



**“wearable EEG system for Auditory Attention Recording”**

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## **Deliverable 8.2: “Data Management Plan”**

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**M3**

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#### Releases history

Release	Date		Description
Version 1	16/03/2023		First version of the DMP. It can be revised if needed.

## ABSTRACT

The wEAR Data Management Plan (DMP) is in line with the Horizon Europe DMP template, designed to be applied to any Horizon Europe project that produces, collects or process research data.

This first Data Management Plan aims to describe and present the data management principles and strategies, embracing the Open Science Practices, which are in line with the host institution's core values.

The DMP should be considered as a *living document*, since it should be updated as the implementation of the project progresses and when significant changes occur.

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## 1. DATA SUMMARY

The wEAR Data Management Plan (DMP) aims to provide a strategy for the management of key data, which will be generated and collected during the wEAR project, and to optimize access and re-use of research data. All the Young Researchers SoE projects must try to disseminate and share as much information as possible. In this regard, the main purpose of the DMP is to set a plan focused on the maximization of the accessibility and intelligibility of the data generated during the wEAR project in order to comply with the guidelines of the “FAIR” data. Each data set created during the project will be assessed and categorized as open, embargo or restricted by the owners of the content of the data set.

All the data sets, regardless of their categorization, will be stored in a Google Drive folder created as internal database. The outputs that have the possibility to be protected, will be managed with the Industrial Liaison Office (the University’s technology transfer arm): in line with the rules of Horizon Europe and Italian Grants, the *consortium* will try to protect the foreseen outputs of the plan effectively since they have possible industrial and commercial uses in the bioelectronics sector. To this end, the *consortium* will discuss Intellectual Property (IP) at the earliest phases of the project with Industrial Liaison Office, mindful of not limiting dissemination, to secure project outcomes. The Industrial Liaison Office will support the *researcher* in evaluating findings suitable for potential patenting. If a patenting opportunity arises, the Office will support the *researcher* in preparing and filing the patent.

Overall, the wEAR Data Management strategy that will be followed, can be schematized as reported in Fig. 1.

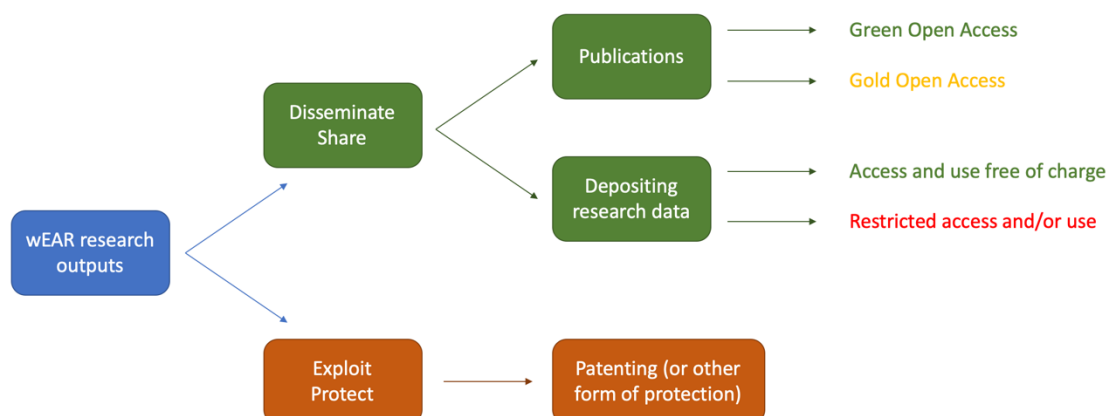


Fig. 1 : wEAR Data Management strategy

wEAR will embrace the Open Science Practices, which are in line with the host institution’s core values ([https://www.unica.it/unica/it/unica\\_e\\_open\\_access.page](https://www.unica.it/unica/it/unica_e_open_access.page)).

- (i) Open access. The results achieved within wEAR will be made available and highly discoverable through open access journals, to ensure the work will be available to other scientists as well as members of the public. Part of

the funding, in collaboration with the Host Institution, will be devoted to the payment of open-access fees for many highly ranked journals.

