Deliverable

WP5 – Dissemination and exploitation

D5.12 Data management plan

Project Information

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Name	Position in project	Organisation	Date	Visa
Mateusz Wlazło	WP5 leader	CBRTP	27/05/2020	OK
Lucia Petti	Coordinator	CNR	27/05/2020	OK
Fabienne Brutin	Project Management Officer	AYMING	27/05/2020	OK

Document history

Version	Date	Modifications	Authors
V0	22/05/20	First version	J. Herisson / AYMING
V1	25/05/20	Clarification of some datasets	G. Nenna / ENEA
V2	27/05/20	Minor corrections (typos) and modification of some datasets	G. Ardila / UGA
VF	27/05/20	Validation by approvers	J. Herisson / AYMING

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Abbreviation

AFM	Atomic Force Microscopy
ATR	Attenuated Total Reflectance
CA	Consortium Agreement
DMP	Data Management Plan
DoA	Description of Action
DOI	Digital Object Identifier
DSC	Differential Scanning Calorimetry
EPR	Electron Paramagnetic Resonance Spectroscopy
FAIR	Findable, Accessible, Interoperable and Re-usable
FT-IR	Fourier Transform InfraRed spectroscopy
GA	Grant Agreement
IPR	Intellectual Property Right
MS	Mass Spectroscopy
NMR	Nuclear magnetic resonance
OA	Open Access
PMP	Photo Mobile Polymer
PZL	Piezo-composite layer
R&D	Research and Development
R&I	Research and Innovation
SEM	Scanning Electron Microscopy
TCO	Transparent Conductive Oxide
TGA	Thermogravimetric analysis
WP	Work Package
XRD	X-Ray Diffraction

Executive summary

The **PULSE-COM** project is a Research and Innovation Action of **FET-OPEN** that has been accepted for funding within the *Challenging Current Thinking* topic in collaboration with the European Union's H2020 Framework Programme (H2020/2014-2020), under Grant Agreement n°863227.

Its **main goals** are:

- To fabricate a Photo Mobile Polymer (PMP) film with high performances that could be used in association with a lead-free Piezo-composite layer (PZL),
- To enhance PMP and PZL performances and provide additionnal functionalities,
- To integrate the PZL onto the PMP film in a way to ensure a complete transfer between the two structures,
- To integrate PMP-PZL into industrial implementations.

PULSE-COM will achieve the following **breakthrough**:

- Open new windows on the future development of light-driven nanomotors and their potential applications in different areas such as biomedical, environmental and nanoengineering fields.

During the course of the project, PULSE-COM project will generate data in a wide range of R&I activities.

Due to confidentiality and security concerns (the results from PULSE-COM project will provide the critical steps towards implementation in industrial applications with significant commercial impacts), the research data will not be made openly accessible as primary data but in a processed form. Article 29.3 “Open access to research data” of the Grant Agreement is indeed not applicable for confidentiality and security concerns.

The PULSE-COM project will however comply with the “open access requirements for scientific publications” set out in Article 29.2 and the consortium considers the data management actions a priority.

The project has indeed included in its Work Plan a specific Deliverable (D5.12-Data Management Plan) detailing how PULSE-COM project will collect, share and protect the data produced by the beneficiaries.

More specifically, as part of making research data Findable, Accessible, Interoperable and Re-usable (FAIR), the DMP will detail datasets and describe:

- the handling of research data during and after the end of the project,
- what data will be collected, processed and/or generated,
- which methodology and standards will be applied,
- whether data will be shared/made open access and,
- how data will be curated and preserved (including after the end of the project).

The DMP is **a living document** and this first version, delivered at Month 6, will therefore be updated over the course of the project whenever significant changes arise, such as (but not limited to): new data; changes in consortium policies, for example new innovation potential and the decision to file a patent; and changes in consortium composition and external factors, such as members leaving or joining. (Guidelines on FAIR Data Management in Horizon 2020).

The DMP will also be reviewed in line with the interim and periodic evaluation/assessment of the project, as well as the Final Reviews.

Deliverable report

1 Data summary

The PULSE-COM project will produce data in a wide range of R&I activities that are summarized in Table 1. The DMP being a dynamic document, this list may be modified (addition or removal of datasets) depending on the project's developments. All partners were asked to complete the DMP and provide datasets. Some however had no inputs at this point and will update the DMP at its next review (1st Periodic Report-Month 12), if relevant.

Once generated or collected, the data will be stored in several formats: documents, images, data, etc.

