



D1.3 – Ethics and Innovation Management

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Executive Summary

This document is the Ethics and Innovation Management plan (D1.3) defined under Task 1.5 of EURMARS (Project No. 101073985). This deliverable will assure compliance with ethical standards and best practices. Furthermore, it will describe how ethics considerations can drive innovation.

This deliverable outlines the procedures, future actions, and responsibilities of project partners that will ensure the satisfaction of all ethics requirements and that the results of the project are aligned to the market, for an optimal exploitation of EURMARS technologies.

This Ethics and Innovation Management plan describes instruments and actions proposed to ensure that any potential ethical risks raised by the project's activities and outputs are identified, minimised, mitigated and monitored. The main instrument proposed in this document is an Ethics Risk Assessment Table (Sect. 3.5), a risk assessment tool designed to identify and summarise risks within each task, classify them by impact severity, propose mitigation solutions and monitor their evolution. The tool was developed by TRI to be used in collaboration with all partners for each task as the project progresses. The Ethics Risk Assessment Table is built on 'Ethics by Design' principles that promote technical innovations to facilitate accountability (Sect 3.4).

The Ethics Risk Assessment Table is a distinct tool from the Risk Register Table used as a risk measuring instrument to identify project risks in D1.1 'Project Quality Management Plan (PQMP)', as the former is designed to have a focus on ethics risks and overlaps with the Risk Register Table only partially. As the project progresses, it is possible that ethics-related risks will be included in the Risk Register Table, as well, so that the latter accurately represents ongoing challenges for project meetings.

This document includes a schedule (Sect. 3.6) to obtain and deliver all documents related to ethics requirements identified during the project's initial stages.

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List of Abbreviations

Term	Description
AI	Artificial Intelligence
AI-HLEG	The High-Level Expert Group on Artificial Intelligence set up by the European Commission
ALTAI	Assessment List for Trustworthy AI, developed by the High-Level Expert Group on Artificial Intelligence
D#.#	Deliverable (as defined in the Grant Agreement)
EAB	Ethics Advisory Board
EbD	Ethics by Design
EBM	Executive Board Meeting
EC	European Commission
ED	European Dynamics Luxembourg SA and European Dynamics Advanced Information and Technology Systems SA
EIA	Ethics Impact Assessment
EU	European Union
GA	Grant Agreement
GDPR	General Data Protection Regulation
HE	Horizon Europe
HRIA	Human Rights Impact Assessment
IEEE	Institute of Electrical and Electronics Engineers
L	Likelihood (of ethics risks)
M#	Month (as defined in the Grant Agreement)
OECD	Organisation for Economic Co-operation and Development
OSINT	Open-Source Intelligence
PD	Personal Data
PIA	Privacy Impact Assessment
rL	Residual likelihood (of ethics risks)
rS	Residual severity (of ethics risks)
S	Severity (of ethics risks)
SIA	Social Impact Assessment/Societal Impact Assessment
SWOT	Strengths, Weaknesses, Opportunities and Threats
T#.#	Task (as defined in the Grant Agreement)
TRI	Trilateral Research Ltd.
UI	User Interface
UNESCO	United Nations Educational, Scientific and Cultural Organisation

1 Introduction

European Integrated Border Management faces continuous evolving maritime security challenges, humanitarian challenges, and dynamic hybrid threats present at Europe's borders. According to FRONTEX's "Risk Analysis for 2022", the European Union's border security challenges include increasing irregular migration flows and human trafficking, smuggling, drugs and arms trafficking, illegal fishing and others. The impact of the war in Ukraine and general migratory situation brought forward the need of increased cooperation among European countries to tackle security issues such as document fraud, cross-border crime, including trafficking of human beings and smuggling of illegal goods and weapons. The presence of military operations at EU/NATO's Eastern Flank borders is likely to have everlasting effects on European security, as authorities are on alert for the risk of conflict expanding, and weapons used affecting EU territory.[1]

In order to address these challenges effectively and ethically, authorities at the national, regional, and EU levels require new tools to facilitate collaboration, risk assessment, and decision-making. To this end, the EURMARS project proposes the creation of an advanced surveillance platform to improve the European Multi Authority Border Security efficiency and cooperation (EURMARS).

The core values of the European Union, as described in Article 2 of the Lisbon Treaty[2] and the EU Charter of Fundamental Rights[3], include human dignity, freedom, democracy, equality, rule of law and human rights. As such, all activities supported by the European Union that aim to ensure freedom, security and justice without internal borders, while also taking appropriate measures at its external borders to regulate asylum and immigration, and prevent and combat crime, and promoting scientific and technological progress, must adhere to the EU's ethical standards.[4]

With its proposal to the 2021 Horizon Europe Cluster 3 call on Border Management, the EURMARS consortium took on the responsibility to ensure that the project is compliant with high standards for research ethics (including the Horizon Europe Ethics Appraisal Procedure); data protection; human rights; and the assessment, minimisation, and mitigation of other risks.

1.1 Purpose of the Deliverable

This deliverable will assure compliance with ethical standards and best practices, and furthermore will describe how ethics considerations can drive innovation. This report is intended both for the public to understand how project partners will identify and address ethical concerns, as well as for the project partners to coordinate on common values and policies in support of responsible research and innovation.

This report is designed to ensure that EURMARS research can promote technological innovation for border security management, both for maritime borders and on the interface between European sovereign shorelines and maritime borders. Recognising its strong maritime component, the EURMARS project is in alignment with the European Union Maritime Security Strategy, and the Action Plan updating and revising the European Union Maritime Security Strategy (EUMSS) Action Plan, dated 16 December 2014[5] while complying with fundamental ethical principles and with European and national ethical standards and best practices.

1.2 Scope of the Deliverable

This document outlines the plan for ethics and innovation management during the EURMARS project, at least so far as can be foreseen at M6. It includes procedures for independent evaluation of project activities, human research, for promoting technical innovation through ethics by design and for continuously monitoring and responding to ethics risks throughout the project lifecycle. It is to be used as reference by all partners of the EURMARS project and is available for public dissemination.