- (ii) The supervisors will promote the use of the pre-printing, which allows wide and early dissemination and accessibility of the data/results that often improve papers before the final versions are published.
- (iii) Open peer review will be preferred, whenever possible, since it is a more transparent alternative than “blind” peer review.
- (iv) Trusted repositories, such as IRIS – the repository of the host institution (<https://iris.unica.it>) – or ZENODO (<https://zenodo.org>), an open access repository for all fields of science that allows uploading any kind of data file formats, will be used to share and make accessible data and results and to promote transparency and reproducibility.

Citizen, civil society and end-user engagement. **Co-creation activities** will be carried out in Work Packages 3-4-7: the participation of volunteer groups for the tests will make them as active part of the scientific research. **Co-designed activities** (e.g. workshops, roadmaps etc.) will be planned in order to communicate the research (i.e., ethics, benefits, challenges of wEAR) to a wide non-scientific audience. Wherever it will be possible, citizens and stakeholders will be invited to the labs for popular science demonstrations.

### 1.1 WEAR TYPE OF DATA

This section will generally describe the data that will be created and used in the project (type, format, size and eventually the origin of the data).

All Deliverables and Milestones of the project will be produced before the deadline stated in the proposal (Allegato 4C), and stored into a Google Drive folder created as internal database and into IRIS – the repository of the host institution (<https://iris.unica.it>). They will be shared with all the partners of the *consortium*, as well as official project reviewers. Once generated, these documents will be stored in .pdf format and digitally signed by the researchers and the supervisor (only if needed). The list of the Deliverables and Milestones is here reported:

<b>Work Package Number</b>	<b>WP1</b>
<b>Deliverable / Milestone to be produced</b>	<i>Deliverable D1.1: “Specification of the functional electrodes”.</i>
<b>Month of delivering</b>	M2 - (before 20-02-2023)
<b>Delivered</b>	M2 - (21-02-2023) on time with minor deviation (1 day of delay). Published on IRIS repository.

<b>Work Package Number</b>	<b>WP8</b>
<b>Deliverable / Milestone to be produced</b>	<i>Deliverable D8.1: “Career Development Plan”.</i>
<b>Month of delivering</b>	M2 - (before 20-02-2023)
<b>Delivered</b>	M2 - (20-02-2023) on time. Published on IRIS repository.

<b>Work Package Number</b>	<b>WP8</b>
<b>Deliverable / Milestone to be produced</b>	<i>Deliverable D8.2: “Data Management Plan” (this document).</i>
<b>Month of delivering</b>	M3 - (before 20-03-2023)
<b>Delivered</b>	M3 - (16-02-2023) on time. Published on IRIS repository.

<b>Work Package Number</b>	<b>WP2</b>
<b>Deliverable / Milestone to be produced</b>	<i>Deliverable D2.1: "Functional thin electrodes validation".</i>
<b>Month of delivering</b>	M6 - (before 20-06-2023)
<b>Delivered</b>	X

<b>Work Package Number</b>	<b>WP9</b>
<b>Deliverable / Milestone to be produced</b>	<i>Deliverable D9.1: "Ethical approval for tests with volunteers".</i>
<b>Month of delivering</b>	M6 - (before 20-06-2023)
<b>Delivered</b>	X

<b>Work Package Number</b>	<b>WP3</b>
<b>Deliverable / Milestone to be produced</b>	<i>Milestone M3.1: "Acquisition of the EEG dataset from volunteers".</i>
<b>Month of delivering</b>	M11 - (before 20-11-2023)
<b>Delivered</b>	X

<b>Work Package Number</b>	<b>WP4</b>
<b>Deliverable / Milestone to be produced</b>	<i>Milestone M4.1: "Acquisition of the EEG dataset from volunteers in cocktail party scenario".</i>
<b>Month of delivering</b>	M15 - (before 20-03-2024)
<b>Delivered</b>	X

<b>Work Package Number</b>	<b>WP5</b>
<b>Deliverable / Milestone to be produced</b>	<i>Milestone M5.1: "Development of tools for the estimation of the attended sound source".</i>
<b>Month of delivering</b>	M18 - (before 20-06-2024)
<b>Delivered</b>	X