Table 1: Types of data expected to be generated in PULSE-COM / Status at Month 6

	Dataset	Data description	Main beneficiaries	WP(s)
1	Synthesis of PMP and PMP-components and chemical/physical characterization	Experimental data related to the synthesis of PMP and PMP-components and their chemical/physical characterizations	CNR	WP1
2	Characterization of electrodes	Experimental data related to the growth of the electrodes, their uniformity and their electrical characteristics	All partners	WP2
3	Characterization of PMP	Experimantal data concerning the PMP and the variation of its movement related to the wavelength, power, frequency and angle of incidence of light radiation	All partners	WP2
4	Characterization of PZL	Experimental data related to the electrical and electromechanical characteristics of PZL devices both in static and dynamic conditions	All partners	WP2
5	Characterization of PMP/PZL	Experimental data related to characterization of the PMP/PZL device with the objective to measure its performance	All partners	WP3
6	Development of characterization test benches	Data related to the development of the 3 test-benches for the characterization of the PMP/PZL	All partners	WP2 WP3
7	SEM images	SEM images taken at different stages of fabrication of the devices	All partners	WP1 WP2 WP3 WP4
8	AFM images	AFM images taken at different stages of fabrication of the devices	All patners	WP1 WP2 WP3 WP4

	Dataset	Data description	Main beneficiaries	WP(s)
9	XRD	XRD analyses obtained at different stages of fabrication of the devices	All partners	WP1 WP2
10	Electrical characterizations	Experimental data related to electrical measurements from PZL or PMP-PZL devices	All partners	WP2 WP3
11	Mechanical characterizations	Experimental data related to mechanical measurements from PMP or PMP-PZL devices	All partners	WP3
12	Photo-activated Meso-machines design and test benches design	Data related to the development of Opto-switch, Opto-valve and their test benches	All partners	WP4
13	Photo-activated Meso-machine test results	Experimental data related to the tests performed on the Opto switch and the Opto-valve	All partners	WP4
14	PMP-PZT applications for reconfigurable optical networks	Data generated and collected during experiments,testing and characterisation for validation of reconfigurable optical networks	All partners	WP4
15	PULSE-COM public website	Data posted on PULSE-COM public website	AYMING, All partners	WP5
16	Materials disseminated to the general public	→ Project literature (leaflets, brochures) and posters → Workshops and events → Conference presentations → Scientific papers → Newsletter	All	WP5
17	Result use and dissemination plan	Dissemination plan will include also : → Exploitation roadmap → IPR management → Business plans	CBRTP, All	WP5
18	Performance benchmark	Benchmark towards further R&D and collaborations for further development	AYMING, All	WP5
19	Project management data	Data generated and collected to efficiently manage and monitor the project	CNR, All Partners	WP6

For all data types, the Coordination board together with the WP5 leader will examine the aspects of potential conflicts against commercialization and the IPR protection issues of the knowledge generated before deciding which information needs to be made public and when. The decision process summarized in the Figure 1 will be overseen by the project Coordination Board chaired by Lucia Petti (CNR) as Project coordinator and by the WP5 leader (see Deliverable D6.5-Quality and Risk Management Report submitted at Month 3, 02/2020).

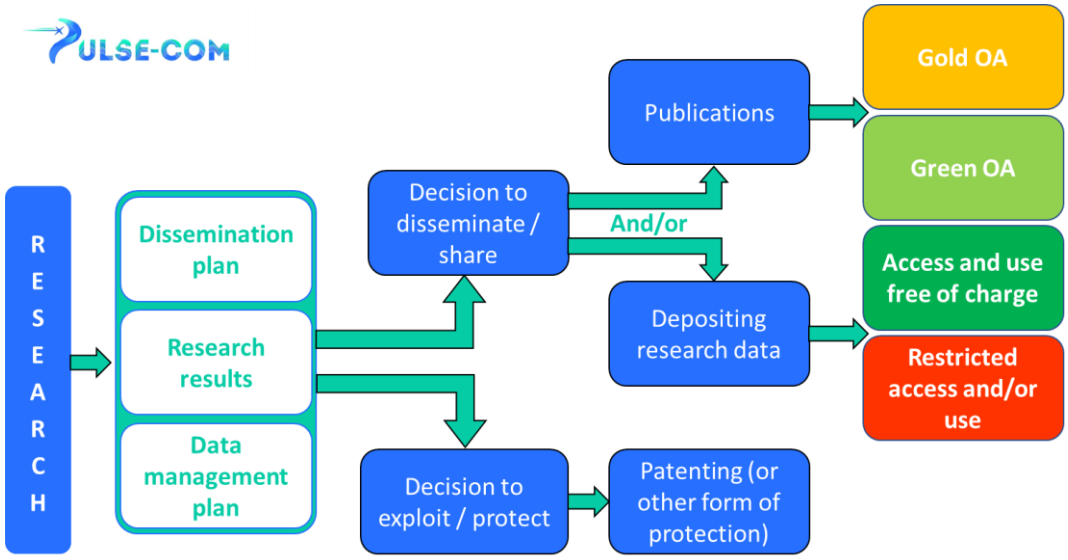


Figure 1: Open access to research data and publication decision diagram (from Guidelines to the Rules on Open Access to Scientific publications and Open Access to Research Data in Horizon 2020).

All open access data such as publications will be made available on the PULSE-COM public website and on ZENODO. Some will not be made accessible for confidentiality reasons (copyright). See Project Consortium Agreement for general data access rights/rules.

1.1. What is the purpose of the data collection/generation and its relation to the objectives of the project?

To ensure the successful management, dissemination and exploitation of the project and its results:

Objective 1 (WP1) is to fabricate a PMP film with high performances that could be used in association with a PZL layer.

