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Introduction

Objective of this deliverable is to introduce our answers to a set of questions (below in blue) from the European Commission (see the WP9 of the technical annex of the grant agreement) in the field of ethics in ROMI

Deliverable

Please find below our answers:

2.1. Details on the procedures and criteria that will be used to identify/recruit research participants must be provided.

The project does not need the involvement of research participants.

2.2. Detailed information must be provided on the informed consent procedures that will be implemented for the participation of humans.

The project is not an health project with the involvement of patients.

2.3. Templates of the informed consent forms and information sheet must be submitted on request.
2.9 The applicant must confirm that ethics approvals for the research with humans have been obtained, and are kept on file.

The project focuses on crops and robot technology. It will not imply research on human, at any level of the research.

4.3. Justification must be given in case of collection and/or processing of personal sensitive data, such as video or still images of humans operating during tests or demonstrations.

The experimental part of the project does not collect or process personal sensitive data. The tests will collect only information about plants (shape or state of development, growth, etc) from the use of cameras on the robot and the drone pointed on the ground.

Even if they are not the core of the project, videos of the tests could occasionally register the participants monitoring the robot, or the drone during the test sessions. In addition, the metadata attached to crops, will include the location (GPS and/or ad hoc Cartesian coordinates) of the farms and therefore of the persons which performed the tests. Both

images and coordinates are considering as personal data by the European legislation[1]. As a matter of fact, these data are considered with a low level of threats to the private life.
However, the consortium will meet the requirements of the General Data Protection Regulation[2], especially concerning the consent, through a signed sheet given to the participants before the tests. To ensure the safety of the personal data, a process of storage of data is more particularly implemented and will be standardized among all partners through a Data Management Plan.

The data produced during the experimentation (WP7) will be gathered in a common database, shared only among the partners during the lifetime of the project.

4.4. Further information must be provided on the procedures that will be implemented for data collection, storage, protection, retention and destruction and confirmation that they comply with national and EU legislation.

According to the project file: “Data collected during the project will include:

- **Images of the crops** acquired by the sensors of the robot. This will concern the crops cultivated in the experimental fields of the partners as well as test fields of participating, third-party farmers.
- **Metadata** attached to crops data. Location (GPS and/or with ad hoc Cartesian coordinates) and time and date information will be attached to each image. Images may result from various configurations (single or multiple cameras/views) or various sensors (visual RGB, depth, Near-Infrared). Such information about the type of sensor as well as the precise robot version used to capture the data will also be included in the metadata file.
- **State information of the robot:** the data associated to the robot behaviour like the time passed on the different tasks and its navigation and tools trajectories will be recorded.
- **Environmental conditions** gathered daily by sensors (temperature and humidity of the ground and air) will be stored and external data related to weather and pollution will also be included.”[3]

As a consequence, the project will involve two types of data:

- The data which are not personal
- The specific personal data

Regarding data which are not personal, all aspects related to collection, storage, protection, retention and destruction are evoked in the data management plan.
Regarding specific personal data, special measures (detailed below) have to be taken, to comply with the European and national laws.

<u>National and European legislation</u>

[1] « ‘personal data’ means any information relating to an identified or identifiable natural person (‘data subject’); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person» Article 4 – 1, General Data Protection Regulation

[2] European Council, European Parliament, 27 April 2016, On the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation), Regulation n°2016/679

[3] File submitted for the grant, p. 38

At the beginning of the project, the consortium has agreed on following the Directive 95/46/EC on the protection of individuals concerning the processing of personal data and on the free movement of such data, and the General Data Protection Regulation (GDPR) as the common legal framework within the European Union. They involve obligations concerning the treatment of personal data in general, and in the scientific field in particular[4]. The EU legislation asks for a clear consent before all collection of personal data[5], and the guarantee of the overall principle of transparency[6] during all the process. Concerning the storage, protection, retention and destruction of the data during all the lifetime of the project, guarantees must be provided, especially concerning the safety[7] and the rights of access[8], to rectification[9], and to erasure[10] personal data, as much as the rights to restriction of processing, to data portability and to object. Those conditions are standardized among all European member states, but national processes of notification to National Offices of the personal data protection remain.

