms.[353] Dangerous technologies such as predictive analytics, emotion recognition tools, and AI-assisted lie detectors continue to be deployed at the border and within reception systems without adequate human oversight.[354]

These technologies are not simply tools—they are socio-technical systems that encode power asymmetries and reproduce structural forms of exclusion. As the #ProtectNotSurveil coalition warns, the AI Act codifies a dual regime of rights: one for EU citizens and another for racialised migrants, legitimising discriminatory surveillance in the name of security.[355] Migrants are not only made hyper-visible through biometric and algorithmic surveillance, but also bureaucratically invisible when errors, data opacity or system incompatibilities prevent access to legal remedies.[356]

From a human rights perspective, the current configuration of interoperable databases and AI-driven surveillance mechanisms violates several core rights enshrined in the CFREU. These include the right to human dignity**,** the right to respect for private and family life, the right to protection of personal data, and the rights of the child. [357]The expansion of Eurodac, the opacity of AI systems, and the interoperability framework create a system where asylum seekers are treated as pre-emptive security threats rather than rights-holders. This not only undermines the right to asylum but also corrodes the principle of non-discrimination by disproportionately targeting racialised and marginalised groups.[358] These violations are structurally embedded in a system that instrumentalises data as a tool of migration control, transforming asylum seekers from subjects of protection into objects of suspicion and containment.

Digital colonialism, as articulated by Ricaurte and Pfeifer, becomes fully visible at this stage.[359] Migrants from the Global South are subjected to intensified data extraction, profiling, and

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[353] European Parliament, 'Joint Statement: How the EU AI Act Fails Migrants and People on the Move' (13 March 2024) https://www.accessnow.org/press-release/joint-statement-ai-act-fails-migrants-and-people-on-the-move. Accessed 9 July 2025

[354] Petri Honken, 'Report on Artificial Intelligence and Migration' (European Parliament 2024) 11–13. https://rm.coe.int/report-artificial-intelligence-and-migration/1680b67b8a accessed 9 July 2025

[355] #ProtectNotSurveil Coalition, Joint Press Release (13 March 2024) https://www.accessnow.org/press-release/joint-statement-ai-act-fails-migrants-and-people-on-the-move/ accessed 9 July 2025

[356] Tara Polzer, 'Invisible Integration: How Bureaucratic, Academic and Social Categories Obscure Integrated Refugees' (2008) 21(4) *Journal of Refugee Studies* 476.

[357] CFREU, arts 1, 7, 8 24.

[358] CFREU, arts 18, 21.

[359] Paola Ricaurte, 'Data Epistemologies, The Coloniality of Power, and Resistance' (2019) 36(2) *Television & New Media*; Pfeifer, (n 53)

experimentation under the guise of migration management. The body of the asylum seeker is scanned, indexed, and inscribed within a European digital archive, yet their voice is often absent from decisions taken about them. Data colonialism here is not only about exploitation, but about control—controlling who moves, how they move, and whether they are granted legal subjectivity within the EU's techno-legal order. At this point in the journey, the migrant is no longer only governed by border guards, but by databases, algorithms, and inter-agency protocols. They are fragmented into data points and subjected to a governance regime that conflates mobility with risk. The right to seek asylum is no longer mediated through legal protection alone but through techno-legal infrastructures that reproduce uncertainty, control, and exclusion.

4.5.2. Case Example: Bureaucratic (Im)mobility in the Digital Asylum System

Empirical documentation by the Society of Civil Rights and legal scholars reveals that German authorities have routinely used smartphone metadata—such as location history and app usage—as proxies to assess credibility and origin.[360] However, this data is often taken out of context, with applicants unaware of the interpretation process, and with little ability to challenge adverse inferences. The Berlin Administrative Court ruled in 2021 that the extraction and use of smartphone data by the Federal Office for Migration and Refugees (BAMF) lacked sufficient legal safeguards and could not serve as valid evidence without further procedural guarantees.[361]

Although this practice was initially framed as exceptional and investigative, it is now embedded within administrative procedures, disproportionately affecting racialised applicants, especially those without formal identity documents. As Amnesty International notes, these technologies often operate under the assumption that asylum seekers are inherently deceptive and must be digitally 'proven true'.[362] Migrants must 'perform' legibility through digital evidence, often without the means, literacy, or knowledge to do so.

