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### **Work Package 3:**

Ethical, social and legal (including data  
protection and privacy) impact assessment

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## **Abstract**

This deliverable is a social and ethical impact assessment of the D4FLY technologies that will be used to ensure the project takes a responsible research and innovation (RRI) approach. This document includes a literature review on societal and ethical values, as well as an analysis concerning if and how selected fundamental rights and European societal values might be impacted by the project's proposed solutions and remedies. It concludes with recommendations for project partners to acknowledge, protect and promote fundamental rights and European values. This document is not a DPIA (see D11.5) or a PIA (see D3.2). Therefore, the reader ought to read all of these deliverables in concert to have a comprehensive overview of the project's approach to privacy, ethics and data protection.

### Project Information

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### List of Acronyms and Abbreviations

ACRONYM	EXPLANATION
BCP	Border Crossing Point
BPTI	Baltic Institute of Advanced Technology
D4FLY	Detecting Document frauD and iDentity on the fly
EC	European Commission
EIA	Ethical Impact Assessment
ELAG	Ethical and Legal Advisory Group
EU	European Union
GA	Grant Agreement
GDPR	General Data Protection Regulation
HHI	Fraunhofer Heinrich Hertz Institute
IND	Immigration and Naturalization Service (the Netherlands)
NCSR	National Centre for Scientific Research ‘Demokritos’
NTNU	Norwegian University of Science and Technology
PIA	Privacy Impact Assessment
POPD	Protection of Personal Data
PPA	Piraeus Port Authority
RNM	Royal Netherlands Marechaussee
RTX	Raytrix
SBGS	Lithuanian State Border Guard Service
TRI	Trilateral Research
UKH	UK Home Office
UoR	University of Reading
VD	Veridos
WAT	Wojkowska Akademia Techniczna Im. Jaroslawa Dabrowskiego
WP	Work Package

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# 1 INTRODUCTION

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This document is an Ethical Impact Assessment (EIA) for the D4FLY project. Since the D4FLY technological tools aim to verify travellers' identities through the use of biometrics, detect spoofing of identity verification techniques through biometrics and the use of artificial intelligence and detect fraudulent breeder<sup>1</sup> and travel documents through the use of artificial intelligence, their development and deployment may significantly impact fundamental rights and EU societal values. This document will identify the relevant rights and values that could be impacted, as they relate to ethics, and assess how negative impacts can be mitigated, and how positive impacts can be further promoted. It will carry out this analysis and assessment by conducting a literature review both on the current state of European smart borders<sup>2</sup> and their reliance on biometrics as a source of identity verification as well as on relevant ethical theories that inform the present analysis. Subsequently, this report will identify ethical concerns and opportunities germane to the D4FLY project. It will then examine two matters of special concern—the rights and care of refugees and societal acceptance of the new technologies—before concluding with recommendations for project partners.

## 1.1 Background

A preliminary ethics and legal guide was completed in M3 of the project, a Data Management Plan (DMP) and required European Commission ethics deliverables in M6 with updates made to several ethics deliverables in M16, and a privacy impact assessment in M8. Although several ethical and societal matters of interest overlap with these preceding reports, and though privacy and data protection are inherently intertwined with ethics, this document focuses mainly on ethical and societal issues and values and not on privacy and data protection. **Consequently, this current document ought to be read in concert with D3.2 PIA as the privacy concerns and mitigations will not be restated here.**

As described in the GA, this deliverable will be developed in the following manner:

- First the EIA will be written and submitted in M18 of the project.
- A briefing paper summarizing the findings of the deliverable will be produced after M18.
- TRI will disseminate the briefing paper and discuss with other partners how the project's proposed solutions can take into account the values and fundamental rights identified in the deliverable and amend the deliverable accordingly.
- TRI will then convene a workshop with partners, advisory board members and other stakeholders to discuss (a) how the project will address societal values and fundamental rights that might be affected by the application of the project's technologies, including the extent to which these risk creating new needs or burdens

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<sup>1</sup> Breeder documents are those used to apply for lawful identity documents such as birth, death, and wedding certificates.

<sup>2</sup> [https://ec.europa.eu/home-affairs/what-we-do/policies/borders-and-visas/smart-borders\\_en](https://ec.europa.eu/home-affairs/what-we-do/policies/borders-and-visas/smart-borders_en)

for citizens, businesses or public authorities; and (b) what concrete measures can be taken to mitigate or avoid any harm to societal values or risks to fundamental rights such as the freedom of movement.

- These insights will be complemented by public and stakeholder commentary on a series of brief scenarios (vignettes) created by the partners, used to finalise the deliverable. The vignettes will feature societal aspects such as the perception of security, possible side effects of technological solutions and potential profiling, and say how they could be addressed in a comprehensive and thorough manner.
- The amended deliverable will be submitted in M26 [Oct 2021].

### **1.2 Aim of this document**

The aim of this document is to summarize and present the findings of the ethical impact assessment carried out for the D4FLY project. This report is intended both for the public to understand how project partners are identifying and addressing ethical and societal concerns and opportunities, as well as for project partners to adopt responsible research and innovation techniques and methods.

### **1.3 Input / Output to this document**

The input to this document include: Institutional experience at Trilateral conducting EIA reports for EU FP7 and H2020 projects dating back to 2004; desk based research including academic papers and books, blogs, white papers, and reports from international organisations on smart border technologies, the status quo of EU border security databases, ethical theories, examples of ethical transgressions made by biometric and automated technologies, the needs and vulnerabilities of refugees; discussions with the project's Ethical and Legal Advisory Group (ELAG); information acquired through an ethics workshop designed and held for consortium partners in January 2020 in Amsterdam; and interviews with partners.

The output is this report.

## 2 WHY CONDUCT AN EIA?

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This section will explain why and how an EIA is conducted in D4FLY. It will also include a subsection on the status quo of current EU smart borders and their use of biometrics to help explain why the D4FLY tools require an EIA.

### 2.1 EIA

Generally speaking, the development and deployment of new information and communications technologies and applications fuelled by the use of personal information may raise not only privacy concerns, but also ethical issues. One of the key objectives of an ethical impact assessment is to engage stakeholders in order to identify, discuss and find ways of dealing with ethical issues arising from the development of new technologies. Like a PIA, an EIA can be used as a way to ensure ethical implications are adequately examined by stakeholders before deployment so that necessary mitigating measures can be taken (Wright & Mordini 2012: 397).

More specifically, the technological tools being developed in D4FLY call for an ethical impact assessment, not only because they are new but because they involve a particular kind of data and technological means that have already created significant ethical issues especially related to discrimination and bias, namely biometrics and automation.

Furthermore, D4FLY tools are envisioned to be used at external EU borders. As borders are sites traversed by vulnerable populations, including particular groups of travellers such as children or the elderly but also refugees, it is paramount to identify and mitigate any potential ethical concerns or to identify and promote ethical opportunities created by the D4FLY tools.

#### 2.1.1 D4FLY Tools

The D4FLY tools are divided into 3 categories: **identity verification**, **counter-spoofing** and **document verification**.

#### 2.1.2 Identity Verification

The verification of a traveller's identity will be made after **the traveller voluntarily enrolls in the D4FLY system** by combining the following biometrics:





### Biometric Corridor

At the Border Crossing Point (BCP), the traveller walks through a biometric corridor. **The biometrics are recorded again and matched against the enrolment data. After verification, the data is deleted.**

### Smartphone Apps

D4FLY is developing a **smart phone app to “learn” the idiosyncratic gestures of the individual regarding acceleration, intensity of movement, and inertia of the body.** This data will be fused with the other biometric data to produce an accurate identity verification result.