1.3 Structure of the deliverable

This document structured into three main sections, as described below:

- Section 1 consists of an introduction on the deliverable’s purpose, scope, structure, and the description of the deliverable’s relationship with other deliverables and tasks.
- Section 2 provides an overview of the Ethical and Legal Framework within which the EURMARS project is developed.
- Section 3 describes the Ethics and Innovation Management plan, which is further organised into sub-sections:
 - An overview of ethics-related risks and the necessity of an Ethics and Innovation Management Plan (Sect. 3.1);
 - A description of the independent Ethics Advisory Board, including its justification, structure and operations (Sect. 3.2);

- A description of how the project meets the ethical requirements in its research activities, including the processing of Personal Data for research (Sect. 3.3);
 - A description of the project’s ‘Ethics by Design’ framework, including a discussion of how these practices drive innovation (Sect. 3.4); and
 - A description of the project’s ethics-related risk assessment methodology (Sect. 3.5) and procedures (Sect. 3.6), including a proposed schedule to obtain all documents related to the project’s ethics requirements.
- Section 4 summarizes the purpose and findings of this deliverable.

1.4 Relationship With Other Deliverables and Tasks

This deliverable describes work and planning carried out as part of EURMARS Task 1.5 ‘Ethics and Innovation Management’. The aim of this task is to ensure that proposed innovation is both sufficiently innovative as well as compliant with ethical standards and best practices, and to explore how the ethics considerations can drive innovation. This task includes processes for GDPR[6] compliance and accountability, ethics mentorship by TRI, the establishment of an Ethics Advisory Board (Sect. 3.2 below), and the preparation of the Ethics and Innovation Management plan described in this report.

This deliverable is closely linked to D1.1 ‘Project Quality Management Plan PQMP’ and D1.2 ‘Project Data Management Plan PDMP’, as all Work Package 1 ‘Project Management’ deliverables aiming to ensure the successful management, administration, coordination and execution of the project, and that the project progresses in accordance with the GA and expectations of the call.

As it is focused on ethics requirements, this deliverable was prepared in coordination with the four Work Package 7 deliverables. These deliverables describe in detail how the project meets EC ethics requirements, and are also products of work carried out as part of Task 1.5 ‘Ethics and Innovation Management’. D7.1 ‘H - Requirement No. 1’ details the recruitment and consent procedures used by EURMARS partners (and in particular VTT) for human research. D7.2 ‘H - Requirement No. 2’ includes the relevant approvals from ethics boards for research involving humans. D7.3 ‘POPD - Requirement No. 3’ describes the procedures that EURMARS partners will follow regarding the processing of personal data in compliance with the EU’s General Data Protection Regulation (GDPR)[6] and other relevant laws and regulations. D7.4 ‘AI - Requirement No. 4’ provides a human rights impact assessment for EURMARS technologies.

Moreover, Task 1.3 ‘Quality Assurance & Risk Management’ partners will liaise with project partners responsible for coordinating Task 2.4 ‘AI ACT Foresight Compliance, Social and Ethical Impact

Assessment'. Special attention should be given to coordination of these tasks with ethics requirements, according to the procedures documented here. In particular, Ethics by Design requirements (Sect. 3.4) will be instrumental in preparing for compliance with the forthcoming EU AI Act.[7]

Additionally, this deliverable imposes ethics requirements on Task 5.7 'Training & Ethics Monitoring', which concerns preparations for demonstrations of EURMARS technologies. These ethics requirements will need to be aligned with additional specifications and requirements from other project partners. The envisaged training programme will prepare border guards to use EURMARS technologies while ensuring ethical awareness and knowledge are increased.

2 Ethics and Legal Framework

The core values of the European Union, as shown in article 2 of the Lisbon Treaty[2] and the EU Charter of Fundamental Rights[3], include human dignity, freedom, democracy, equality, rule of law and human rights. To ensure that all research is conducted on a foundation of moral duty and obligation to adhere to European common values, EURMARS will adhere to the EU Code of Conduct for Research Integrity (ALLEA)[8] Ethics and Legal Framework and the HORIZON Europe Ethics Appraisal Procedure.[9]

The European Code of Conduct for Research Integrity (ALLEA) serves the European research community as a framework for self-regulation across all scientific and scholarly disciplines and for all research settings.[8]

The HORIZON Europe Appraisal Procedure is a process for assessing and addressing the ethical dimension of activities funded under the Horizon Programme. The evaluation focuses on scientific merit, the quality of the management and the potential impact of projects to EU members, individuals, or society as a whole. HORIZON Europe's Appraisal Procedure includes four main steps: Ethics Self-Assessment (conducted by the Applicant in the Application phase), Ethics Screening (conducted by Ethics experts and/or qualified staff in the Evaluation phase), Ethics Assessment (conducted by Ethics Experts in the Evaluation Phase), and ethics checks, reviews, or audits conducted by EC officials in the Implementation Phase.[9]

Ethical oversight in EURMARS will include an external Ethics Advisory Board. The board will be established, and have members appointed, in accordance with EC recommendations.[10], [11]

The EURMARS project, which aims to develop an advanced surveillance platform to improve the EUROpean Multi Authority Border Security efficiency and cooperation, supports through this initiative the EU's multiannual strategic policy for European integrated border management, in accordance with Article 8(4) of Regulation (EU) 2019/1896.[12]

The project's approach to AI ethics is informed by the work of the High-Level Expert Group on Artificial Intelligence (AI-HLEG). The AI-HLEG's 'Ethics Guidelines for Trustworthy AI' offers guidance for ethical development while fostering innovation.[13] These guidelines are revised and operationalised in the AI-HLEG's Assessment List for Trustworthy AI (ALTAI),[14] which is organised around respect for fundamental rights and seven principles ('requirements'):

- Human agency and oversight;
- Technical robustness and safety;
- Privacy and data governance;

- Transparency;
- Diversity, non-discrimination and fairness;
- Societal and environmental well-being; and
- Accountability.[14]

For the platform’s development of AI elements, project partners will follow EC guidance on AI development and use, as documented in the ‘Ethics By Design and Ethics of Use Approaches for Artificial Intelligence’.[15] This guidance harmonises well with the AI-HLEG ALTAI values, being based on recommendations of the AI-HLEG, EU-funded projects like SHERPA[16] and SIENNA[17] and international bodies such as IEEE, OECD and UNESCO.