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[360] Civil Liberties Union for Europe, 'German Authorities' Invasive Searches of Asylum Seekers' Mobile Phones' (Liberties, 2 September 2020) https://www.liberties.eu/en/news/german-authorities-invasive-searches-of-asylum-seekers-mobile-phone/17827 accessed 9 July 2025.
[361] VG Berlin, Judgment 28 K 171.20 A, 24 February 2021.
[362] Amnesty International, *Europe: The EU Artificial Intelligence Act Fails to Protect the Rights of People on the Move* (March 2024) https://www.amnesty.org/en/documents/pol40/7654/2024/en accessed 10 July 2025.

The new EU AI Act**,** risks legitimising and expanding these harmful practices. Despite calls from civil society and international bodies, the final version of the AI Act introduces a separate legal framework for migration, law enforcement, and national security authorities, exempting them from core transparency and accountability requirements.[363] AI systems that have already demonstrated discriminatory outcomes—such as risk scoring tools, biometric categorisation systems, and emotion recognition technologies—remain permissible under the AI Act when used in migration contexts.[364]

Moreover, the use of AI-driven facial recognition at the EU's borders reveals how technological systems can reproduce racial bias under the illusion of neutrality. As as Dr Joy Buolamwini explains, AI learns from existing data—data that often overrepresents white, male faces and excludes BIPoC and trans individuals. This leads to significantly higher error rates for marginalised groups, turning facial recognition into a discriminatory tool. In the context of border control, systems like *iBorderCtrl* risk labelling racialised migrants as threats based on flawed assumptions. Despite these dangers, EU institutions continue to fund and deploy such technologies, often in collaboration with Frontex.[365]

The Pact on Migration and Asylum further reinforces this shift. While presenting itself as a modern, digitised system to 'streamline' asylum claims, it in fact embeds the very practices that produce uncertainty, delay, and exclusion. The Asylum Procedures Regulation introduces new accelerated border procedures, where biometric and digital identity checks determine the admissibility of a claim before substantive protection assessments are made.[366] Combined with the revised Eurodac Regulation**,** which expands the collection and retention of biometric and personal data (including of children from age six),[367] the asylum seeker is transformed into a data subject—processed, compared, and flagged through interoperable databases without meaningful control or oversight.

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[363] Access Now and #ProtectNotSurveil Coalition, *Joint Statement on the EU AI Act and Migration* (13 March 2024) https://www.accessnow.org/eu-ai-act-migration/. Accessed 9 July 2025

[364] EDRi, *Regulating Migration Tech: How the EU's AI Act Can Better Protect People on the Move* (2024) https://edri.org/our-work/regulating-migration-tech-how-the-eus-ai-act-can-better-protect-people-on-the-move/. Accessed 9 July 2025

[365] borderline-europe, *Artificial Intelligence at the EU's External Borders* (June 2024) https://www.borderline-europe.de/sites/default/files/projekte_files/2024_06_Artificial%20Intelligence%20at%20the%20EU's%20external%20borders_0.pdf accessed 9 July 2025.

[366] Regulation (EU) 2024/1347 of the European Parliament and of the Council of 14 May 2024 establishing a common procedure for international protection in the Union (Asylum Procedures Regulation) [2024] OJ L.

[367] Regulation (EU) 2024/1358 of the European Parliament and of the Council of 14 May 2024 on the establishment of Eurodac (recast) [2024] OJ L.

The lowering of the age for biometric data collection under the amended Eurodac Regulation from 14 to 6 years further amplifies the risks. As highlighted by legal scholars and digital rights organisations, such measures expose minors to disproportionate surveillance and potentially lifelong data processing without meaningful safeguards or clear proportionality assessments. The lack of age-specific guarantees and accessible information also undermines their ability to give informed consent and to contest automated decisions.[368] This raises serious concerns under Article 24 CFREU (right to privacy) and Article 12 GDPR (transparent communication), particularly in a context where the database interoperability among Eurodac, ETIAS, EES and SIS II enables a system of biometric surveillance by default.