Objective 2 (WP2) is to improve performances and provide new functionalities to the PMP and PZL devices.

Objective 3 (WP3) is to integrate the PZL layer on the PMP film in a way to ensure the maximal conformability to completely transfer the strain produced from the PMP under exposure of light to the PZL layer.

Objective 4 (WP4) is to demonstrate the PMP-PZL capabilities in different applications in order to validate their use in industrial implementations (photo-activated meso-machines, reconfigurable optical networks and photo-energy harvesting).

Objective 5 (WP5) is to i) ensure and assist the implementation of the dissemination measures; ii) raise the awareness in the consortium to disseminate PULSE-COM research outcomes widely; iii) provide an effective mechanism for knowledge management.

Objective 6 (WP6) is to i) ensure transparent and efficient management standard; ii) communicate within the consortium and with the EC; iii) ensure on-time delivery of deliverables.

1.2. What types and formats of data will the project generate/collect?

Various types of technical, electric, economic, etc. data will be gathered and analysed by the interdisciplinary consortium to address the above-mentioned PULSE-COM objectives.

All types of data that are relevant for the project and which are known at present are listed in Table 1.

During the several phases of the Project, the following data processing levels have to be taken into account:

- Raw data,
- Cleaned up data,
- Processed data,
- Analytical data,
- Publishable data.

Data will be collected/generated in the following formats:

- Presentations and formulated text files: .pdf, .doc/.docx, .ppt/pptx, .txt
- Numeric (tables, charts, counts, measurements, simulation results and waveform graphs): .xlsx, .csv, .opj
- Audio-visual (images, sound recordings, videos and animations): .jpeg, .jpg, .png, .tiff, .aiff, wave, .mp3, .mp4 formats
- Design & layout data format: Electric diagrams and mechanical design: AutoCad, ;pdf, .dxf and Solidworks
- Test and Characterization output will be data in csv-format: characterization, Tester or test-setup output
- Codes and individualization: .m (Matlab), .mdl (Simulink models)
- Other data formats:
    - SEM, AFM and other images: .jpeg, .jpg, .png, .tiff, .raw
    - Impedance spectrometer: .txt, .xlsx, .opj
    - SMU with high sampling rate: .txt, .xlsx, .opj
    - XRD: .dat, .txt, .xlsx, .opj
    - UV/VIS/NIR Spectrophotometer: .dat, .txt, .xlsx, .opj
    - CAD Models: .step, SLDPRT, SLDASM (Solidworks 2019)
    - Drawings: .pdf

1.3. Will you re-use any existing data and how?

Up to now, the consortium members are not considering to re-use any existing data.

1.4. What is the origin of the data?

The different sources of origin of PULSE-COM data are gathered in Table 2.

Table 2: Sources of origin of PULSE-COM data

WP	Dataset	Origin of the data
WP1	Synthesis of PMP and PMP-components and chemical/physical characterization	Data related to the sysnthesis and characterization of the PMP-components and PMP-film (NMR, MS, DSC, TGA, Thermography, Raman, FT-IR, ATR-FTIR EPR, Atomic Force Microscopy and SEM)
WP2	Characterization of electrodes	Dateset related to the morfological and electrical characterization: sheet resistance by means 4-point probe; thikness and roughness by means profilometers; cristallinity by means XRD

WP	Dataset	Origin of the data
WP2	Characterization of PMP	Dateset related to the morphological and electrical characterization: sheet resistance by means 4-point probe; thikness and roughness by means profilometers; cristallinity by means XRD
WP2	Characterization of PZL	Data related to the characterization of the PZL layer (SEM, AFM, XRD and other images, electrical and electromechanical characterization, performance, etc.)
WP3	Characterization of PMP/PZL	Data related to characterization of the PMP/PZL device (SEM and other images, electrical characterization, mechanical measurements (stiffness), displacement, performance of the device (efficiency, lifetime, etc.))
WP2 WP3	Development of characterization test benches	Data related to the development of characterization PMP test benches. Test bench for PMP: optical set-up, photodiodes signal, lock-in frequency signal Data related to the development of characterization PZL test benches. PZL Test bench: mechanical apparatus to move the substrates, electrical measuraments, and power supply signal to give electrical signals to the devices Technical data related to the design of the set-ups: specifications (dimensions, plans, etc.), simulations, calibrations, materials used to fabricate them, sensors, electrical equipment, etc.
WP1 WP2 WP3 WP4	SEM Images	SEM images of: ZnO Nanowires, PMP, seed layers and electrodes to check substantially the uniformity and the roughness of the layers
WP1 WP2 WP3 WP4	AFM images	AFM image of electrodes and other layers to check uniformity, roughness and geometry of the manufactured structures
WP1 WP2	XRD	XRD data related to amorphous and crystalline phases of TCO (Transparent Conductive Oxide) and polymer layers
WP1 WP2	UV/VIS/NIR Spectrophotometer	Spectrophotometric data relating to the absorption peaks of PMP films and the transparency of the deposited layers
WP2 WP3	Electrical characterizations	Dara related to sheet resistance of the electrodes Data related to impedance spectroscopy for materials characterization and complete PZL devices Data related to IV measurements and sampling of the electrical signal over time for PZL devices Data related to electrical behaviour over time of photodiodes related to the PMP movements Data related to the electrical characterization of PZL and PZL/PMP devices.
WP3	Mechanical characterizations	Data related to the mechanical characterization of PMP and PMP/PZL devices.
WP4	Photo-activated Meso-machines design and test benches design	Technical data related to the design of the devices and their respective test benches: specifications (dimensions, expected performances), pictures, charts, BOM
WP4	Photo-activated Meso-machine test results	Data related to the testing of the devices : pictures, charts, mechanical, electrical and optical measurements, calibrations of the sensors, videos
WP4	PMP-PZT applications for reconfigurable optical networks	Data generated and collected during of experiments,testing and characterisation for validation of reconfigurable optical networks
WP5	PULSE-COM public website	Public data generated during the project and shaped for dissemination
WP5	Materials disseminated to the general public	Any document (leaflet, brochure, presentation, scientific papers, newsletter…) dedicated to disseminate the scientific content of PULSE-COM project