To ensure that EURMARS is compliant with EU’s privacy and data regulations, the project will follow the General Data Protection Regulation (GDPR),[6] the UK Data Protection Act[18] the EU Cybersecurity Act,[19] and monitor and adhere to the provisions of the EU Data Act[20] and the EU AI Act[7] once they are adopted. The project will follow closely the EC guidance on ‘Ethics and Data Protection’ which includes guidance regarding the following main topics[21]:

- Pseudonymisation and Anonymisation
- Data Security
- Data protection by design and default
- Informed consent to data processing
- Personal data transfer, collection, deletion and storage
- Collecting data on children
- Use of previously collected data
- Data protection impact assessments
- Profiling, tracking, surveillance, automated decision-making

3 Ethics and Innovation Management Plan

3.1 Overview

The EURMARS consortium consists of 18 public and private entities working together to enhance border surveillance and European border guarding. The research undertaken by the EURMARS consortium will benefit the participants and European society as a whole, as it aims to foresee and prevent security risks at the EU border, to encourage inter-authority collaboration and to facilitate aid for refugees and other migrants or travellers in need of rescue or human rights protections. However, large-scale research projects such as these raise special issues regarding ethics and responsibility.[22], [26]. Responsible research and innovation for large, collaborative projects involving AI require active management in order to ensure that the various values and motives of contributors are harmonised. Fulfilment of this plan will ensure all partners have the tools necessary to successfully adhere to EC ethics requirements and follow best practices.

There are various ethical risks relevant to the EURMARS project, but all can be managed with sufficient planning. As the project proposes the development of a new enhanced border surveillance platform, partners will map, analyse, mitigate and monitor border technology-related ethics that may arise in the project such as challenges raised by the usage of Satellites, Unmanned Aerial Vehicles, Radar, CCTV, Infrared Cameras, Smart Cameras. For example: Smart Cameras make use of a range of algorithms to highlight items or events of interest. The algorithms can be used on the basis of a vague category of ‘abnormal behaviour’, derived by modelling similar behaviours identified priorly and introduced in a select dataset. Depending on the sample used, the detection of abnormal behaviour could potentially place disproportional focus on minorities.[28] Though due to the nature of EURMARS, the risk of this type of anomaly being introduced in the platform is very low, partners will take measures to ensure non-bias of the algorithms used in the platform development phases. These measures are described in detail by D7.4, due at M6 of the project.

Partners will follow Frontex best-practices for the use of these technologies for border surveillance. If the selected technologies to be included in the EURMARS platform will collect sensitive data (eg biometrics of humans identified by the system at sea or trying to cross on land), special procedures will be set in place to ensure the project is compliant with EU regulations.

Special attention will be given to use cases and potential scenarios which entail the engagement of human participants such as search and rescue operations. This is due to the fact that, once EURMARS is deployed for use outside of project scope, detected humans participants may constitute of special categories of persons (ie Asylum seekers and refugees, children, missing persons, the victims of trafficking or exploitation). Partners will ensure end-user trainings include

the following ethical principles: respect for and protection of fundamental rights and freedoms; Non-discrimination, or equal treatment of persons; Incorruptibility; Confidentiality and respect for privacy, a prohibition on torture and cruel, unusual or degrading treatment, Reputational issues, Restraint in the use of force.[28]

EURMARS project research and innovation concerns border guarding and security, which raise especially complex and multi-faceted ethical considerations, but the EURMARS consortium includes a dedicated ethics partner (TRI) and will supplement the perspectives of its partners by seeking input from stakeholders and the judgments of an Ethical Advisory Board (Sect. 3.2).

EURMARS research includes studies with human participants, but these participants are not from vulnerable groups (e.g. they are professionals, not children) and EURMARS partners will follow EC guidance by seeking ethics approvals, documenting informed consent, and observing best practices for the processing of Personal Data (Sect. 3.3).

Proposed EURMARS technologies include AI systems, which raise special ethical concerns, especially regarding human dignity, human responsibility and oversight, transparency, fairness, and accountability. However, EURMARS partners will employ an Ethics by Design (EbD) approach to identify areas of concern early and build innovative solutions to any challenges (Sect. 3.4). Furthermore, the EURMARS project planning includes substantial resources dedicated to AI Act foresight and compliance (T2.4 'AI ACT Foresight Compliance, Social and Ethical Impact Assessment'; D2.4 'AI Act Foresight Report and Blueprint, PIA, EIA and SIA assessment'). By committing these resources, EURMARS hopes to develop industry-leading technology with ethical foundations.

Finally, since EURMARS technologies will be deployed for border guarding and security they raise some extra human rights issues. Such issues are beyond the scope of this document, but will be addressed in Deliverable 7.4 'AI - Requirement No. 4'. These issues will be monitored continuously by TRI and the Ethics Advisory Board for the duration of the project.

All areas of ethical concern or risk will be tracked by means of an Ethics Risk Assessment Table that will serve as the basis of communication, planning and ethics mentorship between TRI, the Ethics Advisory Board, and other EURMARS partners (Sect. 3.5). TRI will continue to monitor, assess, and gather information about the ethical issues in EURMARS by means of this Table, clear communication with partners, and an established schedule for soliciting other information from partners (Sect. 3.6).

In summary, the EURMARS Ethics and Innovation Management plan is based on five pillars:

- Independent oversight of project activities by an Ethics Review Board.
- High ethical standards for research, especially with respect to human research participants.