This legal bifurcation reinforces a two-tier system of rights in the EU: one for citizens and another for migrants, especially racialised individuals seeking protection. In this techno-legal regime, the asylum seeker becomes simultaneously hyper-visible (through surveillance, biometrics, and profiling) and invisible (in access to remedies, legal clarity, and procedural guarantees). Their journey is marked by bureaucratic (im)mobility—where progress through the asylum system is determined less by law and more by algorithmic suspicion, data errors, and opaque decision-making.[369] This reflects a form of digital colonialism, where technologies developed under the guise of efficiency become instruments of control over racialised bodies and displaced populations.[370]

4.6. Conclusions

Tracing the migrant journey across the EU's maritime techno-border—from the open sea, to disembarkation, to the bureaucratic corridors of the asylum system—reveals more than a sequence of legal and institutional practices. It unveils a landscape shaped by fragmentation, discretion, and control, where the promise of protection is not absent, but dispersed and conditional.

What this chapter has exposed is not simply a failure to protect, but a deeper asymmetry of power embedded in the very design of the system. Every phase of the journey is marked by a form of (im)mobility**:** when movement is not blocked, it is delayed; when rights are not denied, they are

[368] Platform for International Cooperation on Undocumented Migrants (PICUM), *Children's Rights in the EU Pact on Migration and Asylum: Analysis and Recommendations* (October 2024) https://picum.org/wp-content/uploads/2024/10/PICUM-Analysis-Children-Rights.pdf accessed 9 July 2025.
[369] Petra Molnar (n 9) 33–38.
[370] Paola Ricaurte, 'Data Epistemologies, the Coloniality of Power, and Resistance' (2019) 5(1) *Television & New Media* 76; Pfeifer, (n 53).

suspended; when responsibility is not refused, it is deflected. The law appears present, yet inaccessible—its guarantees diffuse, its protections unevenly distributed. In this architecture, to be seen is not to be saved, and to arrive is not to be recognised.

This should invite us to pause. Because what we have mapped here is not an abstract regime—it is a lived reality for thousands of people. People like Sani Ladan, who dream of knowledge under the same moon, yet face a border that filters not only movement, but humanity itself.

We must ask ourselves: what kind of Europe are we building, when its borders are wired to detect movement but not suffering; when its systems are trained to read data but not dignity? The law has the capacity to protect—but as long as protection is engineered as an exception rather than a guarantee, structural immobility will remain the norm. And those who move will continue to do so in spite of the system, not because of it.

Chapter 5 – Conclusions and Outlook

There is nothing new about movement. From the beginning of human history, people have traversed oceans, deserts, forests and skies — driven by necessity, curiosity, hope, or fear. What is new, however, is the way in which movement has become a site of legal suspicion, technological governance, and political anxiety. That is why, what we often call a "migration crisis" is, in reality, a crisis of governance, imagination, and solidarity.

This thesis has followed the journey of the migrant across the EU's maritime techno-border — not to simply denounce technologies, but to understand how law and technology work together to structure (im)mobility as a condition of (dis)protection. From the legal production of movement in Chapter 2 to the mapping of surveillance infrastructures in Chapter 3, and the empirical trace of harm in Chapter 4, one thing has become clear: the problem is not the lack of law, but the way it is designed to filter, delay, and condition protection.

The migrant does not appear in front of the law as a full subject. They appear as data. As biometric traces, risk profiles, or unidentified vessels. Protection is not granted — it is scanned, processed, and often denied without a word. Technologies such as drones, satellites, Eurodac, or the EES do not act alone. They operate through legal frameworks that enable remote jurisdiction, operational opacity, and the outsourcing of responsibility. The law, far from resisting this, facilitates it. As Bigo argues, security rationalities have been embedded into legal design itself, transforming mobility into a threat to be governed before it materialises.[371]

In **Chapter 2**, we examined how human mobility is not a neutral or universal right, but a legally constructed and politically stratified condition. Drawing on Sheller, Salazar and Sharma, the chapter traced how law not only regulates but actively produces movement and (im)mobility, shaping the very subjectivities of those who cross borders.[372] This chapter was essential to respond to the first research question, as it laid the conceptual foundation to understand that mobility at sea is not chaotic, but *governed* — through selective visibility, categorisation, and conditional protection. It is here that the

[371] Didier Bigo, Sergio Carrera and Elspeth Guild, *Foreigners, Refugees or Minorities? Rethinking People in the Context of Border Controls and Visas* (Ashgate 2013).
[372] Sheller (n 6); Noel B Salazar, 'Migration and the Regime of (Im)mobility' (2020) 43 *Ethnic and Racial Studies* 124; Nandita Sharma, *Home Rule: National Sovereignty and the Separation of Natives and Migrants* (Duke University Press 2020).

migrant becomes not simply someone on the move, but someone whose movement must be *legitimated* through legal filters that often exclude more than they include.