The measures taken by the consortium reach the interest of the scientific researches to ensure the integrity of data, by a confidentiality process, but also to meet the requirements of national laws concerning the protection of personal data. Indeed, because the project could collect personal data, the database has to follow the national requirements to ensure the safety of the data. As a matter of fact, national laws consider the responsibility of the "data controller" (the consortium) to define all the useful precautions[11] to ensure the safety of the

[4] "the processing of personal data for scientific research purposes should be interpreted in a broad manner including for example technological development and demonstration, fundamental research, applied research and privately funded research", §159, GDPR, *Op. Cit.*

[5] "Consent should be given by a clear affirmative act establishing a freely given, specific, informed and unambiguous indication of the data subject's agreement to the processing of personal data relating to him or her, such as by a written statement, including by electronic means, or an oral statement. » §32; "It is often not possible to fully identify the purpose of personal data processing for scientific research purposes at the time of data collection. Therefore, data subjects should be allowed to give their consent to certain areas of scientific research when in keeping with recognised ethical standards for scientific research. Data subjects should have the opportunity to give their consent only to certain areas of research or parts of research projects to the extent allowed by the intended purpose", §33, *Ibid.*

[6] "The principle of transparency requires that any information and communication relating to the processing of those personal data be easily accessible and easy to understand, and that clear and plain language be used", §39, *Ibid.*

[7] "The processing of personal data for archiving purposes in the […] scientific […] research […] should be subject to appropriate safeguards for the rights and freedoms of the data subject pursuant to this Regulation. Those safeguards should ensure that technical and organisational measures are in place in order to ensure, in particular, the principle of data minimisation" §156, *Ibid.*

[8] "The data subject shall have the right to obtain from the controller confirmation as to whether or not personal data concerning him or her are being processed", Article 15, *Ibid.*

[9] "The data subject shall have the right to obtain from the controller without undue delay the rectification of inaccurate personal data concerning him or her. Taking into account the purposes of the processing, the data subject shall have the right to have incomplete personal data completed, including by means of providing a supplementary statement." Article 16, *Ibid.*

[10] "The data subject shall have the right to obtain from the controller the erasure of personal data concerning him or her without undue delay", Article 17, *Ibid.*

[11] « The data controller shall take all useful precautions, with regard to the nature of the data and the risks of the processing, to preserve the security of the data and, in particular, prevent their alteration and damage, or access by non-authorised third parties." Article 34 *Loi Informatique et Libertés* (France) "The person in charge of the file, and, where appropriate, the person in charge of the processing, must adopt the necessary technical and organizational measures that guarantee the security of the personal data and avoid their alteration, loss, treatment or unauthorized access", Article 9.1, Organic Law 15/1999, *on the protection of personal data.* (Spain).

database. Thus, for instance, the Spanish law asks for a special “mechanism that hinders opening”[12].

To collect the data

To ensure the “freely given, specific, informed and unambiguous indication of the data subject's agreement”, a sheet will be signed by all participants before any tests. It is adapted in order to comply with the national requirements. More information concerning the consent, and the compliance with national regulations are provided in the following question.

Treatment and storage

To ensure their storage in a way that agreed with the national and European laws on protection of personal data, in all cases where user data are sensitives or required to be anonymized, they will be treated as research data in line. The right to access, of modification and erasure of the information concerning person will be guaranteed. No personal data will be made available outside of the project partners unless explicitly agreed by the project partners and users involved. In particular, the consortium will ensure that the location of fields will be reduced to coarse coordinates so that its precise location cannot be recovered, following the European principle of *privacy by design*.

Retention and destruction

A the end of the project, the database will be released to public consultation, in the idea to implement an open hardware model, shared by a community gathering farmers, engineers, scientists, entrepreneurs around the table. Thus, for the robots/drones which will be used by farmers, the owners will be given the possibility to share their data at the scale they wish in the social network dedicated to the project and default usage case will include the possibility to manage data on a local server. To ensure the privacy of participating third-parties (particularly farmers), the consortium will fully anonymize all data before it is shared.

4.5. Detailed information on the informed consent procedures that will be implemented in regard to the collection, storage and protection of personal data must be submitted on request.

As it was previously explained, information may result from cameras and included personal geographical data, with the signed consent of the participants. Both are considered as personal data, claiming a special consent of the participants. The RGPD as a common legal framework defines the consent as “any freely given, specific, informed and unambiguous indication of the data subject's wishes by which he or she, by a statement or by a clear affirmative action, signifies agreement to the processing of personal data relating to him or her”[13].

The consent sheet will be adapted to national laws and National Offices of the personal data protection requirements and gathered all the requirements provided by national laws:

- In France, the requirements are set out by the Law “Informatique et Libertés”[14] and the CNIL[15].