- An ‘Ethics by Design’ approach to technical development that facilitates research as a driver of innovation.
- A collaborative risk assessment methodology for managing ethics risks during the lifetime of the project.
- A schedule to ensure timely information-sharing, interventions (if necessary), and delivery of project goals.

Each of these five themes will be described in greater detail below.

3.2 Ethics Advisory Board

Trilateral Research (TRI) shall supervise the execution of the plan outlined here, and will advise on ethical issues for the consortium. Due to the complexity of ethical issues pertaining to border guarding, it is advisable to seek independent review for ethics oversight by experts who are not affiliated EURMARS project beneficiaries. Therefore, an Ethics Advisory Board (EAB) will be formed to provide such oversight from M7 until the project’s end.

The EAB will be comprised of three experts, including a chairperson elected by its membership, and will conduct its business in line with EC advice on EABs.[11] EAB members will be asked to sign non-disclosure agreements so that they are able to provide independent oversight and advice on all ethical matters relating to EURMARS activities. In particular, EAB members will be encouraged to weigh in on the implementation of the procedures described below, regarding human research and the processing of Personal Data (Sect. 3.3), Ethics by Design principles (Sect. 3.4), ethics risk assessment (Sect. 3.5), and the collection of information on ethics-related practices from project partners (Sect. 3.6).

The EAB will meet quarterly with TRI and other project partners. At these meetings, the EAB will receive reports on project activities, with a focus on ethical considerations. EAB members will have the opportunity at these meetings to ask questions, raise objections, make suggestions and to discuss ethical issues raised by EURMARS activities. Finally, the EAB will prepare written reports detailing their assessments and recommendations for project partners.

The responsibilities for EAB activities will be set out in the Terms of Reference for the EAB. EAB members will be responsible for providing expert assessments of EURMARS project activities and communicating their recommendations to EURMARS project partners. These recommendations should be ‘facilitative’[11] and, wherever possible and appropriate, unanimous. TRI and other project partners will be responsible for clearly communicating project activities to the EAB and providing clear, timely answers to questions from EAB members. Project partners will also be

responsible for determining how to act on the recommendations of the EAB and for implementing those determinations.

3.3 Ethics in Research

TRI will collaborate with EURMARS partners to ensure that the project activities meet Horizon Europe's research requirements in line with the HE Ethics Appraisal Procedure.[10], [11]

During the proposal elaboration stage for EURMARS, TRI supported partners in the completion of the Ethics Self-Assessment required by HE, as a first step to ensure proposed activities are assessed accurately and adhere to rigorous ethical standards. TRI also worked collaboratively with all partners to complete the Ethics Issues Table, which was a starting point for the Ethics Self-Assessment procedure, focusing on the ethical dimension of the project objectives, methodology and likely impact of elements identified.

According to EC guidance on research ethics,[15] the main ethics issues for research involving humans are:

- the respect for persons and for human dignity
- fair distribution of benefits and burden
- the rights and interests of the participants
- the need to ensure participants' free informed consent (*with particular attention to vulnerable categories of individuals such as children, patients, discriminated people, minorities, persons unable to give consent, etc.*).

During the Ethics Assessment phase of the HE Ethics Appraisal Procedure, experts identified the additional safeguards that EURMARS project partners will need to implement. The objective of these steps is to support project partners in addressing the ethics issues raised by their research and if necessary to take preventive or/and corrective measures. EURMARS project partners were assigned additional reporting requirements in the form of the four Work Package 7 deliverables described in Sect. 1.4 above. Two of these deliverables (D7.1 'H - Requirement No. 1' and D7.2 'H - Requirement No. 2') concern informed consent and ethics board approvals for human research, such as the workshops described immediately below. The third deliverable (D7.3 'POPD - Requirement No. 3') concerns data protection, and will also be discussed below. The final deliverable (D7.4 'AI - Requirement No. 4') concerns human rights and will be addressed in the following subsections (3.4–3.6).

As the task leader for Task 1.5 ‘Ethics and Innovation Management’ and the partner responsible with overseeing ethics requirements during the project’s research phase, TRI will contribute to the safeguarding of the ethical values by addressing the following ethical requirements, along with project partners (Related to Research with Human Participants (D7.2) and Personal Data (D7.3)):

- Monitor and Advise on any safeguarding procedures and selection criteria used by partners to identify/recruit participants for research activities. (Research with Human Participants; D7.1).
- Copies of opinions/ approvals by the Ethical Advisory Board for the research with humans. (Research with Human Participants; D7.2).
- Clarification on the processing of the personal data (descriptions of technical, organizational and security measures, informed consent procedures) (Personal Data; D7.3).

3.3.1 Informed consent

EURMARS project activities include interactions with stakeholders, and in particular potential end-users, to collect information that inform the technical requirements of EURMARS technology and to assess prototypes. To this aim, various workshops and meetings will be organized throughout the duration of the project. Stakeholders will be invited to these workshops via emails that explain the purpose of the workshops and meetings, that participation is purely voluntary, and provide clear information on how Personal Data will be stored (contact details) for the project’s research purposes only. Workshops participants will also be informed that if they are interested and willing to participate in the workshops, we will ask them to sign an information sheet and consent form, indicating their willingness to participate in the workshops. The workshops may be online or face-to-face. Children, patients, or other vulnerable groups will not be included as participants or data subjects in EURMARS research.

One of these workshops was organised for the collection of end-user requirements in M4. Project coordinators followed the procedure described in the project’s proposal for these workshops. All project participants were employees of EURMARS project partners, and were respected and treated with dignity and worked collaboratively to ensure a fair distribution of benefits and burdens during this research stage. Stakeholders participated in the first workshop on a voluntary basis and were informed in advance that they were able to leave the workshop at any time without any negative consequences. During the workshop, the project coordinator ensured that the workshop would not result in discriminatory practices or unfair treatment and that a diverse cross-section of stakeholders from the consortium would be invited to the workshops and meetings, allowing all the opportunity to express themselves and raise any issues of concern. All future workshops will follow a similar approach to this first one.