Chapter 3 took us deeper into the legal and technological infrastructure that enables this selective governance of movement at the EU's maritime border. We explored how frameworks such as the SBC, EUROSUR, Eurodac, the Interoperability Regulations, among others, form a vast legal architecture that permits the deployment of technologies not just to observe, but to *anticipate and filter* migration.[373] These systems co-produce a *techno-borderscape*, where legal norms are embedded in surveillance infrastructures that normalise risk-based management and externalisation. The legal framing of migration as a matter of security and policing — rather than protection and care — showed how the EU is not only responding to mobility, but actively reshaping it through digital and legal means. This chapter directly answered the second research question, showing how law legitimises and enables exclusion through technological governance.

In **Chapter 4**, by following the migrant journey in three phases — at sea, upon arrival, and within the system — the chapter showed how legal protections are structurally deferred at every stage. At sea, we saw how surveillance and coordination replace rescue; upon arrival, how biometric procedures condition access to rights; and within the system, how data profiling and bureaucratic containment produce long-term invisibility.[374] The cases examined confirmed that the fragmentation of jurisdiction, the opacity of screening procedures, and the interoperability of data systems work together to immobilise those who are already vulnerable. What emerged was a system where protection exists on paper, but not in practice — not because law is absent, but because it is *designed to delay*. This chapter grounded the theoretical claims in concrete harm, affirming that the digitalisation of the maritime border is not merely a security project, but a structure of governance that transforms protection into an obstacle course.

Outlook

This thesis has shown that the digitalisation of the EU's maritime border is not only a matter of technology, but of legal design. As long as law continues to treat protection as an exception and

[373] Dijstelbloem (n 9)
[374] William Walters and Martina Tazzioli, 'Migration, Technology and the Politics of Visibility: The Management of Borderline Cases' (2021) 59 *Political Geography* 102638;

migration as a threat, no amount of innovation will make the border just. Technological infrastructures will continue to filter, delay, and pre-categorise lives unless their purpose is radically redefined.

Emerging frameworks such as the AI Act 2024 and the New Pact on Migration and Asylum risk reinforcing the very dynamics they ought to reform. Without centring human rights from the outset — not as an add-on, but as a design principle — we will keep building borders that are "smart" in function but blind in justice. As Pfeifer argues, the smart border reproduces colonial assumptions under the guise of efficiency.[375] The path forward lies in rethinking design itself: a border designed for dignity, not deterrence.

This calls for a deeper shift. From legal categories that reduce people to biometric entries, to databases that turn asylum into risk management — every layer of the current regime can be otherwise. The EU has the capacity to govern movement differently, to design systems that welcome, not filter; to build infrastructures that enable safe passage, not predictive rejection. But this requires moving from fear to solidarity — and from control to care.

[375] Pfeifer, (n 53)

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Annex

Figure 1. The Schengen Area and Third Countries Participating through Bilateral Agreements.