WP	Dataset	Origin of the data
WP5	Result use and dissemination plan	Exploitation roadmap, IPR management and business plans will provide a frame for this dataset
WP5	Performance benchmark	Ayming will provide a methodology and intelligence tools for partners to be able to benchmark themselves
WP6	Project Management	All project-related documents (contractual documents: GA, DoA; deliverable and milestones reports, interim/periodic reports, financial forms, meeting presentations, etc.)

1.5. What is the expected size of the data?

The dataset is not fixed and will grow over the project's duration as new data becomes available. In most cases, data will be growing and revisable, with new data added and old data archived. However, in some cases, data will be fixed: measurement results for instance are fixed, i.e. never changed after being collected or generated, for later review of original data.

1.6. To whom might it be useful ('data utility')?

In many cases, project data will be originally collected, provided or generated by one project partner and implemented or analysed by at least one other partner during the project's lifetime.

In general, all collected and/or generated data will be most useful for all project partners within the consortium.

Processed and published data will be especially useful for:

- the scientific/researcher community listed below:
  - National R&D Institute for Microtechnology IMT Bucharest (Romania),
  - National R&D Institute for Optoelectronics INOE 2000 Bucharest (Romania),
  - Tubingen University,/IPCh (Germany),
  - University Burgos/ICCRAM (Spain),
  - CEA (France),
  - Tyndall (Irland),
  - CNRS laboratories (France),
  - EUREC.
- industrials, technology providers: i.e. scientific instrumentation, air space and defence, medical devices.
- relevant stakeholders and end-users.

2 FAIR DATA

2.1. Making data findable, including provisions for metadata

Are the data produced and/or used in the project discoverable with metadata, identifiable and locatable by means of a standard identification mechanism (e.g. persistent and unique identifiers such as Digital Object Identifiers)?

Articles published will be assigned a Digital Object Identifier (DOI) to ensure the data is easily citable and findable.

DOIs indeed provide a reliable and permanent link to where the work is available online, the ability to find all publications associated with a single author, including unpublished work, and include the publishing date of the research.

PULSE-COM will also comply with the EU obligation that any communication, documentation and publication activity related to the project must acknowledge the financial support of the European Union.

The following acknowledgement will be added to each publication and dataset description, thus facilitating identification and location of the data produced.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 863227.

What naming conventions do you follow?

A naming convention is already in place for Deliverables and other documents such as interim/periodic reports for example (see **Deliverable D6.5-Quality and Risk Management Report**).

For draft deliverables:
PULSE-COM_DX.X_Name of document/Descriptive details_DDMMYY_VX
e.g.: PULSE-COM_D5.12_Data Management Plan_100320_V0

For final release:
PULSE-COM_DX.X_Name of document/Descriptive details_DDMMYY_VF
e.g.: PULSE-COM_D5.12_Data Management Plan_310520_VF

Any other documents:
PULSE-COM_WPX_NameOfTheDocument_Partner_DDMMYY_VF
e.g.: PULSE-COM_WP1.1_Internaldeliverable_Ayming_020120_VF

All data collected within WP 1 to 3 and 5 will be stored on ENEAbox repositories, protected by individual passwords and accessible following the following links:

- WP1: https://eneabox.enea.it/index.php/s/8lwtsMHgUP7U0aF/authenticate
- WP2: https://eneabox.enea.it/index.php/s/td4Vat4KTOMq8IN/authenticate
- WP3: https://eneabox.enea.it/index.php/s/bPRVgumZKpYx0PR/authenticate
- WP5: https://eneabox.enea.it/index.php/s/tnjkPlHRrT6IAyh/authenticate

These repositories are managed by ENEA partners involved in the project, with the main responsible being Giuseppe Nenna. Passwords will be provided on demand.

A dedicated repository for WP6 will be created on the secured Aymingsphere platform to store all relevant project management-related data collected/generated. Files and folders in the dataset repository will be versioned and structured by using a name convention consisting of project name, work package number, dataset name, partner name and date;

ex. "PULSE-COM_WPX_datasetname_partnername_YYMMDD".