Another workshop was organized for the alignment of project requirements and use cases development in M3, which engaged EURMARS project partners. Project coordinators followed the same procedure as the one previously outlined, in line with the procedures described in the project's proposal for these workshops.

As EURMARS technology takes shape, it will be tested in pilot scenarios now being developed (Task 5.1 'Pilots Definition: Scenario, Methodology and Test Plan'). These pilot scenarios will deploy prototypes of EURMARS technology to test its data-collection capabilities and procedures, its performance and in fictional threat scenarios and gather user feedback (Task 5.2 'Living Lab in Bulgaria', Task 5.3 'Demonstration in Cyprus', Task 5.4 'Demonstration in the UK', Task 5.5 'Cross-border Demonstration in Bulgaria/Romania', Task 5.6 'Evaluation, Benchmarking & Lessons Learned'). The ethics risks related to this pilot research are minor, since the human participants will be employees of EURMARS partners. Nevertheless, the Ethics and Innovation Management plan in this document includes safeguards for protecting human participants, safeguarding human rights, and processing Personal Data.

As best practice, TRI strongly recommends that all interviews/workshops/other interactions which include end-users or other stakeholders external to EURMARS partners be accompanied by informed consent forms with regards to the processing of Personal Data and participant information sheets. During the pilot tests mentioned above, project partners have agreed to verify in advance with TRI whether informed consent agreements are necessary.

3.3.2 Processing of Personal Data

Regarding Personal Data, the project coordinator collects and processes stakeholders' contact details, including their name, title, organisation, country, email address and phone number. The data are collected and processed for the purpose of informing stakeholders about the project and its results that may be of interest to them, consistent with Art. 37 of the GA. The list will be used to facilitate the selection and invitation of the included stakeholders workshops and meetings. The contact list was compiled with informed consent (GDPR Art. 6.1.f) or legitimate interest (Art. 6.1.f).[6] With every communication, stakeholders are also informed that they can be removed from the contact list if they wish without negative consequence.

To ensure compliance with GDPR[6] and data protection standards, project partners will collaborate on the preparation of a deliverable (D7.3) in which they:

- Clarify how the personal data that will be processed is relevant and limited to the research project (data minimization principle);
- Inform on technical and organizational measures implemented to safeguard the rights and freedoms of data subjects/research participants;

- Inform on security measures implemented to prevent unauthorized access to personal data or to the equipment used for data processing; and
- Describe any anonymization/pseudonymization techniques to be implemented.

During the project's first six months, EURMARS partners launched a survey with the goal to identify and understand specific end-user requirements related to the project's scope. Before distribution to end-users, the draft survey was internally reviewed by a selected set of project partners, project coordinator and TRI, as partner responsible with ethical compliance. The final survey was distributed to project end-users in November 2022. The end-user survey included a consent form and information sheet, and followed the procedure described in D7.1 'H – Requirement No. 1'.

To ensure compliance with data protection regulations, TRI will recommend to all partners using GDPR-compliant tools to collect, process, and store research subject's personal data, to check terms and conditions for all the service providers used during this project to process data to help mitigate risks for data subjects, encrypt research data and protect relevant keys/passwords, and consult the entity's subject matter expert for advice on data security.

During the research, testing and implementation phase of the EURMARS surveillance platform, project partners take responsibility for providing detailed information on how they will ensure respect for fundamental human rights and freedoms, with mentoring support from TRI and regular reminders about information needing to be assessed.

3.4 'Ethics by Design' as Driver of Innovation

Research with human participants is an important part of the EURMARS project, but that research is performed in service of the project's primary goal: to develop new technologies, including AI, for improving European maritime border surveillance. Furthermore, these technologies must meet high ethical standards with respect to the protection of Personal Data, the preservation of human dignity and human oversight, and the safeguarding of human rights. Therefore, ethical considerations shall be incorporated into the technology development process from the start of the project, addressed as early as possible and monitored closely during the lifetime of the project. By confronting ethical issues early and with seriousness, EURMARS project partners mean to avoid ethical oversights or compromises. This approach is known as 'Ethics by Design' (EbD).[15]

As the EURMARS project will have an AI component, we will refer to EC definition of Artificial Intelligence:

i Artificial intelligence (AI) refers to systems that display intelligent behaviour by analysing their environment and taking actions – with some degree of autonomy – to achieve specific goals. AI-based systems can be purely software-based, acting in the virtual world (e.g. voice assistants, image analysis software, search engines, speech and face recognition systems) or AI can be embedded in hardware devices (e.g. advanced robots, autonomous cars, drones or Internet of Things applications). ([23]; see also [24])

Ethical regulation of AI is still immature, and certainly less developed than EU regulation of other technological issues such as Personal Data protection.[25] However, more developed AI regulation is expected soon in the form of the AI Act[20] and other legislation. However, EURMARS will prepare for the future of ethical AI standards by following existing guidance and best practices (e.g. [14], [15] and TRI’s established subject matter expertise). This goal aligns with Task 2.4 ‘AI ACT Foresight Compliance, Social and Ethical Impact Assessment’ and deliverables D2.4 ‘AI Act Foresight Report and Blueprint, PIA, EIA and SIA assessment’ and D7.4 ‘AI - Requirement No. 4’. This section will introduce the EURMARS EbD approach, but the approach will be elaborated further in D2.4 and D7.4.

As mentioned above (Sect. 2), the EURMARS project approach is informed by the AI-HLEG Assessment List for Trustworthy AI (ALTAI) and its seven high-level requirements[14]:

- Human Agency and Oversight:
 - Human agency and autonomy: AI can support human decision-making but must not replace human judgment. In addition, human users must always understand when they are interacting with AI rather than with other human persons.
 - Human oversight: AI must facilitate meaningful human interventions in the operation of AI systems.
- Technical Robustness and Safety
 - Resilience to attack and security: AI must be resilient to threats including interactions with adversarial or malicious users.
 - General safety: Technical risks of the AI system must be assessed and minimised and/or mitigated.
 - Accuracy: Judgments, predictions and recommendations of the AI system must not be false or misleading.
 - Reliability, fall-back plans and reproducibility: There must be contingency plans for worst-case scenarios.