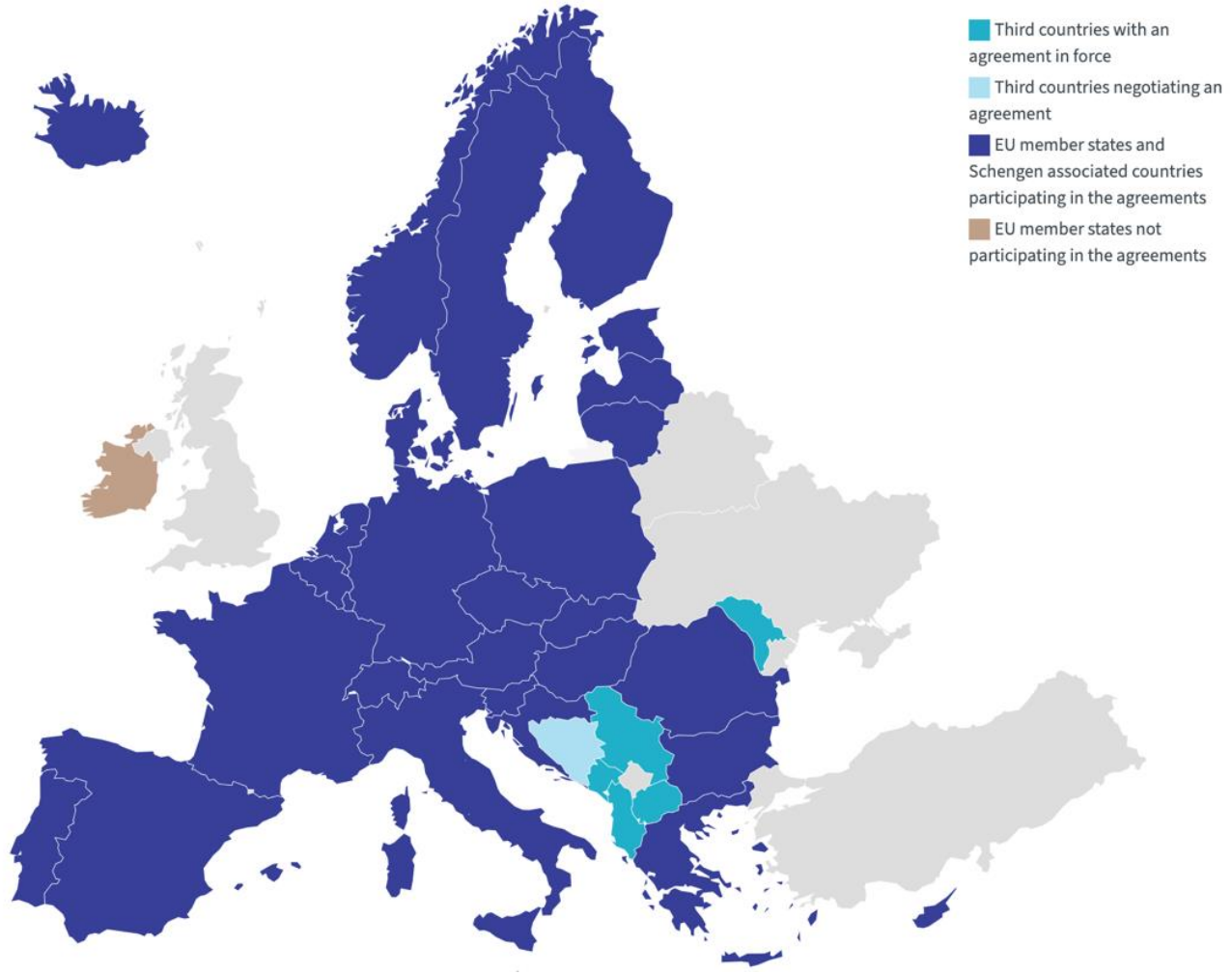

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Figure 2. Fragmentation of EU Migration Governance through Decentralised Agencies and Commission DGs (2025).