<b>Work Package Number</b>	<b>WP6</b>
<b>Deliverable / Milestone to be produced</b>	<i>Deliverable D6.1: "Design of the wearable stand-alone prototype".</i>
<b>Month of delivering</b>	M19 - (before 20-07-2024)
<b>Delivered</b>	X

<b>Work Package Number</b>	<b>WP8</b>
<b>Deliverable / Milestone to be produced</b>	<i>Deliverable D8.3: "Plan for the Dissemination and Exploitation including Communication activities".</i>
<b>Month of delivering</b>	M23 - (before 20-11-2024)
<b>Delivered</b>	X

<b>Work Package Number</b>	<b>WP7</b>
<b>Deliverable / Milestone to be produced</b>	<i>Milestone M7.1: "WEAR functional system for the tests with volunteers".</i>
<b>Month of delivering</b>	M24 - (before 20-12-2024)
<b>Delivered</b>	X

Besides project Deliverable and Milestones, the (i) articles published in scientific journals, (ii) conference proceedings and (iii) conference/workshop abstracts will be produced and safely stored into a Google Drive

folder created as internal database. All these outputs will be shared with all the partners of the *consortium*, as well as official project reviewers. Once generated, these documents will be stored in .pdf format.

As for the (i) articles and (ii) conference proceedings, it will be tried to publish on Open Access scientific journals (green or gold). Part of the funding will be used to pay the fees. Moreover, all these outputs will be published on IRIS – the repository of the host institution – (<https://iris.unica.it>) or on ZENODO (<https://zenodo.org>).

In addition, all the data generated (.csv files) from the experimental activities within the labs (such as the electrical and mechanical characterization of the electrodes, design of the electronic components and board, EEG signals acquired from volunteers) will be stored within a personal database of the researcher and shared with all the partners of the *consortium*, as well as official project reviewers. The data that will be published will be uploaded as .csv files on IRIS (<https://iris.unica.it>) or on ZENODO (<https://zenodo.org>), an open access repository for all fields of science that allows uploading any kind of data file formats, will be used to share and make accessible data and results and to promote transparency and reproducibility.

## 2. FAIR DATA

### 2.1 MAKING DATA FINDABLE, INCLUDING PROVISIONS FOR METADATA

Metadata allow to other researchers to easily find data in an online repository. Therefore, they are essential for the findability (as well as re-usability) of the dataset. wEAR metadata will be uploaded in a standardized form as follow:

- the name of the funding agency “MUR”;
- the name of the action “Young Researchers\_Soe”;
- the name of the acronym of the project “wEAR”;
- the name of the document;

As already mentioned, it is in the intention of the *consortium* to collect wEAR data in an open online research data repository (ZENODO or IRIS). These repository can improve the management and the spreading of the data, since they allow researchers to deposit both publications and data, providing tools to linking them to these through persistent identifiers and data citations. Moreover, they are in compliance with FAIR data principles, facilitating the finding, accessing, re-using and interoperating of datasets.

wEAR files and folders will be created and submitted by using a name convention consisting as follow:

MUR – Young Researchers SoE – wEAR project\_name of the document.doc



## 2.2 MAKING DATA ACCESSIBLE

In order to maximize the impact of wEAR research data, the results will be shared within and beyond the *consortium* and the official reviewers. Specifically, the wEAR Deliverables and Milestones will be public and they will be accessible by:

- the *consortium* Google Drive database;
- the repository IRIS (<https://iris.unica.it>).

It is worth of mentioning that all data/documents deposited on IRIS are accessible without restriction for public. Selected data and results will be shared with the scientific community and other stakeholders through publications in (i) scientific journals and (ii) presentations at conferences, as well as through open access data repositories. The wEAR project datasets will be first stored and organized in a database by the data owners (personal computer and on the Google Drive database), and then they will be made available for verification and re-use, through trusted repositories IRIS or ZENODO.

## 2.3 MAKING DATA INTEROPERABLE

In order to ensure the interoperability, the *consortium* will observe OpenAIRE guidelines for online interoperability. In particular, it will be used standard vocabularies to define data and metadata in order to enable data exchange, re-use and interoperability. All datasets will use the same standards for metadata capture/creation.