- Privacy and Data Governance
 - Privacy: AI systems must not violate rights to privacy, physical/mental/moral integrity, or data protection.
 - Data governance: AI systems must comply with GDPR and other relevant regulations and standards.
- Transparency
 - Traceability: The quality of data, data sources, data labels, and algorithms must be assessed and thoroughly documented so that the provenance of AI recommendations can be clearly understood by developers, auditors, and other relevant users.
 - Explainability: AI systems must provide reasons for their recommendations in terms that are clearly understandable by end-users.
 - Communication: The capabilities, limitations, benefits, and risks of AI systems must be clearly communicated to users, including end-users.
- Diversity, Non-discrimination and Fairness
 - Avoidance of unfair bias: AI recommendations must not be biased in unfair ways, even unintentionally. Special care must be taken for the protection of vulnerable or historically marginalised groups.
 - Accessibility and universal design: AI user interfaces must be usable for persons with a variety of abilities and conditions, including disabled people. Disabled users must not be disadvantaged or negatively affected in comparison with other users.
 - Stakeholder participation: Stakeholders and people affected by the technology—including non-end-users—should be consulted for their views.
- Societal and Environmental Well-being
 - Environmental well-being: Environmental impacts of AI systems should be assessed and, whenever appropriate, minimised or mitigated.
 - Impact on work and skills: Impacts on human work arrangements should be assessed, including the potential for replacing workers or requiring new technical skills of workers.
 - Impact on society at large or democracy: Risks should be assessed for negative impacts on social institutions, democratic processes, or social interactions.
- Accountability

- Auditability: AI systems should be auditable by independent third parties. Auditability should be facilitated by measures such as ensuring traceability.
- Risk management: AI systems should be assessed and monitored. Oversight and governance procedures should be clearly documented and followed. Users may require training to avoid function creep and misuse of AI systems. There should be procedures for user feedback about system vulnerabilities, risks, or biases.

Following the Ethics by Design (EbD) approach,[15] TRI will advise partners to take into account ethical considerations in each phase of the surveillance platform’s development including requirements gathering; system architecture development and procurement; prototyping and piloting; and monitoring and evaluation.

To ensure that the end-user is considered during the platform’s development process, TRI advises a close focus on how research participants and/or end-users will be informed about EURMARS technologies. In particular, end-users should understand:

- that they are interacting with an AI or technological system, rather than with a human person.
- the capabilities, limitations, benefits and risks of the AI system and its operations.
- how the system makes decisions/recommendations and the reasons for individual recommendations.

This understanding should be facilitated by the system’s user interfaces. Wherever appropriate, end-user understanding should be supported through trainings and tested. In addition, we recommend that the technical requirements for the AI system include ethical design features recommended in EC EbD guidance[15] such as:

- Human-readable logs of the system’s internal processes to facilitate audits by authorised third parties;
- Customisable settings that allow human oversight and control regarding AI decisions, e.g. threat classification, risk assessment and decisions procedures;
- Access controls to prevent unauthorised users from interacting inappropriately with the system, its sensors, or other elements;
- And documentation regarding
 - Processes for ensuring the quality and fairness of data-gathering mechanisms,
 - Processes for monitoring and safely processing Personal Data,

- The behavior of AI algorithms for threat classification, risk assessment, and decision support,
- And how technical partners made decisions regarding the implementation of ethical design features in the system.

Innovative solutions may be required to implement some of these recommendations, but such solutions will be necessary for the future of ethical AI. These recommendations will be expanded and operationalised in future project activities, especially the human rights impact assessment (HRIA; D7.4 ‘AI - Requirement No. 4’) and upcoming ethics impact assessment (EIA), social impact assessment (SIA) and privacy impact assessment (PIA) (D2.4 ‘AI Act Foresight Report and Blueprint, PIA, EIA and SIA assessment’). These documents will be guided by the European Convention on Human Rights (ECHR) and its protocols,[26] the European Social Charter[27] and the EU Charter of Fundamental Rights.[3]

And because AI bias can sometimes be a subtle problem, TRI—the EURMARS ethics mentor—will reach out to help technical partners to prevent, avoid and mitigate potential bias, discrimination and stigmatisation in input data and algorithm design and outcomes. To this end, all Work Package leaders are strongly advised to include TRI advisors in every relevant meeting to ensure compliance to the ethics requirements and properly identify, assess, monitor and mitigate potential risks.

To ensure that EURMARS’s surveillance platform is aligned with ethics best practices, innovation needs, and market competition, TRI will oversee that, throughout the project, partners collaborate and have visibility over:

- **Market Intelligence and Technology Watch Plans:** to identify ethics best practice trends for technology solutions, launch of new surveillance and multi-technology-integration platforms, innovations applicable to border security, market trends in the field. This may potentially include the creation of a system of tools and reliable OSINT sources, weekly monitoring of market trends and regular briefings to project partners (Task 1.5 ‘Ethics and Innovation Management’).
- **Collaborating with European Dynamics (ED),** the leader of EURMARS Task 6.1 ‘Exploitation Strategy and Market Uptake’, to ensure product competitiveness for the EURMARS surveillance platform from an AI Act compliance and ethical robustness perspective. This may potentially include creating a Competitive Intelligence Research Plan; briefings including targeted market analysis, competitor analysis, and/or SWOT analysis (Task 6.1 ‘Exploitation Strategy and Market Uptake’). Task 6.1 will be aligned with research activities conducted within Task 2.4, led by TRI (Task 2.4 ‘AI ACT Foresight Compliance, Social and Ethical Impact Assessment’).

- Monitoring changes to legal frameworks with potential impact on EURMARS and AI Act Foresight analysis work. These changes may be relevant to market competitiveness. (Task 2.4 ‘AI ACT Foresight Compliance, Social and Ethical Impact Assessment’).
- Training and mentoring activities (Task 5.7 ‘Training & Ethics Monitoring’).