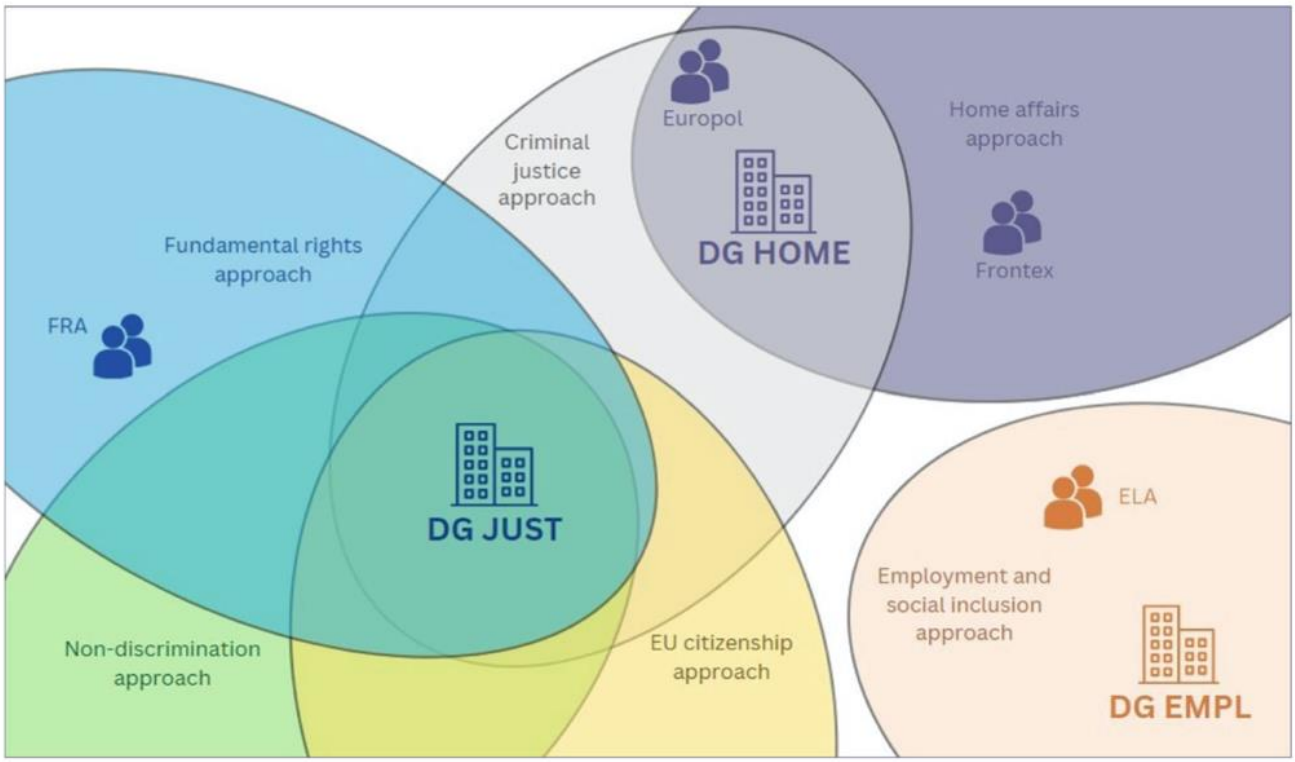

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Figure 3. RPAS Architecture and Operational Flow for Multi-Purpose Maritime Surveillance.