D4FLY is developing a **smart phone app for border guards to verify a pre-enrolled face image.** A traveller enrolls in the D4FLY system via a passport and face scan. The face scan is matched to passport data. This match is encrypted and sent to the border guard's smart phone. The border guard makes a live scan of the traveller with a smart phone and the D4FLY app verifies the identity.

### Blockchain

Additionally, **D4FLY is researching new methods to use blockchain to send biometric data for identity verification as a privacy enhancing approach.** The scenario is the same as above, but the data will be sent via self-sovereign blockchain.

### 2.1.3 Counter-Spoofing

AI algorithms to counteract 3 kinds of attacks, or spoofing attempts, are developed in D4FLY:



### Face Morphing Attacks

In several European countries, citizens can self-provide a face photo when they apply for an identification document, e.g., identity card or passport and the taking of the photo is not overseen by authorities. This allows criminals to hand in an altered, synthetic image that looks similar to two different subjects (morphed face image). Thereby a criminal can travel, do business etc. under the identity of an accomplice by using a genuine document issued from a state authority.

D4FLY is developing a **morphed face detector based on Deep Neural Networks (DNN) that can detect whether a photo has been morphed or not.**

### Presentation Attacks

A presentation attack is defined as a “presentation to the biometric data capture subsystem with the goal of interfering with the operation of the biometric system”<sup>3</sup>. D4FLY focuses on face and iris presentation attacks that aim to interfere with the biometric system such that the attacker can assume another person’s identity by simulating the other person’s biometric traits. In case of a face presentation attack, the attacker uses means to change how the biometric system sees the attacker’s face, e.g., by holding a face image, a mobile device etc. in front of the biometric system’s camera or by using a 3D or partial facemask. In case of an iris presentation attack, the attacker uses similar means to feign a different iris.

D4FLY is developing **AI to conduct local blood flow analysis, DNN 3D face scan, thermal face scan with DNN to detect temperature patterns and face image captured with multispectral cameras**. These tools detect presentation attacks with a high-quality image (photo attacks), a realistic 3D mask of the authorized person (mask attacks), and a partial (e.g., nose) 3D facial mask, holding a printed face or showing an image or video of a face in front of the biometric capturing device. For a human inspector, it is often challenging to detect mask attacks because they imitate entire 3D structures and facial colours. All of these tools are being developed because they can each distinguish living material from synthetic.

These tools are intended to be integrated into the enrolment kiosk, to ensure that enrolment into the D4FLY system is legitimate.

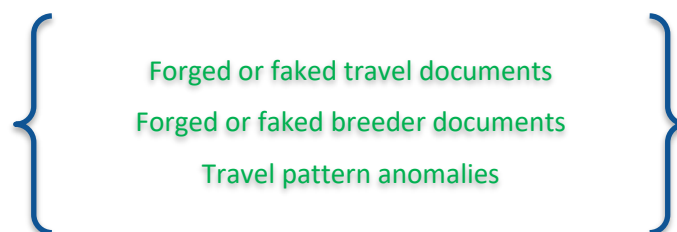
#### Imposter fraud

In case of imposter fraud, the attacker is also assuming another person’s identity, but without artificially changing the appearance or using a forged document. In this scenario, the attacker (imposter) is using someone else’s identification documents, whose photo resembles more or less the attacker. The used documents are often lost or stolen from the actual owner and purchased over the dark net<sup>4</sup>.

The travel metadata extraction tool and the electronic verification tool described in the subsequent section will target this kind of fraud. In addition, **D4FLY is developing an AI tool to guide border guards in identifying small differences between the person in the photo and the traveller presenting the passport.**

### 2.1.3 Document Fraud Detection

D4FLY is developing AI algorithms to detect:



<sup>3</sup> ISO/IEC 30107 Information technology — Biometric presentation attack detection

<sup>4</sup> See BBC 2018

### Forged or Faked Documents<sup>5</sup>

Specifically, D4FLY is developing an AI algorithm to detect unauthorized numbers, stamps or dates, printing ink or technique on identity documents.

Additionally, since passports include visa pages with stamps with entry and exit information of travellers, this travel information is commonly used as one of the indicators of risk (e.g., certain countries, frequency of travel, or duration of the visit), which may lead to more thorough inspection of the document. **One AI tool focusses on the automatic extraction of the metadata associated with travel patterns from stamps on the visa pages in passports.** ICAO states that the analysis of metadata associated with travel patterns can identify indicators associated with trafficking and smuggling by detecting unusual and illogical travel attributes such as indirect travel routings and short stays following long haul travel (ICAO 2017, 66).

Electronic security features embedded in identity documents such as passports and drivers' licenses have become increasingly easier to fake or disable. **D4FLY is designing a new automated document verification tool to verify a multitude of high quality physical and electronic security features in passports (e.g., Kinograms®, Optically Variable Inks (OVIs), Multiple Laser Images (MLIs) or Changeable Laser Images (CLIs)) to detect absent or altered security features, complex forms of electronic fraud and advanced morphing.**

Finally, research is being done concerning the possibility of developing a **blockchain prototype to store the verification history of documents and to secure them against tampering.** The expected technology maturity level of this technology is lower compared to others in the project.

#### 2.1.3 Risk Assessment

It is relevant from an ethical perspective that the D4FLY project contains a task in which **various kinds of metadata will be fused together in order to provide an automated risk assessment of a particular traveller.** The metadata to be included are: the verification score generated from the verification between the kiosk enrolment and the biometric corridor, incidents of face morphing and presentation attacks, travel pattern anomalies and incidents of document fraud. End users have expressed interests in pulling data from Passenger Name Record Data and the Entry Exit System as well.

The risk assessment will appear as a traffic light system for border guards by which travellers are given a red, yellow or green light corresponding to high, medium and low risk.

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<sup>5</sup> A forged document is an alteration of a genuine document, whereas a fake or counterfeit document is an unauthorized reproduction of a genuine document. See, <https://www.interpol.int/en/Crimes/Counterfeit-currency-and-security-documents/Identity-and-travel-document-fraud>

The benefit of combining these different kinds of metadata is that an automated analysis of it may provide a view of the bigger picture that a human could miss.

## **2.2 Biometrics at the Border**

An EIA for the D4FLY tools is not only necessary because its tools can have ethical impact. The background context of using biometrics to grant travel and migration permission is already rife with ethical sensitivities. As a consequence, the use of biometrics to verify travellers' identities at the border demands careful ethical scrutiny. There are several reasons for this attention.

On the one hand, the application of technological and automated methods for identity verification and counter-spoofing measures can help to ensure that EU borders are better secured against terrorists, human traffickers or other criminals entering the EU and that non-criminal travellers cross the border without long waits.

At the same time, the use of biometrics as a verifier of a person's identity entails interpreting the human body as a data source.<sup>6</sup> Not only are particular external characteristics of migrants presented in terms of descriptions (height, colour of eyes) in government data files; actual scans of the body are increasingly finding their way into databases. It becomes a 'machine-readable body' (Van der Ploeg 2002). The body is regarded as a source of information, the code of which can be read by a machine. Some scholars have interpreted this process as meaning that the body becomes a component of the machine: it is being interpreted and formatted as if it were an information storage device that simply has to be scanned in order to be registered. The body becomes 'the universal ID card of the future' (Van der Ploeg 1999: 301; Dijstelbloem et al 2011: 12), or a password granting access and privileges (Deleuze 1995).