3.5 Ethics Risk Management

3.5.1 Ethics Risk Assessment Methodology

In line with Horizon Europe’s focus on a risk-based approach to identify and assess potential risks related to ethics, TRI will utilise an Ethics Risk Assessment Table to manage ethics risks in EURMARS. This tool is in addition to the Risk Table identified in deliverable D1.1 ‘Project Management Quality Plan’, since the main purpose of that table is to identify any type of project risk that should then be assessed, monitored and mitigated in collaboration with other partners during project meetings. By contrast, the Ethics Risk Assessment Table is an Ethics-focused risk assessment tool, designed to identify and manage ethics-related risks, specifically.

Each row of the table shall correspond to an ethics-related risk. Each risk is identified with a EURMARS project task, so that task leaders can efficiently keep track of the risks identified for their task. If several project tasks are associated with similar or identical risks, the risk shall be identified multiple times, associated with each relevant task.

Each column of the table shall be populated with information regarding the identified risks, their probability and severity, and measures that EURMARS partners will take to minimise or mitigate them. For an easier risk assessment process overview, the table includes a clear association of each risk with a task, the task duration and the project partners involved in the task (Table 1). The specification of this information will facilitate collaboration among partners working on each task when identifying any risks.

Table 1. Ethics Risk Assessment Table Headings, Part 1

Column	Column Heading
B	Work Package no.
C	Work Package name
D	Task no.
E	Task name
F	Duration (Mx–My)

G	Task Leader
H	Contributors

Then, for each identified risk, partners will provide risk management judgments (2), which are described below. Partners will populate these fields with guidance from TRI, especially regarding judgments of ethical severity (S or rS). TRI’s advice will be informed by input from the EAB (Sect. 3.2).

Table 2. Ethics Risk Assessment Table Headings, Part 2

Column	Column Heading
I	Risk ID
J	Identified ethics risk
K	L: Likelihood of risk materialising (Low/Med/High)
L	S: Ethical severity of risk (Low/Med/High)
M	Prevention/minimisation measures
N	Mitigation measures
O	rL: Residual likelihood after measures (Low/Med/High)
P	rS: Residual ethical severity after measures (Low/Med/High)
Q	Monitoring observations
R	Comments

For each identified risk, partners must assess the likelihood (L) that negative consequences may occur and the severity (S) of those consequences from an ethical perspective. This information will allow project partners to prioritise identified risks. We declined to calculate compound scores based on probability and severity scores in order to encourage partners to understand and think about their associated risks holistically—when it comes to adopting an ethics mindset, understanding one risk may facilitate the understanding of others. Furthermore, most partners are only required to understand a subset of the total risks identified (i.e. those that are relevant for their tasks, as specified in column G; see Table 1).

Additionally, for each identified risk, partners must provide information on minimisation and mitigation measures they can or intend to implement that would reduce the likelihood or severity of each identified risk. As ethics mentor for the project, TRI will be available to advise other partners on how to prioritise and manage their ethics risks, but each partner is responsible for implementing the suggested measures in their own tasks. Finally, partners will assess the residual likelihood (rL) and residual severity (rS) of each risk, taking into account the suggested minimisation and mitigation measures. There is also a comments field for recording information that project participants should take into consideration while monitoring the evolution of these risks within each task.

The Ethics Risk Assessment Table will be used as the basis for a touchpoint table that will be provided to members of the EAB (Sect. 3.2), so that they can maintain their independent oversight of project ethics issues.

Ethics risk categories that will be monitored shall include, but not be limited to, the following:

- Site risk for demonstrations planned in Romania/Bulgaria, Cyprus, UK
- Research with human participants
- Protection of Personal Data
 - Pseudonymisation and anonymisation
 - Informed consent to data processing
 - Data collection legal basis (including use of previously collected data, i.e. ‘secondary use’)
 - Data security
- Profiling, tracking, surveillance, automated decision-making and big data
- Misuse of technology or research findings
- AI-related risks (see Sect. 3.4), relating to
 - User understandings of EURMARS technology
 - Auditability of EURMARS technology
 - Human oversight and control of AI policies
 - Traceability and documentation of ethics-related development decisions

The main risks categories were selected in line with the guidelines proposed by the HE programme guidelines for ethics and data protection matters[10], EC guidance for Ethics by Design (Ebd) for artificial intelligence[15], and the ethics guidelines and assessment list (ALTAI) of the AI-HLEG[13][14].

3.5.2 Risk Mitigation Procedures

As the task leader for Task 1.5 ‘Ethics and Innovation Management’, TRI is responsible for assessing and advising on the project partners’ adherence to best practices. As mentioned, above, TRI will adopt the following general risk management policies:

- TRI shall establish an Ethics Advisory Board (EAB) in M7, which will examine EURMARS deliverables, ethics decisions, and the Ethics Risk Assessment Table (T1.5; see Sect. 3.2 above).
- TRI shall attend the EURMARS consortium’s regular meetings (monthly EBMs and WP meetings) to discuss strategies and action items for each Work Package to identify, assess, monitor and propose minimisation and mitigation solutions for potential ethics risks.
- TRI will facilitate trainings for partners and/or end-users on ethical requirements and compliance for the duration of the project. (For example TRI organised a drop-in meeting about Personal Data protection during M5 to advise partners on data security and GDPR compliance.)
- TRI will support and advise on informed consent forms needing to be facilitated to project partners and/or end-users to ensure ethical requirements and compliance for the duration of the project.