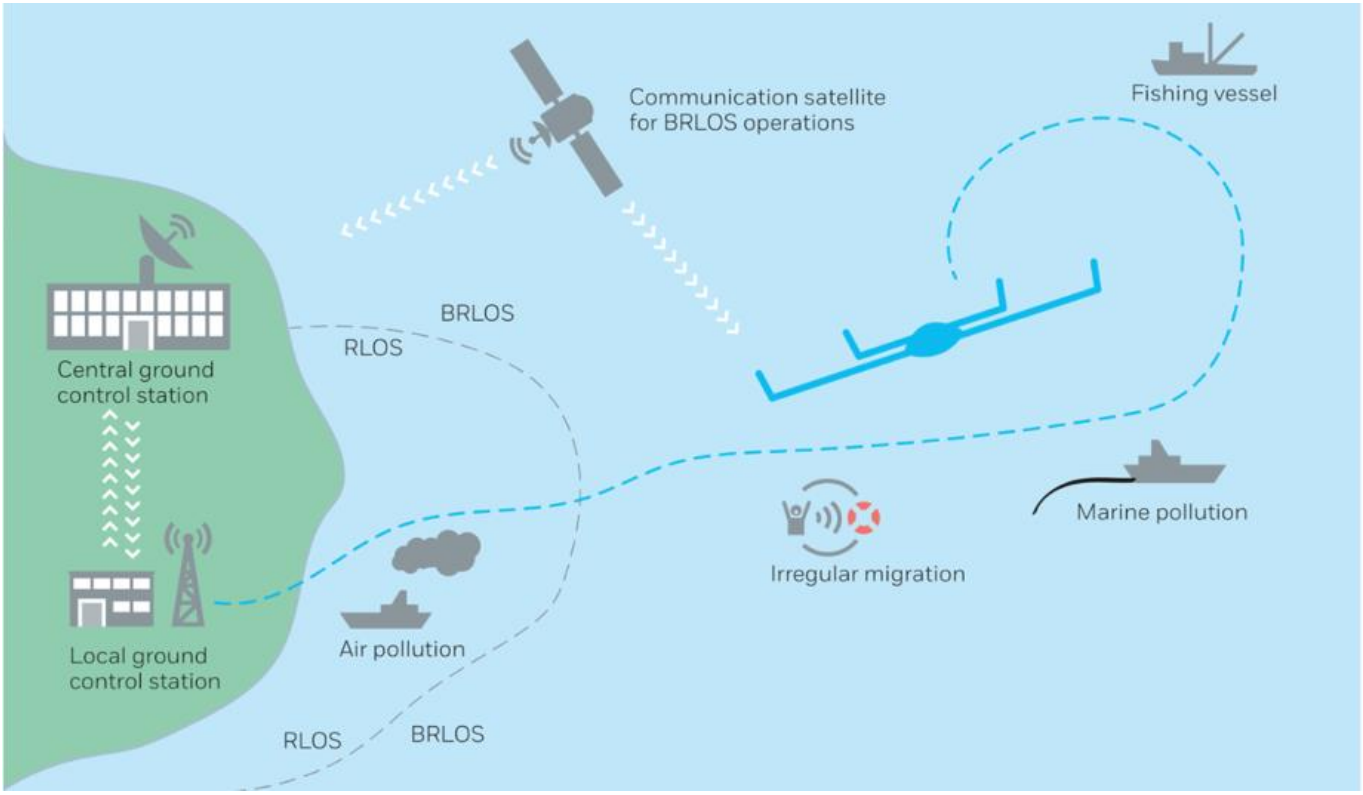

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Figure 4. Coastal surveillance architecture integrating radar and sonobuoy sensors.

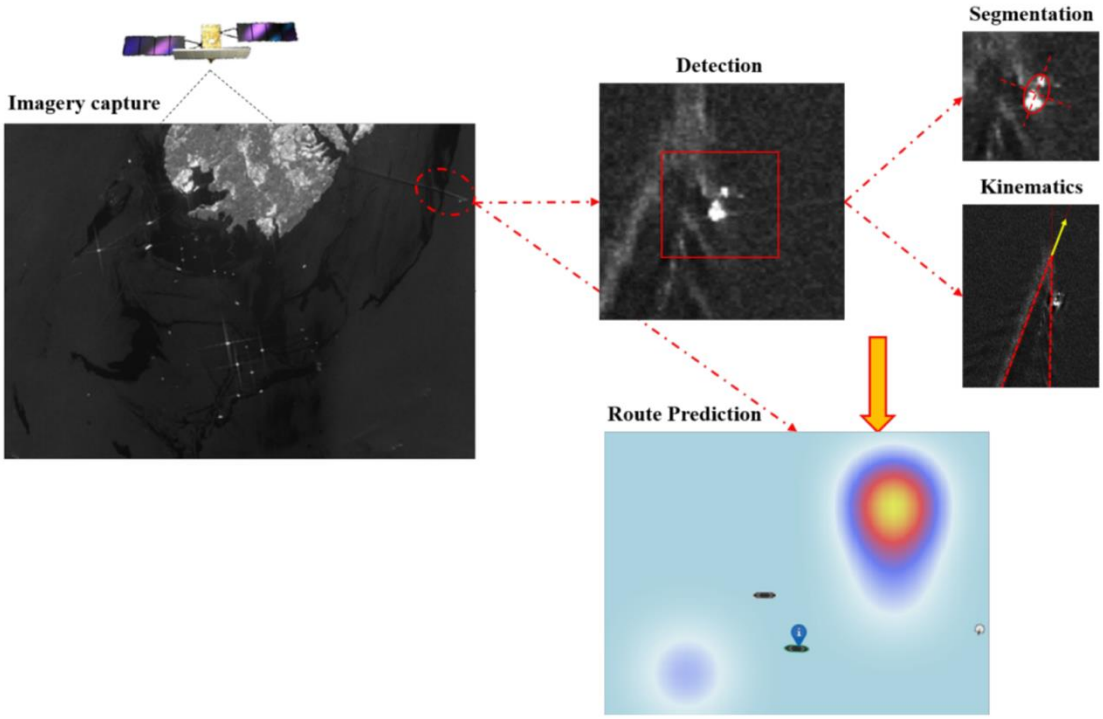

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Figure 5 – Operational structure of the EUROSUR Situational Awareness system. (2024)