The ethical concern is that something akin to Cartesian mind/body dualism is implicitly adopted by border guards or technology designers whereby ethical values such as dignity or autonomy are considered to be anchored in mental or psychological features alone and the human body becomes objectified and seen only as a data source. However, bodily integrity and respect for another's body must be maintained. Although this report does not offer a specific mitigation for this ethical concern because it falls outside the scope of the D4FLY project, the question of how the use of biometrics generally might affect an individual's or society's view of the human body is worth considering by any project partners designing or using biometric tools.

## **2.3 Method**

The methods comprising this EIA are as follows: The ethics partner TRI has conducted a literature review consisting of academic books and articles, EU policies and legislation, white papers, blogs and reports by NGOs and other stakeholders concerned with the ethical issues concerning smart borders, migration, asylum, ethnic and gender bias arising with the use of facial recognition and AI, surveillance, biometric data collection and storage and societal

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<sup>6</sup> The use of the body as a data source is, however, not exclusive to biometrics or border security. The health sector also investigates the body as a source of data.

acceptance of the relevant technologies. In addition, TRI possesses extensive academic expertise in normative ethical theories and applied ethics. By merging this expertise and this research, as well as by consulting the project's ELAG and holding interviews with partners, TRI has identified relevant ethical and societal concerns and opportunities raised by the D4FLY tools.

This document summarises this research and identification of ethical and societal issues. It considers the ethically significant and complex question of whether the D4FLY tools make it more difficult for refugees to enter the EU and it addresses the crucial matter of whether European citizens and residents will accept D4LY tools, especially considering the ethical failures of identity verification tools in the past.

### 3 ETHICAL LAWS AND THEORIES

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In order to conduct an ethical analysis of the D4FY tools, we need to be clear on which ethical values require acknowledgment, namely awareness, respect, protection and promotion. EU legislation provides some guidance in this regard. The following references are made to ethics and values:

#### **Charter of Fundamental Rights of the EU (CFR)**

‘peaceful future based on common values’ (preamble, 1st recital)

‘Conscious of its spiritual and moral heritage’ (preamble, 2nd recital)

#### **Treaty on European Union (TEU)**

‘DRAWING INSPIRATION from the cultural, religious and humanist inheritance of Europe, from which have developed the universal values of the inviolable and inalienable rights of the human person, freedom, democracy, equality and the rule of law,’ (preamble, 2nd recital)

*Art 2:*

‘The Union is founded on the values of respect for human dignity, freedom, democracy, equality the rule of law and respect for human rights, including the rights of persons belonging to minorities.’

‘These values are common to the Member States in a society in which pluralism, non-discrimination, tolerance, justice, solidarity and equality between women and men prevail.’

#### **Declaration Lisbon Treaty 2007**

EU Charter does not affect right to legislate “in the sphere of public morality (of human dignity and respect for human physical and moral integrity”.

**European Group on Ethics in Science and New technologies (2000)**

“The respect of the dignity of the human person is at the root of the ethics of science and new technologies as well as of human rights.<sup>7</sup>”

Although these foundational EU documents, as well as the D4FLY GA, mention particular values such as autonomy, dignity, tolerance, justice, solidarity, fairness, equality, and non-discrimination, they also reference moral integrity, universal values, inviolable and inalienable rights of the human person (that is, natural rights not only legal rights), common values and a humanist moral heritage. These latter references are not made concrete thereby motivating the question which universal values or natural rights must be considered. What is more, these documents do not provide much of any justification for the identification of values and rights in question. Ethical theories can provide guidance to partners to help discern which rights are natural and fundamental from an ethical perspective (not a legal one), which values might be universal, and why arguments supporting these claims are justifiable.

### **3.1 Utilitarianism**

Utilitarian theories maintain that the moral worth of actions or practices is determined by their consequences (Kagan 2013). An action or practice is right if it leads to the best possible balance of good consequences over bad consequences for all of the parties affected. There are several versions of utilitarianism, but the one considered the standard statement of the theory is from the 19<sup>th</sup> Century British philosopher, John Stuart Mill (Scarre 1996). Mill proposes what he calls the “greatest happiness principle” as the foundation of normative ethics. Mill states, “Actions are right in proportion to their tendency to promote happiness or absence of pain, and wrong insofar as they tend to produce pain or displeasure” (Mill 2001). According to Mill, pleasure or happiness (which he equates) is the only intrinsic value. Every other desirable thing is a means to promote pleasure and prevent pain. In this way, Mill attempts to define the nature of good and good consequences. Good consequences are those that produce the most pleasure or happiness for the most people. By defining pleasure as the only intrinsic value, Mill places himself firmly in the camp of hedonistic utilitarianism. However, later utilitarians have argued that other values besides pleasure possess intrinsic worth, such as welfare, knowledge, courage, and rewarding relationships (Sinnot-Armstrong 2019). Nevertheless, what unites all of these theories as utilitarian is their focus on consequences; however we define “good”, we ought to act so as to produce good consequences.

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<sup>7</sup> It is important to note that EGE opinions are non-binding. For more on references to ethics and values in EU law, see Frischhut 2019.

This theory plays an important role in the D4FLY project as the H2020 ethics requirements explicitly require project partners to assess the risks of their work and as well as the impact that the development of new technologies could have for the wellbeing of society.

### **3.2 Deontology**

In contrast to this emphasis on consequences, the theory of deontology, most commonly associated with the 18<sup>th</sup> century German philosopher, Immanuel Kant, defends the position that there exist some values that ought to be promoted and complied with, no matter the potential good consequences of transgressing them. Border guards will be familiar with the values Kant identifies as they are also ones they are obligated by their professional codes of conduct to acknowledge and understand: autonomy, dignity, respect for persons, and equality of persons (University of Birmingham 2010). Kant points out that humans are beings with the capacity to make autonomous choices. He argues that this capacity imbues each person with dignity; that is, each person is worthy of respect and moral consideration simply in virtue of being human. Since autonomy and dignity require respect for all, people must be treated equally.

Kant argues that we are all obligated to follow “the moral law” which encodes these values and each of us must adopt it as our guiding principle of action. He contends that this moral law can be formulated in various ways. First, he states that one ought to “Act in such a way that you treat humanity, whether in your own person or in the person of any other, never merely as a means to an end, but always at the same time as an end” (Kant 1981). This means that we ought to refrain from using another person merely to achieve our own goals as if the other person were not an independent person with interests, desires, needs and concerns of his/her own, capable of making autonomous decisions. Kant also writes we are obligated to “Act only according to that maxim whereby you can at the same time will that it should become a universal law” (Kant 1981). This formulation reflects the importance of the equality of persons for Kant. Whatever principle we choose to guide our actions, it must be a principle that any other person could and would choose to guide his/her actions as well. According to Kant, ethical actions are not sensitive to individual interests or particular circumstances; if they are right, they are right in every place and time.

Like consequentialism, the deontological perspective is also embedded into European value systems, and we see appeals to protect such values in the calls for the design and development of new technologies in H2020 projects including D4FLY.