Partners will also use the internal data naming conventions/standards in force within their organisations.

Will search keywords be provided that optimize possibilities for re-use?

Yes, keywords will be provided within the documents as well as for web browsers.

Do you provide clear version numbers?

All documents, including deliverables, reports and minutes, etc., have a tracking feature in the template to ensure versions can be easily monitored. These documents can be initially saved to the PULSE-COM Aymingsphere platform before finalisation and upload to project portals.

The PULSE-COM Aymingsphere platform is hosted and administered by Ayming. The contents are managed with oversight from Ayming and CNR. Aymingsphere provides additional version control features, enabling partners to amend documents and data online, and older versions can be explored at any time.

Partners are requested to archive rather than delete any previous versions on the platform which can remain active and available to project partners for the duration of the project plus 5 years, and more if required.

What metadata will be created? In case metadata standards do not exist in your discipline, please outline what type of metadata will be created and how.

At that moment, it is too early to define a specific metadata that will cover all the project. This part will be updated for the next version of that document.

2.2. Making data openly accessible

Which data produced and/or used in the project will be made openly available as the default?

How will the data be made accessible (e.g. by deposition in a repository)?

Where will the data and associated metadata, documentation and code be deposited? Preference should be given to certified repositories which support open access where possible.

Have you explored appropriate arrangements with the identified repository?

If there are restrictions on use, how will access be provided

The PULSE-COM consortium will use a wide range of tools to disseminate research findings, technical concepts and innovative ideas in order to promote the project and to raise awareness of its progress. Those tools include publications and presentations of papers in journals and at selected conferences, participation to fairs and exhibits as well as the organization of special panel sessions in distinguished technical conferences and workshops, or EC events.

To comply with the "*open access requirements for scientific publications*" set out in Article 29.2 of the GA, PULSE-COM partners are encouraged to submit scientific papers in international peer-reviewed journals.

The policy of the protection of the foreground will be carefully coordinated with the exploitation and dissemination activities. In any case, the consortium will make sure to keep a balance between protected and publically available results.

The members of the consortium will see that all journals or conferences, in which the project will publish, offer the possibility of Open Access, and this will be the chosen route for the dissemination.

These aspects are addressed by the Project Consortium Agreement, which will prevail.

Some of the targeted high-impact scientific journals are listed in **Erreur ! Source du renvoi introuvable.** (extracted from DoA-Part B). The list will be updated as the project develops and new results generated.

Table 3: Publication and open access: expected journals to be used by academic partners in PULSE-COM

Partners	Targeted journals	Planned number per year
CNR	ACS, RSC, Wiley, IOP	1 or 2
ENEA	OSA, AIP, IOP, ACS, Elsevier	1 or 2
UGA	Wiley, Elsevier, IOP, Nature	1 or 2
CTEC	ACTUATOR 20-22, Conference Proceedings	2
SITEX 45	Elsevier, IEEE	1
INFLPR	Wiley, Elsevier, IOP	1
CBRTP	Elsevier	1 or 2

Industrial partners (CTEC, SITEX 45 and CBRTP) will mainly publish press releases, papers in conferences, etc.

Gold open access is priority in order to boost dissemination of results through fast and usually easy to find access on webpages of publishers. If gold open access is not available, the 'green' route (archiving in a repository) will be chosen. The data and associated metadata, documentation and code will preferably be deposited in certified repositories which support Open Access.

Online repositories used within PULSE-COM:

Zenodo, a multidisciplinary repository accepting multiple data types, publications, software (https://zenodo.org/). Information regarding Zenodo is provided in Annex.

HAL, a repository for self-archiving of scientific publications of researchers and laboratories

ArXiv (https://arxiv.org): widely used in the scientific community

OpenAIRE: Open access repository initiative (https://www.openaire.eu)

All open access data such as publications, abstracts, etc. will also be available on the PULSE-COM website: https://www.pulsecom-h2020.eu/ (Figure 2).