## 2.4 INCREASE DATA RE-USE

In order to allow a safe data re-use, Creative Common Licensing (in particular Non Commercial Share-Alike licenses) will be used to protect the ownership of the datasets, as well *attribution* (i.e., the users of the dataset must give appropriate credit to the ownership of the datasets, providing a link to the license and indicate if changes were made). In some specific cases, restrictions on re-use policy will be applied for protected data, whose re-use will be limited within the project partners. As a matter of fact, possible restrictions could be *embargo periods*. The project data will be re-usable for at least 1 year after the end of the project.

## 3. OTHER RESEARCH OUTPUTS

Not applicable. All the possible research outputs have been presented in the previous sections.

## 4. ALLOCATION OF RESOURCES

The costs that are necessary for making wEAR project data or other research outputs “FAIR” (e.g. direct and indirect costs related to storage, archiving, re-use, security, etc.) are limited to the fees for the publications on

Open Access journals (green or gold). Indeed, the repositories IRIS and ZENODO are free of charge and open platform. As for the journals fees, they will be covered by using part of the funding and using co-funding from the Host Institution. The responsible for data management of wEAR project is the researcher, under the supervision of the principal supervisor.

## 5. DATA SECURITY

All the personal data collected by this project (in WP3, WP4 and WP7) will be processed in compliance with the EU GPRP 2016/679. It is worth of mentioning that NO special categories of personal data – Article 9(a) and 10 GDPR – will be collected. It is in the intentions of the *consortium* to fully comply with the applicable International, European and national law in matter of data protection. It is in the intentions of both the supervisors to guide and train the researcher on this crucial task. They guarantee that the activities that will be carried out during wEAR project, will follow the highest ethical standards.

Participants' confidentiality will be protected, in order to limit the negative impact of the persons concerned and to ensure fairness, transparency and accountability of the data processing, data quality and confidentiality. The *consortium* will clearly state the purpose of collecting data, the data sources, the processing methods, the retention time, the data recipients and the legal basis, following the "data minimization principle" (i.e., data may be processed ONLY if it is really adequate, relevant and limited to what is necessary for the project). All these information will be included in the informed consent. Ensuring privacy and confidentiality is essential. Any information obtained in connection with this project and that can be identified with the participants will remain confidential and will be disclosed only with the participant's permission or as required by law. Confidentiality will be maintained by pseudonymization via codes stored on an identification list (only the investigator is allow to identify the participants). The list will be stored with restricted access, either digitally on a password-protected server or physically in a locker, and destroyed at the end of the study. Personal names will not be used in any of research report, neither released outside the study.

## 6. ETHICS

Two main potential ethics and security issues were found in relation to wEAR project, as it: (i) involves human participants (healthy volunteers); (ii) collects and processes personal data. For this reason, a careful attention will be focused on the ethical principles relevant to such scenario, namely:

- guarantee privacy and confidentiality of the volunteers;
- respect human dignity and integrity;
- guarantee transparency towards research subjects;

- ensure the possibility of withdrawal at any moment during the study.

The activities related with the ethics and security issues will be carried out in WP3, WP4 and WP7, and are focused on the acquisition and processing of electroencephalography (EEG) data signals from volunteers. As reported in the previous section, the researcher and the supervisors guarantee that wEAR will fully comply with the applicable International, European and national law in matter of ethics, ethical conduct in research, as well as data protection. No negative impacts are expected as a consequence of wEAR project and its activities. Moreover, it is worth of mentioning that the physical risks related to the involvement of human participants in this project are minimal. Indeed, the EEG measurements performed during these tests will be non-invasive and not harmful: during wEAR two different non-invasive and not harmful acquisition methods will be compared: (i) standard scalp-electrodes connected to standard recording instrumentation; (ii) biocompatible ear-electrodes connected to standard recording instrumentation. Moreover, in all cases, the experiments will be closely supervised by one or more qualified researchers.

## 7. OTHER ISSUES

Not applicable.

## CONCLUSIONS

Deliverable 8.2 details the main principles and guidelines for the Data Management for the wEAR project. As living document it will be updated throughout the project lifetime. Further updating of the Data Management Plan will include the eventually updating of online research data repository where data are collected and shared and the data the description of dataset and research data gradually generated and collected.