### **3.3 Rights**

Rights-based theories, especially those concerning human rights, evolved from the notion of natural rights (Beauchamp et al. 2008). The 17<sup>th</sup> century British philosopher John Locke wrote that humans have certain natural rights against interference from the state on their freedoms. Locke and many of his contemporaries have had a deep influence on current discourse concerning human rights as they identified rights to life, liberty, property, a fair and speedy trial, as well as several others which have become core rights in major Western legal and political documents. As with the values distilled from the previous ethical theories, border guards will be familiar through their codes of professional conduct with human rights discourse and the rights of travellers, such as the right to the freedom of movement, or bodily integrity, that must be respected (University of Birmingham 2010).



### **3.4 Virtue Ethics**

Rather than focusing on rights, obligations, and directive rules, virtue ethics places the locus of ethics in the cultivation of a good, that is, virtuous, character. This approach has its roots in the classical Greek tradition represented by Plato and Aristotle and in the Greek stoics and has, along with utilitarianism and Kantian deontology, become one of the three most influential ethical theories in the West. Aristotle argued that virtue is a disposition to act in the right way at the right time (Aristotle 2000). It is well entrenched in the person and consists in noticing, expecting, valuing, feeling, desiring, choosing, acting, and reacting in certain characteristic ways (Shafer-Landau 2012). Some of the key virtues he identifies also appear in several national codes of conduct for border guards (University of Birmingham 2010), and as such, D4FLY tools should encourage, or at least not discourage, their cultivation and exercise: courage, temperance, honour, integrity truthfulness, and justice. Aristotle argues that a virtuous character must be cultivated and made part of the individual through continuous training of one's character. One of the reasons for this training is that virtues are multi-faceted characteristics that often interact with other virtues. For example, one becomes an honest person by telling the truth throughout his/her life, not just on a single occasion. But being an honest person means more than simply telling the truth simply because it is the truth. It also involves understanding why honesty is important, the desire to be an honest person, knowledge of whom one is speaking with and the context within which one is currently involved in order to be tactful and discreet when necessary. These nuances reflect the complexity of human characteristics and human interaction which virtue ethics aims to encompass.

### **3.5 Ethics of Care**

As indicated by its name, the ethics of care places primary ethical significance on caring. Care is an emotion or a network of emotions involving sympathy, empathy, sensitivity, altruism, mercy and love (Gilligan 1982; Held 2007). It involves understanding the needs and wants of the person cared for including the person's vulnerabilities that require attention and care. Defenders of the ethics of care note that all people find themselves in either temporary or permanent positions of vulnerability and dependency on others for care and help. Acknowledging this fact of human existence is therefore essential to any ethical theory and to ethical action. A further core feature of the ethics of care its recognition of the importance of relationships. Again, defenders of the theory note that all people find themselves in certain relationships—as a spouse, friend, parent, child, co-worker, etc. Accompanying each of these relationships are responsibilities that are inherent to the nature of the relationship itself. For example, parents are responsible for caring for and nurturing their children and friends have the responsibility of being honest and respectful with one another.

These responsibilities help constitute the relationships. This is evidenced by the fact that when these responsibilities go unfulfilled or neglected, the corresponding relationships often dissolve (Scanlon 2008). For example, a friendship is constituted in part by a responsibility to be truthful to one's friend. If one party to the friendship discovers that the other has been dishonest, the friendship—a relationship based on trust—may end. Proponents of the ethics of care argue that ethical action will be influenced by such relationships and responsibilities.

D4FLY partners and border guards will recognize in this theory certain aspects relevant for their work. The ethical significance of vulnerability directly relates to refugees who travel to the EU in need of succour. It is also relevant for any traveller who may need additional help while traveling and crossing the border including children, the elderly and disabled, which is why it appears as several national codes of conduct for border guards (University of Birmingham 2010). Mercy, compassion and empathy are traits that can help in many situations at the border and the D4FLY tools should promote such traits when possible.

### **3.6 Principlism**

Likewise recognizing that a single ethical directive cannot reliably yield ethically good and right action, defenders of principlism argue that there are several ethical principles that can express how ethically significant cases ought to be handled. Focusing on the field of medical ethics, Beauchamp and Childress identify the following principles as ones generally accepted by most ethical theories: respect for autonomy, beneficence, and justice (Beauchamp and Childress 2013). Although their original context was medical ethics, several philosophers have extended the scope of these principles to other fields where practitioners must make ethical decisions (Martin et al. 2010). Respect for autonomy, beneficence and justice are clearly relevant ethical principles for D4FLY partners and border guards as well, as they appear in most codes of conduct for border guards (University of Birmingham 2010). To these values we might also add other principles we have already discussed such as honesty, empathy and acknowledgement of vulnerability.

### **3.7 One of the Rawlsian Principles of Justice**

The final ethical theory that is relevant for D4FLY partners is inspired by the philosopher John Rawls and one of his two principles of justice for a society. It is important to mention that Rawls did not present his theory of justice as an ethical theory to guide individual ethical action. Nevertheless, one of the two principles can be adapted to individual decision making and hence potentially help serve as a reliable resource for D4FLY designers and border guards trying to perform right and good action. In its adapted form, the Rawlsian principle requires actors to give the greatest benefit to the least-advantaged members of society (Rawls 1971). This principle would provide a general and high-level principle with which to test various context-specific cases to estimate the likely effects of certain actions as well as the implementation of new technologies for identity verification and security checks at the border. It is clearly not a complete ethical theory and it remains an open and important question how border guards could determine who amongst those individuals crossing the border at their particular border crossing point are least-advantaged, but it remains an important ethical consideration.

### **3.8 Proportionality and Necessity**

For EU projects, any restriction or limitation of a fundamental right must be necessary and proportional.

Necessity is a fundamental principle when assessing the restriction of fundamental rights, such as the right to the freedom of movement. The limiting of any fundamental right must be strictly necessary. Necessity shall be justified on the basis of objective evidence and is the first

step before assessing the proportionality of the limitation. Necessity is also fundamental when assessing the lawfulness of activity in question.

Proportionality is a general principle of EU law. It restricts authorities in the exercise of their powers by requiring them to strike a balance between the means used and the intended aim. In the context of fundamental rights, such as the right to the freedom of movement, proportionality is key for any limitation on these rights.

More specifically, proportionality requires that advantages due to limiting the right are not outweighed by the disadvantages to exercise the right. In other words, the limitation on the right must be justified. Safeguards accompanying a measure can support the justification of a measure. A pre-condition is that the measure is adequate to achieve the envisaged objective (EDPS 2020).

### **3.9 How to Combine these Diverse Theories?**

In the presence of such a diversity of ethical theories, one might lose hope in finding a single comprehensive account of ethical decision making and action (Burnor and Raley 283). However, this conclusion need not be interpreted negatively. It may be more reasonable and reflective of our actual experience of ethical phenomena to combine different ethical theories. Sometimes we need to think of producing good consequences, other times we need to protect autonomy and dignity, while still other times we would do well to identify values emerging from relationships with others, or look to guidance from established principles, or grant ethical priority to the most vulnerable.

Like physical phenomena, ethical phenomena seem to be sufficiently diverse to require a plurality of theories to describe them adequately. Just as physics, chemistry, biology and geology are all needed to describe the physical universe, so too may we need utilitarianism, Kantian deontology, virtue ethics, the ethics of care (and more) to describe inviolable values, wellbeing, ethical character and the value of relationships, and to prescribe human action accordingly (Burnor and Raley 284; Hunt 1987, 217-218). Each of these ethical phenomena are essential to ethical experience and ethical reasoning. As a consequence, D4FLY partners and border guards ought to be aware of all of these values and different approaches to ethically good/right decision making and action.