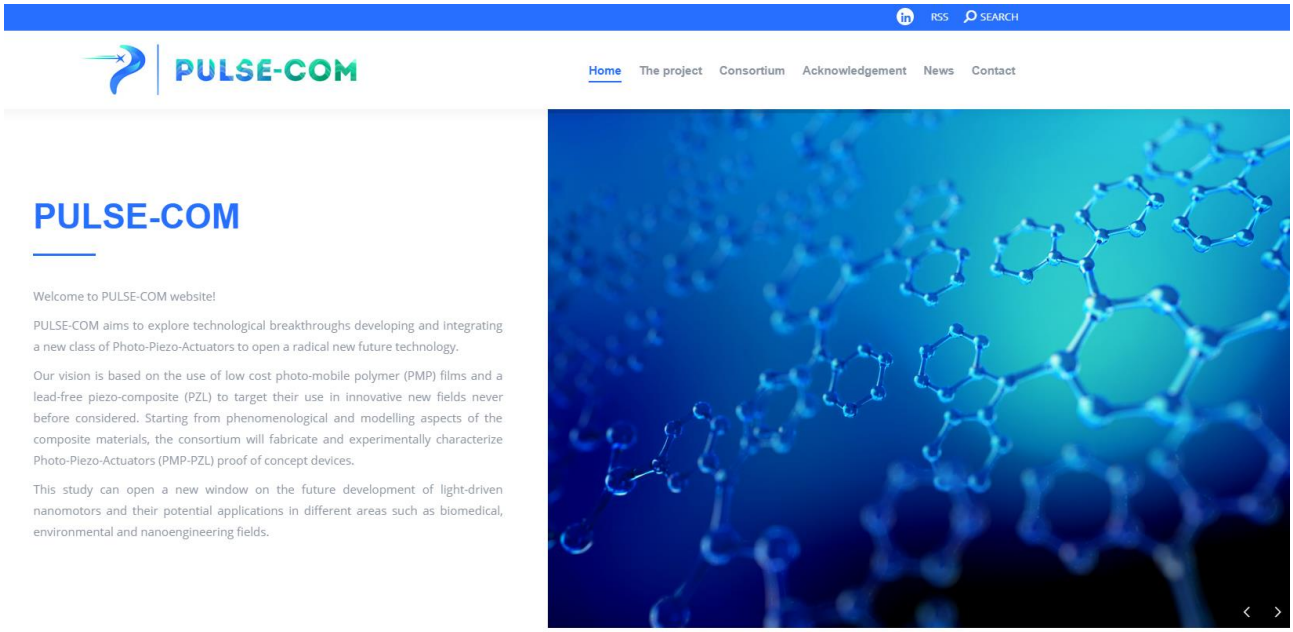


Figure 2: Visual of the homepage of PULSE-COM website

If certain datasets cannot be shared (or need to be shared under restrictions), explain why, clearly separating legal and contractual reasons from voluntary restrictions.

Certain datasets being confidential and available only for members of the consortium, or having a potential for commercial or industrial protection, will not be shared or shared under restrictions. General principles and obligations of beneficiaries related to the ownership and sharing of data and results, access rights to Intellectual Property are laid down in the Consortium Agreement. The Beneficiaries agree to apply and be bound by the provisions of this contractual agreement.

What methods or software tools are needed to access the data?

Is documentation about the software needed to access the data included?

Is it possible to include the relevant software (e.g. in open source code)?

Appropriate methods or software tools that are needed to access the data are depending on the research data and repository/research data infrastructure requirements.

Currently, the software tools needed to access the data are:

- Microsoft office suite (Word, Excel, PowerPoint, …)
- PDF Acrobat reader
- Web interface, web applications

Is there a need for a data access committee?

Not at this stage.

However if the need arises in the future, decision will be made by Coordination board and Exploitation Committee.

How will the identity of the person accessing the data be ascertained?

Requests to access restricted data/datasets will be sent to the corresponding author and the decision as to whether grant or revoke access to data will be made on a case-by-case basis by the Data owner/Project Coordinator/WP Leader.

2.3. Making data interoperable

Are the data produced in the project interoperable, that is allowing data exchange and re-use between researchers, institutions, organisations, countries, etc. (i.e. adhering to standards for formats, as much as possible compliant with available (open) software applications, and in particular facilitating re-combinations with different datasets from different origins)?

Yes, in principle, all data that are not imposed by restrictions will be interoperable, that is exchangeable and re-usable between project partners, etc.

The project will encourage the use of current standards and contribute to the development of new ones.

Further guidance and details on interoperability of data will be given in the Consortium Agreement and future updates of the DMP.

What data and metadata vocabularies, standards or methodologies will you follow to make your data interoperable?

All partners who are involved in the generation, collection and analysis of data will determine the metadata standard to be applied in accordance with discipline-specific practices and FAIR principles.

Will you be using standard vocabularies for all data types present in your dataset, to allow inter-disciplinary interoperability?

All efforts will be made to use standard vocabulary for data types present in our datasets to allow interdisciplinary interoperability.

In case it is unavoidable that you use uncommon or generate project specific ontologies or vocabularies, will you provide mappings to more commonly used ontologies?
N/A at this stage.

2.4. Increase data re-use (through clarifying licences)

Datasets will on a general basis be kept confidential and only made accessible to consortium members for confidentiality reasons. Requests to access data/datasets will be sent to the corresponding author and the decision as to whether grant or revoke access to data will be made on a case-by-case basis by the Data owner/Project Coordinator/WP Leader.

The Consortium Agreement will set forth data access, sharing and restrictions rules.

How will the data be licensed to permit the widest re-use possible?

Access, sharing, licensing rights will be further defined in the Consortium Agreement.

When will the data be made available for re-use? If an embargo is sought to give time to publish or seek patents, specify why and how long this will apply, bearing in mind that research data should be made available as soon as possible.

According to the Grant Agreement, the earliest point in time is 45 days after publication among the project partners.

The minimum embargo time is 45 days to give partners the chance to object, modify or patent the project's result/outcome.

Are the data produced and/or used in the project useable by third parties, in particular after the end of the project? If the re-use of some data is restricted, explain why.

The published data is reusable after the project's end. The unpublished data will not be available for reuse because of confidentiality reasons, e.g. industrial data is sensitive regarding competition. Such data could be made available upon request with dedicated agreement.