[12] “The storage devices for the documents containing personal data shall have mechanisms that hinder opening. When their physical characteristics do not permit such a measure, the data controller shall adopt the measures that prevent access by unauthorised persons. » Article 107, Royal decree 1720/2007, *which approves the regulation implementing organic law 15/1999, of 13 December, on the protection of personal data* (Spain)

[13] Article 4-11, RGPD, *Op. Cit.*

[14] Loi n°78-17, 6 janvier 1978, *Loi relative à l'informatique, aux fichiers et aux libertés*, available at https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000886460

- In Germany, the sheet follows the obligations of the Federal Data Protection Act and the Aufsichtsbehörden und Landesdatenschutzbeauftragte (which ask for the written and clear consent of the person concerned, with the mention of the object of the research[16]).
- In Spain, the sheet will follow the requirements of the article 5 of the Law Of Data Protection and the Agencia Española de Protección de Datos[17]. Furthermore, the pilot licenses and public / private spaces are considered and followed under spanish law.

An example of a sheet is joined in the template asked in the 4.6 question.

4.6. Templates of the informed consent forms and information sheet must be submitted.

I, the undersigned **[name and surname]**, confirm to be aware of the following information and accepted them:

The data **[type of data]** collected are stored in an electronic database, monitoring by **[name of the monitor]**, in order to **[intended use].**

This data will be stored for **[time]** and will be accessible only to **[list of authorized person]**.

Accordingly to the national law **[name of the national law]**, and the European General Data Protection Regulation, you could exercise the right to access your files, and asks for a rectification to: **[name of the Data Protection Officer].**

[Agreed and accepted]

Date **Location**

Signature

7.1. The applicant must provide further information about the possible harm to the environment caused by the research and state the measures that will be taken to mitigate the risks.

One of the main purposes of this project is to develop an open and lightweight robotics platform for micro farms, in order to assist farmers in weed reduction and crop monitoring. Through this project, farmers will save time (approximately 25%) and be more productive without using chemicals or pesticides. Thus, the platform will provide detailed information on sample plants, which acquires more global information to prevent stressed plants and follow closely the growth of the harvest, still without chemicals. As a long-term consequence, the ROMI project will assist the choice of the farmers to develop sustainable farming techniques.

7.3. The applicant must ensure that appropriate health and safety procedures conforming to relevant local/national guidelines/legislation are followed for staff involved in this project.

Health

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[15] Commission Nationale de l'Informatique et des Libertés,

[16] Article 4 §a – al. 1 and al. 2, *Bundesdatenschutzgesetz*, January, 13, 2004, available at : http://www.gesetze-im-internet.de/englisch_bdsg/index.html

[17] "1. The interested parties to whom personal data are requested must be previously informed in an express, precise and unambiguous way: a) The existence of a file or treatment of personal data, the purpose of the collection of these and the recipients of the information.; b) The mandatory or optional nature of your response to the questions that are asked ; c) The consequences of obtaining the data or the refusal to supply them ; d) Of the possibility of exercising rights of access, rectification, cancellation and opposition ; e) Of the identity and address of the person responsible for the treatment or, where appropriate, of his representative.", Article 5-1, Organic law 15/1999, *Op. Cit.*

Concerning the first side of the concern, the health, the robot is entirely mechanical and numerical, without chemicals, or pesticides. So there is no impact on humans, animals, and plants health – apart from weeds. In a field where many young farmers entering the profession and actually quit after five years of intensive labor, because of exhaustion or muscular problems, among other issues, the mechanization will have a positive impact on the health of farmers by reducing the painful work and saving their time. Reducing the manual work is currently significant due to the impossibility to use available technological means such as tractors on such small surfaces.

Safety issues

The safety reaches two types of concerns. On one hand, the building standards of the robot, and on other hand, the authorization at national levels to use a drone in a public space.

Safety standards for robots and drones

- Concerning specifically the safety standards for the robot, the consortium will follow the European and national laws regulating the use of robots. An internal security committee will be set out by the consortium to make sure that experiments pursued during this project will comply with:
  - the requirements of "the prototype" proposed by EASA on drones[18]
  - the requirements from CERNA for the regulation of robots and autonomous devices[19]

Furthermore, the consortium has decided to follow the European Parliament resolution of 16 February 2017 on Robotics[20]. This resolution gathered recommendations on the safety of the robot, especially for the staff. The security committee will closely follow the discussions about these requirements and the potential new regulations that could unfold from there. In particular, the consortium will include a emergency button on the robot so that it can be stopped

- Concerning the drone, it is already used by the partner IAAC, and respecting all the safety norms required.

Nevertheless, with the development of the automatization of the agricultural machines, the ISO norms committee is near to release a package of safety norms, useful for the robot and the drone. Therefore, the ISO norm 18 497 (Safety of highly automated agricultural machines) is currently under consideration[21]. The General Assembly want to study the possibility to standardized the conditions of safety set by this ISO norms.

The consortium could consider the need to contact an engineering office to assist the consortium with the security aspects of the robot.