## 4 ETHICAL CONCERNS

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Reflecting upon the ethical theories described in the previous section within the context of D4FLY, the following ethical concerns and opportunities can be identified. Some of the concerns address the entire D4FLY system whereas other address individual components. These concerns ought to be read in concert with the concerns and mitigations presented in D3.2 PIA, as the present report focusses on ethical concerns and mitigations only.

### 4.1 Bias and Discrimination through Facial Recognition Tools

**Concern:** Numerous recent studies have provided evidence that automated facial recognition technologies can be biased against people with non-white racial and ethnic backgrounds as well as women in terms of producing both false negative rates (rejecting a correct match) and false positive rates (matching to the wrong person) (e.g., Crumpler 2020). These errors can lead to serious transgressions of an individual’s autonomy, dignity and privacy especially in the context of border security and permitting or denying individuals’ entry into the EU.

**Mitigations:** It is essential to understand that D4FLY tools are not being designed or developed for non-consensual identity verification as is carried out in some law-enforcement contexts, for example, searching for a suspect of a crime based on CCTV video footage. The D4FLY facial recognition tool only makes a one-to-one match with reference data that has been previously and voluntarily provided by the traveller through enrolment in the D4FLY system.

Secondly, D4FLY is combining a traveller’s face image with an iris scan, a somatotype scan and a 2D photo in order to improve upon the accuracy of biometric identity verification. Such a “multi-modal” biometric verification system can compensate for the inherent weaknesses of pure standalone face recognition. We can thus speak of multiple layers of insurance.

Nevertheless, the project wants to try to ensure as much as possible that all travellers can use the D4FLY system and no one is excluded due to appearance.

- a. Partners designing the facial recognition tool must train the AI on as diverse a dataset as possible. As D4FLY partners are frequently using publicly available datasets, they are somewhat at the mercy of the data already available. However, sincere attempts must be made to find diverse datasets and to test the error rates of the system when used by individuals of diverse ethnic backgrounds and women.
- b. End users must be made aware of the error rates for these tools when used to verify the identity of individuals with diverse ethnic backgrounds and women. It must be made absolutely clear that a negative verification result does not indicate any kind of criminal suspicion. This should be included within training.

### 4.2 Blanket Video Surveillance

**Concern:** It might be thought that D4FLY tools will be used for video surveillance in public spaces or for clandestine video surveillance.

**Mitigations:** D4FLY tools are being designed for, and will be potentially deployed, only at the sites of external EU borders. By law, in order to cross an external border, travellers must consent to have their identities verified. D4FLY is not adding any additional verifications to the status quo. It is developing tools to make identity verification more efficient and accurate. Furthermore, as travellers must first enrol their biometric data for their identities to be

verified by the D4FLY system, the one-to-one matching of an individual's biometrics with the reference data is always carried out with prior consent.

Additionally, the iris scanning technology lacks the technical capability to verify an individual's identity at a distance of more than a few meters. As a consequence, it could not be used for clandestine or long distance surveillance of individuals in public areas.

#### **4.3 Exclusion of certain groups**

**Concern:** The biometric corridor being constructed to record a traveller's biometrics and compare them to the enrolled reference data has a width of 1 meter. In order to allow the D4FLY cameras to make an accurate scan of the iris, the corridor cannot be wider. This width excludes access to people in wheelchairs, strollers or other physical aids wider than a human body. Additionally, a person walking hunched over would potentially not be physically able to raise his/her head up so the eyes face the camera. Further, it was agreed for the construction of the prototype that travellers from 1.5 to 2.2 meters tall could be scanned. This height range excludes children or adults shorter than 1.5 meters.

**Mitigations:** For air travel, passengers with reduced mobility are carried in accordance with EU Regulation No. 1107/2006 of 5 July 2006 on the rights of disabled passengers and passengers with reduced mobility. Any passengers travelling to/from the USA are carried in accordance with the U.S. DOT provisions, Title 14, Code of Federal Regulations, Part 382, effective as of 13 May 2009. The IATA Passenger Accessibility Operations Manual instructs airlines in the handling of passengers with disabilities and can serve as a useful initial guide.

Technology partner Veridos has reported that with some additional effort a tracking system could be installed in the corridor, which would allow a precise tracking of an individual's face, and automatically direct the camera to the face for good quality iris images. The installation of such a system would allow for the design and construction of a wider corridor. Additionally, if the face tracking system were mounted on a movable device (with servo motors), it would cover a wider field of view including smaller and taller individuals. However, as the focus for D4FLY is on the image capture device, the face tracking system was not prioritized. Hence the described disadvantages have been accepted for the prototype stage. If deployed, D4FLY partners ought to pursue these technological possibilities to offer an option inclusive of physically diverse individuals. If the corridor must be deployed prior to the installation of this additional system, partners ought to publicly acknowledge the current shortcoming to communicate to those affected that the partners understand the inconvenience and did not exclude any groups internationally.

Although the prototype limits the height range of travellers, D4FLY partners have reported that future product development could include a wider range of heights.

Even if people are excluded from using the D4FLY system, they will not be prevented from crossing the border. Travellers can use the current technological systems already in place or request to be checked by a border guard.

#### **4.4 Unequal access to enrolment and use**

**Concern:** Access to technology can be affected both by socio-economic status and geographic location. Regarding socio-economic status, it is still undecided if the enrolment kiosks will only be placed at BCPs for immediate enrolment during travel, or whether attempts will be made to place them in locations such as a shopping district of a city, to allow for a more convenient

enrolment process in advance of travel. The placement of the enrolment kiosks throughout a given city may be easier from some groups to access than others. For example, if the kiosks are located in a shopping district populated with expensive stores, some individuals of lower economic means may never visit this area, and as such may not be aware of, or be able to benefit from, the D4FLY solution. As a result, individuals vulnerable to poverty may not enrol, or may find it difficult to enrol, in the D4FLY system.

If enrolment kiosks are placed primarily at BCPs, the kind of BCP in question may attract travellers of a particular socio-economic status. For example, one of the use cases for which D4FLY is providing a solution is cruise ship ports with Piraeus Port as one of the field test sites. Cruises are notoriously expensive meaning that cruise passengers generally enjoy a high socio-economic level. If the enrolment kiosks were disproportionately placed at cruise ship ports, the D4FLY solution would mainly benefit persons already enjoying a high economic and societal position.

Regarding geographic location, if the enrolment kiosks are principally located at external EU BCPs, then it is critical to consider on which side of the border the kiosks will be placed. For example, will the kiosks be inside the EU in, for example, Spain and Finland, or on the other side of these borders in Morocco and Russia. If they are to be located outside of the EU, partners need to think carefully about how travellers will be properly informed in order to give consent, and how the D4FLY system can promote trust among a population that may distrust LEAs and border guards from another country.

Both education level and technological familiarity may also affect who enrolls in the D4FLY system. Individuals with less education may not fully understand the details of biometrics and biometric identity verification. Those less familiar with technology or not in possession of modern technological devices may not feel comfortable enrolling in the D4FLY solution. This exclusion is worrisome from an ethical standpoint if the D4FLY system were to benefit some already societally advantaged individuals and groups over others.