How long is it intended that the data remains re-usable?

Minimum 5 years of reusability after the end of the project lifetime is envisaged. This time period is set in relation with the article 18 of the Grant Agreement concerning records keeping.

Are data quality assurance processes described?

Quality control is ensured by the Deliverable D6.5–Quality and Risk Management Report, defined in the first 3 months of the project and submitted through the Participant Portal in February 2020.

The Quality Policy further details the responsibilities of the consortium members and defines a consistent set of working procedures, processes and best practice guidelines in order to ensure highest quality standards of the PULSE-COM project outcomes and efficient management.

An internal review process is in place to guarantee the quality of the data described in the deliverable reports submitted to the Commission services. It is illustrated by the Figure 3.

Figure 3: Approval process of all PULSE-COM technical reports

Specific rules and processes are also defined regarding the dissemination and protection of project knowledge.

As a general rule, to guarantee data quality/consistency, partners shall follow the following procedure for any dissemination of project-related items (abstracts, publications, presentations, press releases, leaflets, websites...) or in case of emerging protectable results (patents, trademarks, utility models…):

- Step 1: Scientific publication or patent should be put on Aymingsphere and information emailed by the primary author for approval at the latest 45 days prior to the submission deadline to:
  - The project Coordination Board:
  - the Project Coordinator, Lucia PETTI;
  - the Project Scientific Coordinator, Riccardo Castagna;
  - the Advisor from ENEA, Giuseppe Nenna;
  - the Project Manager, from Ayming, Fabienne Brutin, and her deputy Jean Herisson.
  - The WP5 leader, Mateusz Wlazlo, and his deputy, Grzegorz Kołodziej.
- Step 2: The WP5 leader or his deputy (or by default one member of the Coordination Board) sends an email to all partners for approval (SB representatives and deputies). Any comments or objections should be sent to the primary author and the persons listed above in 1.
  - If objections are raised, the involved parties shall discuss how to solve the issues within a reasonable time frame;
  - If no comments or objections are made within 30 calendar days, then the communication is automatically approved.
- Step 3: The primary author submits the final version on Aymingsphere and email the persons listed in 1;
- Step 4: The WP5 leader ensures the update of PULSE-COM dissemination table (to be prepared + put on aymingsphere);
- Step 5: Ayming team ensures the update of the PULSE-COM website.

3 Allocation of resources

What are the costs for making data FAIR in your project? How will these be covered?

Costs related to open access to research data in Horizon 2020 being eligible for reimbursement during the duration of the project under the conditions defined in the H2020 Grant Agreement.

Who will be responsible for data management in your project?

Data management is part of all Work Packages within PULSE-COM and is therefore implemented in all the project and management activities.

AYMING will mainly be in charge of the Data Management Plan, supported by the Coordination Board and all project partners.

Are the resources for long-term preservation discussed (costs and potential value, who decides and how what data will be kept and for how long)?

This will be discussed by the Consortium at one of the next Supervision Board.

4 Data security

What provisions are in place for data security (including data recovery as well as secure storage and transfer of sensitive data)?

Data collected/generated in the project are first organized and stored by the data owners on their personal computers, or on the institutional/company's secured server(s) and/or hard drive(s), automatically backed-up.

ENEA has provided specific ENEAbox repositories dedicated to WP1 to 3 and 5 and secured through specific passwords.

If not restricted for confidentiality purposes, in particular technical/pure lab data, final data are also stored on the project dedicated private file sharing space "Aymingsphere": Management-related data are by default securely stored on Aymingsphere and shared among all partners. This secured directory, for which a visual of the homepage is provided by the Figure 4 is accessible on:
https://www.aymingsphere.com/projectmanagement/PULSECOM.