To identify, assess, monitor and mitigate risks to project compliance with ethical principles and standards, TRI will establish the following process for the usage of the Ethics Risk Assessment Table tool, captured in an Excel file, designed to identify and map potential risks for each project task (if any). TRI will adopt and utilise the table in accordance with the following process:

- TRI initially populates the table with ‘initial risks’ based on a review of the GA, early ‘requirements’ discussions and project meetings.
- TRI initiates discussions with the leader of each Work Package to confirm the initial risks, adding or removing rows as necessary. The Ethics Risk Assessment table is made available to all EURMARS partners via the project’s ProofHub, a common online platform in which project documents are shared among EURMARS partners.
- TRI coordinates with Work Package leaders on risk assessments (L and S), proposed measures, and judgments of residual risk (rL and rS) on a case-by-case basis for each identified risk.
- The Ethics Risk Assessment Table is used as a resource for the Ethics Advisory Board, who will also be invited to provide suggestions for revising or improving the Table.

- Work Package coordinators use and update the Ethics Risk Assessment Table with minimisation and mitigation measures implemented, and use the table as a resource for prioritising work based on ethical and legal compliance considerations.
- TRI will continuously update the Ethics Risk Assessment Table with insights gained from ongoing ethics management, e.g. HRIA (D7.4), PIA, EIA and SIA (T2.4, D2.4), and liaise with Work Package coordinators on any concerns or difficulties that arise during the lifetime of the EURMARS project.

3.6 Timeline for Collecting Ethics-related Documents from EURMARS Partners

In order to coordinate ethics and innovation management (Task 1.5) for EURMARS, TRI must communicate clearly and frequently with project partners regarding their activities, especially as regards human research, the processing of Personal Data, the development of ethical AI by design, oversight of human rights risks, and any other identified ethical risks. TRI will facilitate this communication through use of the Ethics Risk Assessment Table (Sect. 3.5 above), attendance at Work Package meetings and other meetings, and through other forms of communication. For some ethics management tasks, however, TRI will need to collect more detailed information from various project partners about their activities and plans. TRI will oversee a schedule for the collection of these documents, as detailed in Table 3. Document names are marked in bold where they are not deliverables described in the Grant Agreement.

Due to the EU-Restricted nature of 13 deliverables, document collection will not follow the same procedure as for the other project deliverables. EU-Restricted nature cannot be accessed without additional safeguarding measures, which would make the regular document collection impractical. As such, Table 3 only includes the document collection schedule for non-EU-Restricted EURMARS deliverables.

For the purpose of task T1.3, EU-Restricted EURMARS document collection will only be conducted in agreement with project partners on a case- by-case situation.

EU-Restricted documents fall under the Protection of European Union classified information (EUCI) requirements. EU-Restricted constitutes the fourth level of EU classified information, which entails that the unauthorized disclosure of this information could be disadvantageous to the interests of the EU or one or more of the member states.[29]

The following EURMARS deliverables have been listed as EU-Restricted:

- D3.1 Sensor Development - 1st Release
- D3.2 Sensor Development – 2nd Release
- D3.3 Interfaces to External IT Services - 1st Release
- D3.4 Interfaces to External IT Services – 2nd Release
- D3.5 Sensor Fusion Software Module - 1st Release
- D3.6 Sensor Fusion Software Module - 1st Release
- D4.1 Collaborative C2 including subsystems, Visualization & Alarming - 1st Release
- D4.2 Collaborative C2 including subsystems, Visualization & Alarming - 2nd Release
- D4.3 Risk Assessment Framework & Decision Support - 1st Release
- D4.4 Risk Assessment Framework & Decision Support – 2nd Release
- D5.1 Pilots Definition
- D5.2 Test Report from Demonstrations - 1st Release
- D5.3 Test Report from Demonstrations - 2nd Release

Table 3. Schedule for Collecting Ethics-related Documents from EURMARS Partners

Document to be collected	Relevant task/deliverable	Month
Copies of Informed Consent Forms for Research with Human Participants	D7.3	M1–M6
Copies of Ethics Board Approvals for Research with Human Participants	D7.2	M1–M6
Data Protection Questionnaire	D7.3	M1–M6
EURMARS Requirements and Assessment Methodology (Deliverable)	D2.1, T2.1	M6–M12
Ethics by Design Assessment Questionnaire	D2.4, T2.4	M6–M18
EURMARS System Architecture, 1st Release (Deliverable)	D2.2, T2.3	M10–M16
EURMARS System Architecture, 2nd Release (Deliverable)	D2.3, T2.3	M18–M24
‘Know Your Customer’ Exploitation Risk Assessment Questionnaire	D2.4, T2.4	M6–M18
AI Act Compliance Questionnaire	D2.4, T2.4	M6–M18

<i>No deliverable or other document output during M24-M30</i>		
Evaluation, Benchmarking and Lessons Learned (Deliverable)	D5.4, T5.6, T1.5	M36

4 Conclusions

Responding to T1.5 “Ethics and Innovation Management”, task led by TRI which is set to last between M1-M36, D1.3 outlines the plan for ethics and innovation management that will be used as blueprint for the EURMARS project.

The deliverable describes procedures for independent evaluation of project activities, human research, for promoting technical innovation through ethics by design and for continuously monitoring and responding to ethics risks throughout the project lifecycle. As task leader, TRI acts as Ethics mentor monitoring and documenting the ethics issues involved in the project and how they are handled.

This Ethics and Innovation Management plan describes instruments and actions proposed to ensure that any potential ethical risks raised by the project’s activities and outputs are identified, minimised, mitigated and monitored.

To this end, the main instrument proposed in this document is an Ethics Risk Assessment Table, a risk assessment tool designed to identify and summarise risks within each task, classify them by impact severity, propose mitigation solutions and monitor their evolution. The tool was developed by TRI to be used in collaboration with all partners for each task as the project progresses. The Ethics Risk Assessment Table framework is built on ‘Ethics by Design’ principles, that promote technical innovations to facilitate accountability.

The deliverable includes a schedule to obtain and deliver all documents related to Ethics requirements identified.

The D1.3 deliverable aims to support EURMARS partners efforts to optimize the balance between commercialization interests, the need to share knowledge, and a responsible design and innovation by introducing an ‘Ethics by design’ approach

This document is to be used as reference by all partners of the EURMARS project and is available for public dissemination.

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