In addition, one might be concerned that more men than women will enrol in the D4FLY system and benefit from its solution. Studies indicate that work-related travel is carried out more by men than by women (Gustafson 2006). This discrepancy is thought to be due both to sex and gender inequalities in the work force as well as that women are disproportionately responsible for household duties and childcare (Nobis and Lenz 2005). As a consequence, use of the D4FLY system could be predominantly male, which might further entrench societal prejudices. Furthermore, the potential underrepresentation of women could implement bias into the AI tools as they continue to “learn” from new datasets lacking women, and lacking women of diverse ethnic backgrounds.

**Mitigations:** These issues are currently under discussion in the consortium. Consequently, partners will continue to address them and this report will be updated for its resubmission in M26. Nevertheless, this report can already state the following:

If deployed for use by the wider public, efforts ought to be made to place D4FLY enrolment kiosks in places equally accessible to all, with adequate and easy to process instructions on how to use them.

D4FLY partners cannot seek to solve sex and gender discrimination in the work force or the home. The mitigation here is, as a first step, one of ethical awareness. Border guards ought to be aware of the societal causes of potential underrepresentation in the D4FLY system to guard



against forming prejudices. TRI includes the project's end users in its discussions and workshops on ethics in order to achieve this end.

At the same time, there is evidence "that in few contexts, gender plays a significant role in determining the intention of accepting new technology and there are cases where gender differences cannot be discerned" (Goswami and Dutta 2016, 51). Regarding travel, one study shows that though men may travel more often for business, women travel more often for leisure (Collins and Tisdell 2002). Reflecting on these studies in tandem would produce the conclusion that D4FLY partners need not be overly concerned with significant gender differences in enrolment. Still, these findings need to be researched further and combined with considerations concerning both how different cultural norms as well as age might affect the frequency and modes of travel among different genders (e.g. Hui et al. 2017; Adeel et al. 2017).

Finally, so that bias does not emerge, designers may need to audit their tools and manually add women's biometrics to the AI tools after they have been deployed if they find a gender gap in travel frequency and mode.

#### **4.5 Transgender travellers**

**Concern:** Transgender people have a gender expression or gender identity that differs from the gender they were assigned at birth based on their biological sex. According to the National Center for Transgender Equality, "A transgender woman lives as a woman today, but was thought to be male when she was born. A transgender man lives as a man today, but was thought to be female when he was born. Some transgender people identify as neither male nor female, or as a combination of male and female". (NCTE)

Consequently, transgender travellers have a gender identity, and potentially a gender appearance, that differs from the gender associated with the biological sex stated on their identity documents. The ethical concern is that transgender travellers could potentially face discrimination by not being able to pass through the D4FLY system, and could potentially be burdened with additional checks and questions by border guards simply based on their gender identities.

**Mitigation:** The D4FLY biometric identity verification only makes a one-to-one match with the biometric enrolment data. Hence, as long as the traveller's appearance at the border matches their appearance at the time of enrolment, the D4FLY system will verify the individual's identity. If a person undergoes significant changes to their appearance between enrolment and travel, they should re-enrol the biometric data to update the reference data.

Although the D4FLY system should not create additional burdens for transgender travellers, it is still possible that border guards could consider a mismatch between gender identity/appearance and biological sex to be suspicious. Here again the mitigation is one of ethical awareness and training. Border guards ought to understand that such a mismatch is not inherently suspicious.

#### **4.6 Blood-flow detection as invasive**

**Concern:** The blood-flow analysis tool is meant to detect whether an individual is wearing a 3D mask or make-up to disguise his/her true appearance. There is a potential worry that this tool would identify non-criminal individuals as suspects simply for wearing extensive make-up as a life choice.

**Mitigations:** Non-theatrical, or “every day” make-up can be penetrated by the blood-flow detection tool. D4FLY partner HHI Fraunhofer tested this with their dataset. One volunteer applied especially strong make-up, which she described as an “exaggerated amount” and “not suitable for the office”, and the tool functioned properly.

Opaque or theatrical make-up cannot be penetrated by blood-flow detection. However, the statement of ICAO on makeup and passport images is: “People usually try to look better than normal in an ID photo. In some extreme cases an excessive use of make-up affects computerized as well as human facial recognition capabilities. Therefore, the subject should only wear typical every day make up” (ICAO 2018, 39). Additionally, ICAO claims that passport image needs to match the subject’s face when using the passport. Consequently, even individuals who wear heavy make-up as a life choice, cannot legally do so when having their passport photo made or when passing a border control point.

#### **4.7 The AI tools to detect living material might work better with certain skin colours**

**Concern:** Any time an automated tool is designed and used to detect or identify some aspect of the human body, we ought to ask whether it works equally well on all skin types and colours.

**Mitigation:** For the face morphing attack detection, D4FLY uses several datasets that include people from a wide spectrum of different ethnicities and with different skin colours.

For the 3D face imaging, D4FLY uses only 3D-data (without colour information) and thus the detector does not depend on skin colour.

For blood-flow detection, studies have evidenced that the pulse signal can be extracted for all photo-types regardless of skin colour (Haan and Jeanne 2013).

Finally, due to the Coronavirus pandemic and the corresponding lockdowns, Fraunhofer HHI could not arrange capture sessions with a large group of data subjects, and as a result its researchers, with consent, had to test on recordings of themselves. However, at this stage of development Fraunhofer HHI is not offering its tools as a prototype; rather they are still at a lab evaluation level.

#### **4.8 Extraction of Travel Metadata as Invasive**

**Concern:** It might be thought that the automated extraction of the metadata associated with an individual’s travel pattern is invasive and violates an individual’s right to privacy.

**Mitigation:** The D4FLY solution is simply an automation of the legally mandated task that border guards already have. Border guards are responsible for examining the stamps in a traveller’s passport to look for proper exit and entry of countries, proper visas held and travel to countries associated with serious organised crime and training of terrorists (ICAO 2017).

#### **4.9 Smartphone Sensor Data as Invasive**

**Concern:** One might think that the smartphone app that “learns” the user’s movements in order to identify the user on the basis of such movements will involve location tracking or be able to identify particular kinds of movements and, hence, gather data concerning where and what an individual was doing at a particular moment.

**Mitigation:** The app does **not** record the user’s location. It cannot identify particular action types. It collects data on acceleration, intensity of movement, and inertia of the body. As these



biometrics are not sufficient on their own to identify an individual, they are fused with the other more reliable biometrics (e.g., iris, face) to help raise the accuracy of the identity verification process.

#### **4.10 Metadata Fusion for Risk Assessment as Invasive**

**Concern:** The combination of various kinds of metadata may potentially be invasive regarding the privacy of the individual. Although one piece of metadata on its own may not transgress an individual's privacy, it has been shown that combining various kinds of data can create a robust profile about a person and lead to identification (Matheson 2018). Furthermore, the assignment of a risk level to an individual can create hardships for that individual if mistakes are made as it is very difficult to have a risk level changed (Florence 2006).

**Reply:** This is a reply and not a mitigation as the details of this task are only being determined at the time of the writing of this deliverable. As a result, many of the relevant details to conduct an appropriate ethical analysis of the task are still vague or unanswered. Therefore, although this entire report will be updated after consultation with partners and resubmitted in M26 (Oct 2021), this concern in particular requires revisiting. Nevertheless, the following issues have already been identified as relevant to ethics, privacy and data protection.

Regarding the project/development phase of this task, it is still undecided among partners whether real data or synthetic data will be used to build and evaluate the system. Clearly, real data would require compliance with the GDPR whereas synthetic data would not.