Using a drone in a public space

All European members of the consortium have different concerns about safety. To obtain an authorization for the drones in the European country, the user (the consortium, then the farmers) has to prove to national authorities the respect of safety requirements. As a

[18] https://www.easa.europa.eu/easa-and-you/civil-drones-rpas

[19] http://cerna-ethics-allistene.org/digitalAssets/38/38704_Avis_robotique_livret.pdf

[20] Resolution (2015/2103(INL)), available at : http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+TA+P8-TA-2017-0051+0+DOC+PDF+V0//EN

[21] Available at https://www.iso.org/fr/standard/62659.html

consequence the drone will have to comply with obligations like a pilot licence, declaration to national authorities and implementation of safety processes. Those obligatory measures draw a complete package of safety standards to ensure the safety of the staff and the user.
In France, the arrêtés of December 17, 2015[22] have implemented obligations (as a process of emergency landing) at the annex II. Thus, it limits the high, near crowded areas, in order to avoid it to crash on staff, or on people. The French law[23] is about to evolve in 2018 to implement new safety requirements (such as a night light), and mostly an obligation of training the staff or the farmers to use the drone. Thus, a user manual as to be provided with the drone.

The German regulation concerns specifically the safety during the flights. The ordinance of the April 6, 2017[24] restrained the high and the location of the flight. Licences could be asked to prove the knowledges of the staff, for drone louder than 5kg.

In Spain, the drone is already commercialized and tested under the requirements of the Spanish law[25]. The law sets out enforced obligations concerning the formation of the drone pilot, and a technical examination to ensure the drone meet the safety requirements of the National agency[26].

The trend is to enforce those obligations, especially in France. Aware of it, the partners will be in touch with the national agency in charge of the drones:

- In France : the Direction Générale de l'Aviation Civile
- In Germany : the Bundesministerium für Verkehr und digitale Infrastruktur
- In Spain : the Agencia Estatal de Seguridad Aerea

8.1. Details on potential dual use implications of the project and risk-mitigation strategies must be provided and the applicant must confirm that ethics approval has been obtained, and is kept on file (if applicable).

The potential dual use of the data is quite low due to the data themselves, which are not involving activities or results raising security issues, or `EU-classified information'.

Every data collected stay among the partners, through the internal encrypted database. Moreover, the tests will not involve third-parties not included in the project, reducing the risks of dual use of the data during the experimentation.

At the end of the project, when the data will be released to public consultation, dual uses have not to be taking into account. Indeed, they will become a part of an open-access software, under a Creative Common licence, becoming naturally free of use.

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[22] Arrêtés, December 17, 2015, *relatif à l'utilisation de l'espace aérien par les aéronefs qui circulent sans personne à bord***,** (available at **:** https://www.legifrance.gouv.fr/eli/arrete/2015/12/17/DEVA1528469A/jo); *relatif à la conception des aéronefs civils qui circulent sans personne à bord, aux conditions de leur emploi et aux capacités requises des personnes qui les utilisent,* (available at https://www.legifrance.gouv.fr/eli/arrete/2015/12/17/DEVA1528542A/jo/texte)

[23] Loi n° 2016-1428, October 24, 2016, *relative au renforcement de la sécurité de l'usage des drones civils*, available at https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000886460

[24] Official sum up of the obligations are available at http://www.bmvi.de/SharedDocs/DE/Artikel/LR/151108-drohnen.html

[25] Royal decree 1036/2017, December 15, 2017, *por el que se regula la utilización civil de las aeronaves pilotadas por control remote*, available at http://www.boe.es/buscar/doc.php?id=BOE-A-2017-15721

[26] Official sum up available at :
http://www.seguridadaerea.gob.es/lang_castellano/cias_empresas/trabajos/rpas/marco/default.aspx

Nevertheless, the potential dual-use could also results of the drone himself. The microfarms could be implemented near to sensitive zones, or crowded zones. On that matter, national legislations are quite strict:

- Tougher obligations to prove the safety, especially concerning the control of the drone, are implemented, in order to limit the risks of crash.
- National laws limit the ability of flights through a restrictive authorization. This authorization could be deleted in case of threats for safety.
- Finally, the drone will stay near to the crops, excluding the possibility to take a global picture, and will concentrate on the crops.

10.1. Details on measures to prevent misuse of research findings must be provided.

There is no risk of misuses of research findings at our knowledge, due to the absence of sensitiveness in the data and the research.

Nevertheless, as a possibility of misusing concerns all partners, it shall be submitted to the General Assembly, which could take all the useful measures, with the agreement of all the consortium members.

11. Before the beginning of an activity raising an ethical issue, the applicant must confirm that any ethics committee opinion required under national law has been obtained, and are kept on file.

The data on plants, crops and field required no declaration to an ethics committee.

The ethical issues raised by the project are connected only to the protection of personal data and the safety of the robots and drones.