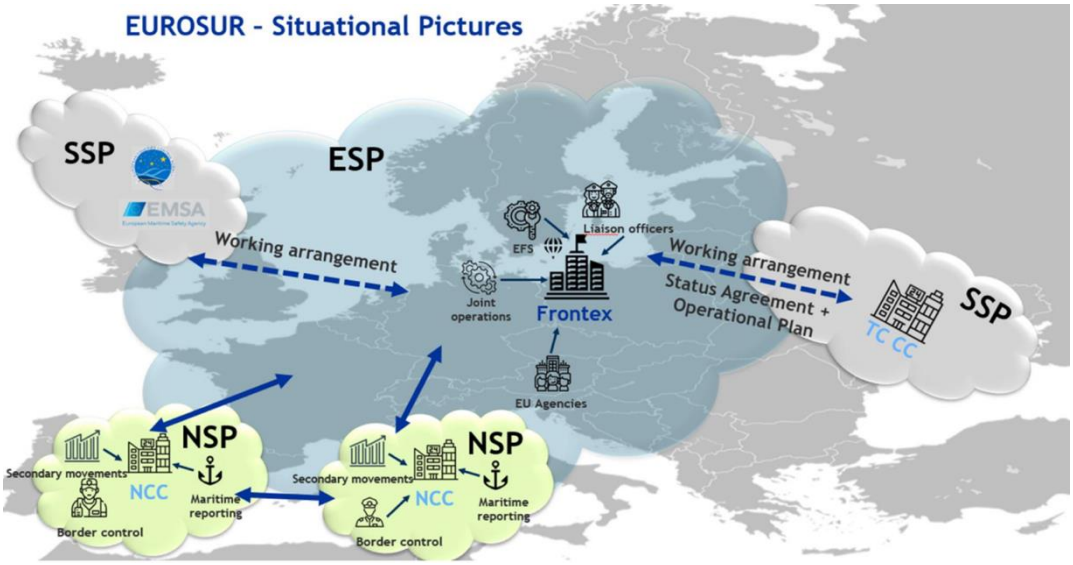

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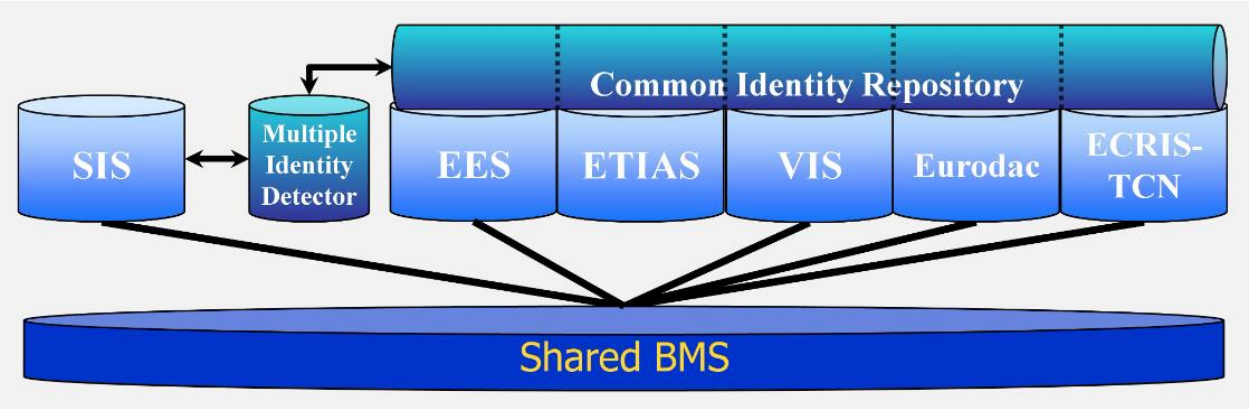
Figure 6 – Architecture of Interoperable Databases in the EU: Link Between SIS, CIR, BMS and the Multiple Identity Detector (MID).



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