Regarding a potential deployment, the kind of border crossing would determine which kinds of metadata are available. For example, the biometric corridor will not be deployed at a land border where travellers cross mainly in vehicles. To conduct a proper ethical and privacy assessment, it must be clear which data will be included in the risk assessment.

Since false positives would create significant hardships for individuals, the proportionality of assigning each traveller a risk level must be addressed in detail.

#### **4.11 Encumbering Migrants and Refugees Entering the EU**

**Concern:** Migrants who, according to EU law, are not entitled to settle in the EU are becoming more and more inventive in circumventing the restrictions. As such, it is doubtful whether strict border control has the intended effect (i.e. decrease of irregular immigrants). Quite often extraterritorial surveillance leads to the so-called 'balloon syndrome', whereby a migration flow is not stopped but simply displaced. Of critical ethical concern is the fact that the safe itineraries are blocked does not imply that people abandon their plans to enter Europe. Rather, these people take more dangerous routes. Since these alternative routes expose immigrants to even greater risks, the tightening of the external borders leads to an increasing number of fatalities among irregular immigrants. Between 1993 and 2006, more than 7000 deaths have been documented of people trying to reach the European border. Moreover, the number of deaths increased significantly after controls were applied to the extended borders in 1995 (Spijkerboer 2007; Dijkstra et al 2011: 2).

Secondly, migrants are in a vulnerable position vis-à-vis the state concerning access to and knowledge of democratic means of appeal. In theory a migrant who is turned away for the wrong reasons or because of a technological failure may obtain a lawyer and eventually go to

the European Court. However, his/her position is weaker than the citizen who always has his democratic rights: to go to the media, to organize a protest or boycott and to vote at election time. Those most affected by border policy and its new technologies are not citizens of the desired country but come from elsewhere. The usual mechanisms for democratic control are missing (Dijstelbloem et al 2011: 15).

Thirdly, there is a risk that the EU border is functioning as a kind of testing centre for different kinds of new technologies, with the migrant as a test subject (or test object). The testing of new technologies is not ethically problematic in itself. It is important to learn from mistakes and improve on accuracy, efficiency and security. However, it is also important to give voice to the migrant and establish mechanisms for those most affected by the technologies to provide feedback on the systems and to exercise their agency, rather than be treated as mere objects.

**Mitigations:** These are highly complex ethical issues without clear mitigations or solutions. However, promoting ethical awareness is an important step in ethical reflection and ethical action. If more border security stakeholders become aware of these issues, then the possibility is raised to act more ethically even if “ethical perfection” is impossible. Indeed, ethical ignorance more often than malice leads to harm or wrongdoing. This document, and the ethics training and monitoring carried out by partner TRI, aim to achieve this end.

Regarding providing migrants with opportunities to exercise their agency, the EU has recently taken steps to achieve this end. The first meeting of the Commission expert group on the views of migrants took place on 12 November 2020. The Commission created this group to involve migrants in the development of EU migration, asylum and integration policies ([https://ec.europa.eu/home-affairs/news/integration-and-inclusion-migrants-first-meeting-commission-expert-group-views-migrants\\_en](https://ec.europa.eu/home-affairs/news/integration-and-inclusion-migrants-first-meeting-commission-expert-group-views-migrants_en)). **D4FLY will continue to monitor this group’s statements and advice to see if it can implement any of its recommendations.**

#### **4.12 Societal Acceptance**

**Concern:** Several of the concerns stated above could have a negative effect on the societal acceptance of the D4FLY tools. Owing to widespread misuse and false positives associated with biometric and surveillance technologies, especially face recognition tools, there have been justifiable calls to ban such technologies (Roussi 2020). This issue is of critical ethical concern because EU residents and citizens should not feel that they live in a surveillance state, that their movement is being tracked or that their personal data is being collected and analysed without their consent. Such actions can lead to ‘the chilling effect’ whereby law-abiding individuals are afraid to participate in ordinary activities out of fear of the technology in use.

**Mitigation:** With the exception of EU confidential information or partners’ IP, all aspects of the D4FLY project are transparent and public. The purpose of this document, as well as the PIA, the EC ethics requirements and the website are to make the project as transparent as possible to the public. Since the project is not engaging in blanket surveillance, and the D4FLY tools are under careful and ongoing ethical, privacy and data protection monitoring, people will likely accept the tools. Moreover, the identity verification tools are being designed to help travellers cross the border while on-the-move by making the identity verification process more accurate and more efficient.

#### **4.13 Automation Bias**

**Concern:** Automation bias is the propensity for humans to favour suggestions from automated decision-making systems and to ignore contradictory information made without automation, even if it is correct. As the D4FLY project is designing several automated tools to make identity verification and document fraud detection more accurate and more efficient, end users could potentially develop automation bias thereby risking the rights of travellers or applicants for residency or asylum.

This same bias might occur with travellers as well. Can partners be confident that all enrolled travellers understand their rights, obligations, lines of redress, and that everyone has been sufficiently attentive to the information provided before giving consent? Or will travellers trust the technology without taking careful consideration of these matters?

**Mitigation:** No D4FLY tool will make an automated decision without human oversight. The identity verification tools will be used as a first-line check, but will not replace human border guards who will continue to perform second-line checks. Similarly, for document fraud detection, the automated AI will be an aid for the human experts and not their replacement. Nevertheless, end users must guard against bias. End users must be trained to continue to use uniquely human skills and judgement – intuition, empathy, critical thinking and abstract reasoning – always remembering that the tools are precisely that—tools. They can be used by humans, but never followed unquestioningly.

For the travellers, the D4FLY system will provide a clear statement of information, rights and risks at enrolment sites (e.g. kiosks or apps). Additionally, the D4FLY website will be accessible to the public and will contain detailed information about the tools, statements of participants' data protection and privacy rights and clearly detailed paths of redress. Nevertheless, partners should keep in mind that service providers can never be completely sure that customers have done their due diligence in reading the information carefully and reflecting on their rights and corresponding risks.

## 5 ETHICAL OPPORTUNITIES

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EIAs focus mainly on ethical risks. This attention is appropriate since the risks are ones affecting fundamental values, rights, wellbeing, discrimination, equality, fairness and dignity. However, it is worthwhile to identify ethical opportunities associated with new technologies as well. Doing so can aid developers in thinking about how to steer their current design, and even influence future design work.

### 5.1 Contactless verification

Using contactless face recognition and iris scanning to verify a traveller's identity has several ethical advantages.

- a. Since most fingerprint scanning still requires touching the finger to the scanner, it can spread bacteria and viruses. Not just an issue of health, promoting individual and societal wellbeing is an objective of all H2020 projects.
- b. In some cultures it is customary for women to wear elaborate henna artwork on their hands, which can make fingerprint reading difficult (Murad 2020).
- c. Additionally, some Muslim women wear a niqab covering their face with the exception of the eyes. Iris scanning would allow them to stay clothed as they wish (Murad 2020).
- d. Cancer patients can undergo drastic changes to their fingerprints making travel difficult (Azadeh et al. 2016).

### 5.2 Privacy Enhancing Tool

D4FLY is investigating the use of blockchain to transfer biometric data such as a face image for identity verification. If successful, the traveller would remain in possession of his/her biometric data at all times. Although still in an early exploratory phase, this possibility would be a significant boost to the protection of personal data and privacy enhancement.

### 5.3 Preventing serious organised crime

Human trafficking, smuggling, drugs trafficking as well as terrorism are enabled in large part by irregular migration and document fraud (Europol 2017; Crates 2020). Enhancing the capacity to detect identity fraud can have a significant impact on reducing serious organised crime. As these crimes are threats to victims' fundamental rights and dignity, their hindrance is essential.

### 5.4 Document fraud and human expertise

The AI designed to detect document fraud can help applicants for asylum and residency by reducing the number of documents that human experts need to examine thereby providing them more time for more difficult cases. Having less-stressed and over-worked document investigators allows for more careful consideration of applications.

## 6 RESPONSIBILITY

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Although most people have an implicit understanding of the meaning of responsibility, it is sensible for the D4FLY project and its partners to make an explicit statement regarding how responsibility is understood.

### 6.1 What is Responsibility?



**Responsibility in the context of this project is the preparedness to accept mistakes and wrongdoing, and the readiness to take action to remedy those mistakes and wrongs.**

The purpose of this document, the PIA, the ethics deliverables and the ethics workshop with partners is to identify the activities with which mistakes and wrongs could occur, in order to avoid them in the first instance, but also to prepare partners to acknowledge them and to take appropriate mitigating or reparatory actions should they occur.

The project has established clear lines of accountability especially through documenting responsible parties such as data collectors and DPOs, but also by carrying out DPIAs for data collection events involving human subjects. These lines of accountability are public and included in WP11 deliverables, and the D4FLY website.

### 6.2 Collective Responsibility

Participation in a group or organisation does not lessen an individual partner's responsibility. In addition to individual responsibility, we can identify "collective responsibility". Collective responsibility is derived from collective ontology and agency.

Collectives range from highly structured entities, like corporations, to loosely structured groups of as few as two people. The number of members of a collective is not necessarily an indication of its complexity or simplicity. Large groups, such as a rioting mob, might have little or no structure; small groups such as an academic department, might have quite a complex structure outlined in a formal constitution and well-defined administrative roles and responsibilities. The more structure a collective has, the easier it is to dissociate its identity from any particular contingent of its members. For example, statements such as "The English defeated the French at Agincourt", "Greenpeace protests new whaling procedures", and "The Gulf Oil Corporation raised the price of gasoline by 5 cents per gallon" indicate that we generally accept collectives to make and act on decisions (French 1984; List and Pettit 2011; Miller 2016). To say that the Gulf Oil Corporation agreed to raise the price of gasoline is clearly not equivalent to saying that each employee at the corporation agreed to raise the price of gasoline. To say that the English defeated the French at Agincourt is not equivalent to the claim that each English soldier and commander defeated each French soldier and commander.

To reduce such group agents to their individual members would arguably miss the fact that many decisions and acts are not necessarily aggregative.

Nevertheless, philosophers do not agree about the necessary features that define groups as cohesive agents as opposed to aggregates of individuals. Although most conclude that having and acting on intentional structures is both necessary and sufficient (e.g., French 1984; Isaacs 2011), others argue that the power to influence others confers non-aggregative agential status on certain groups (Smiley 2010). Despite a lack of consensus on this matter, many philosophers and social theorists are in agreement that to reduce the actions, decisions, and intentions of certain groups to those of its individual members would omit reference to the manner in which the group as a collective entity was able to make decisions and act (Gilbert 1992; Searle 1995; Tuomela 2013).

A direct result of identifying collective action is identifying collective responsibility. Although the D4FLY consortium is not a legal entity, it fits the preceding description of a collective agent, implying it can be ascribed responsibility as well. The D4FLY consortium, and each of its partners is ethically responsible for any harm or wrongdoing resulting from its actions. Of course, all partners are taking all precautions to avoid any harms or wrongs, and it certainly does not anticipate any occurring. Simultaneously, the consortium is responsible in the manner defined above: it is prepared to accept any mistakes or wrongdoing, and it is ready to remedy any mistakes or wrongs.

## 7 RECOMMENDATIONS

The H2020 project PERSONA, ‘Privacy, Ethical, Regulatory and Social No-gate crossing point solutions Acceptance’<sup>8</sup> has developed ethical requirements for smart border technologies (Persona, D1.3). D4FLY willingly adopts these recommendations with some small moderations, as they endorse the values identified by the foregoing ethical analysis (autonomy, dignity, non-discrimination, fairness, equality, no harm, fundamental rights, protecting the vulnerable, necessity and proportionality), match the above-described mitigations and apply directly to the D4FLY context.

The following ethics recommendations ought to be combined with the privacy recommendations from D3.2 and adopted by D4FLY partners.

ID	Description
ER1	<b>Informed consent:</b> the users of borderless crossing technologies should be reasonably informed about the data that are being processed and about how the system works, in order to interact and possibly challenge it.
ER2	<b>Respect of freedoms:</b> individuals (notably travelers and border customs) should remain free to make decisions from themselves. Mechanisms for human oversight should be in place to ensure human intervention in particular situations (e.g. in cases of false positives or false negatives).
ER3	<b>Identity:</b> Compatibly with the architecture of the identification system, the ‘what’ element of one’s identity (a biometric token such as an iris scan, but also the number of our passport) should not take over or disregard the ‘who’ element of identity (personal stories, the complexity of one’s lived experience).
ER4	<b>Misuse:</b> Travel and biometric data should not be used beyond the original purpose.
ER5	<b>Technical robustness and safety:</b> technologies deployed at the border could be inaccurate or unreliable due to their technical limitations (e.g. facial recognition subject to spoofing, iris scan does not work in certain environmental conditions).
ER6	<b>Non-discrimination:</b> AI tools must be trained on images of people with diverse ethnic, gender and sex backgrounds and tested and audited for bias.
ER7	<b>Equality:</b> the users are ensured equal distribution of benefits and costs by using borderless crossing technologies, without any unfair bias or stigmatization.
ER8	<b>Equality:</b> D4FLY kiosks must be widely deployed so that membership in the D4FLY system does not become a proxy for high socio-economic status.

<sup>8</sup> 787123 PERSONA (H2020-SEC-2016-2017-2)

ER9	<b>Accessibility:</b> the technologies are designed to be usable by people with disabilities, the elderly and the vulnerable.
ER10	<b>Accountability:</b> mechanisms have to be in place to ensure accountability and responsibility for designing and deploying biometrics and AI systems and their outcomes.
ER11	<b>Transparency:</b> the data collected, the functioning of the system and business models should be traceable, explainable, and communicated to users.
ER12	<b>Ethical Sensitivity:</b> designers and border guards ought to read this document to become aware of ethical complexities so that values and rights do not get ignored.
ER13	<b>Legal due diligence:</b> designers, biometrics companies, LEAs and border control authorities should engage in identifying laws and otherwise regulatory requirements and design borderless technologies that respect such requirements/ (The D4FLY legal analysis will take place in a subsequent deliverable, D3.4).



## 8 CONCLUSIONS

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This deliverable (D3.3) is an ethical impact assessment of the D4FLY tools and system. It based its findings on EU legal documents and ethical theories. After identifying ethical concerns, mitigations for those concerns and ethical opportunities arising from the D4FLY tools, this document makes recommendations to project partners for the ethical design and deployment of its technologies. The ethical recommendations ought to combined with the privacy recommendations made in D3.2, PIA. As described in the GA, this document will be discussed with partners and the ELAG at a workshop to be held between project months 18-26. The results of these discussions will be added to this document and then resubmitted to the EC.

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