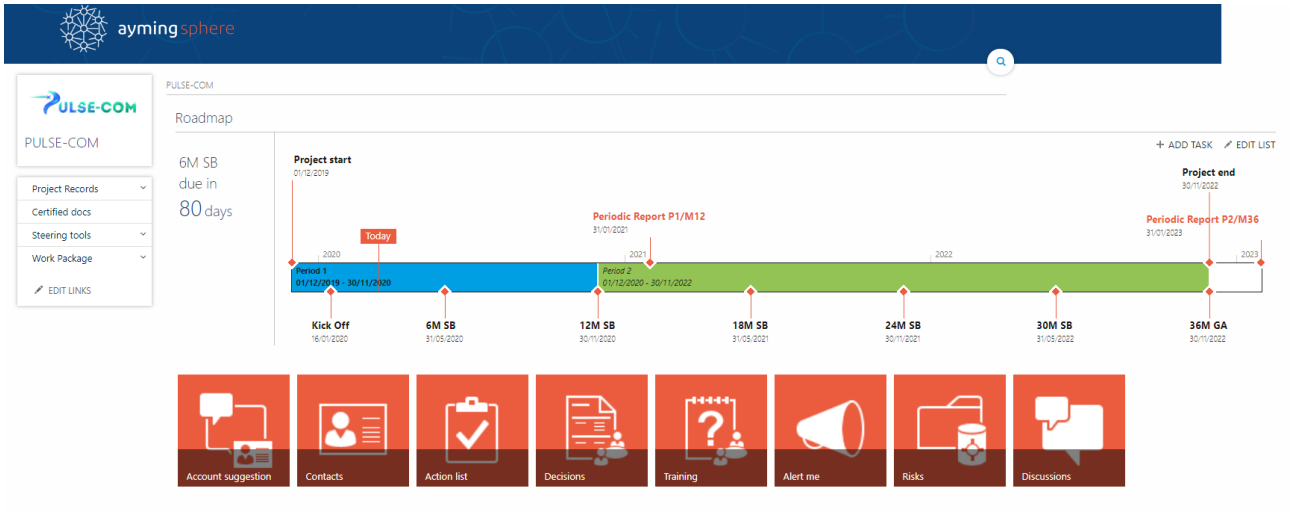


Figure 4:Visual of PULSE-COM homepage directory on Aymingsphere

The Aymingsphere platform is a SharePoint based data/file sharing service administered and hosted by Ayming. This structuring solution, offering high security level, easy interface, allows managing R&D projects and data within a secured environment. It is key part of the knowledge management strategy implemented in the project and serves as a collaborative platform to ease document and information sharing.

Partners log in with a private and secure username, password and captcha, data is encoded and content access is managed by access rights policy. Partners can only see the contents they are allowed to access to.

All partners have project member rights and can access the project's key information: management / quality / meetings / communication documents, deliverables, certified documents (GA, DoA, CA, etc.), Work Packages, etc.

Extended access rights (i.e. project coordinator access rights) are only accessible upon request.

The use of the Aymingsphere secured platform is preferred any other communication means to:

- secure exchange of project material (templates, official and contractual documents e.g. reports, meeting materials, financial documents, drafts, etc.);
- Project official document repository;
- Meetings organization (choosing the date, maps, agenda, etc.);
- Strategic or technical discussions (via forums).

By default, all project material & documentation exchange is to be made exclusively via Aymingsphere.

Password/login are personal and shall not be communicated to anyone.

Email is not be used to exchange confidential project material, only informal information.

Any official and confidential signed documents and letters are sent by secured mail with acknowledgment of receipt.

Is the data safely stored in certified repositories for long-term preservation and curation?

The data collected/generated within the PULSE-COM project and stored on either the partner institution's secured servers, automatically backed-up, or the Aymingsphere collaborative platform (depending on data restrictions criteria) will be kept for at least 5 years after the project ends so as to comply with Article 18 of the Grant Agreement-Keeping records-supporting documentation: "*The beneficiaries must - for a period of five years after the payment of the balance - keep records and other supporting documentation in order to prove the proper implementation of the action and the costs they declare as eligible (…)*".

Storage for confidential dataset will be ensured by individual partner institution's data repositories. Storage on the Aymingsphere platform will depend on the data restrictions criteria (to be decided on a case-by-case basis).

5 Ethical aspects

Are there any ethical or legal issues that can have an impact on data sharing? These can also be discussed in the context of the ethics review. If relevant, include references to ethics deliverables and ethics chapter in the Description of the Action (DoA).

No ethical/legal issues to report at this stage of the project.

Is informed consent for data sharing and long-term preservation included in questionnaires dealing with personal data?

N/A

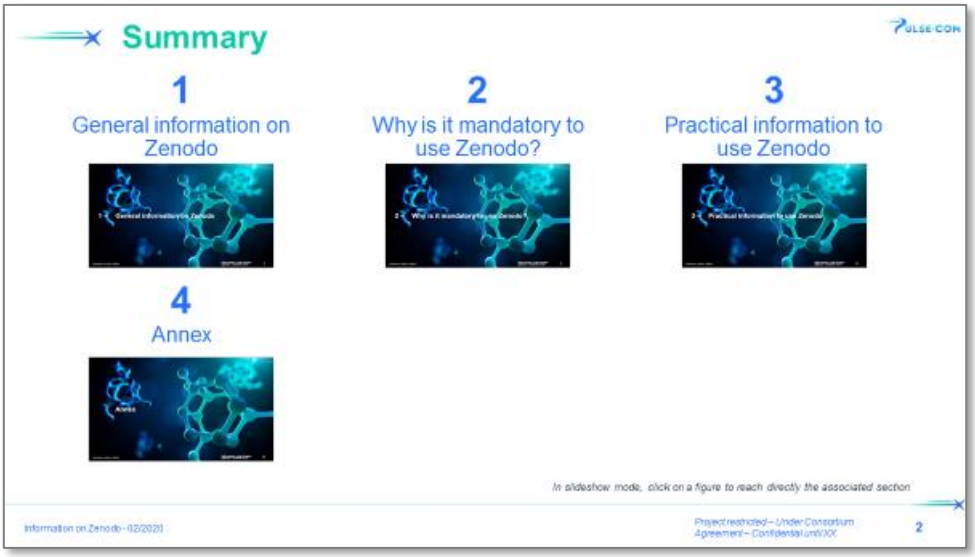
6 Other

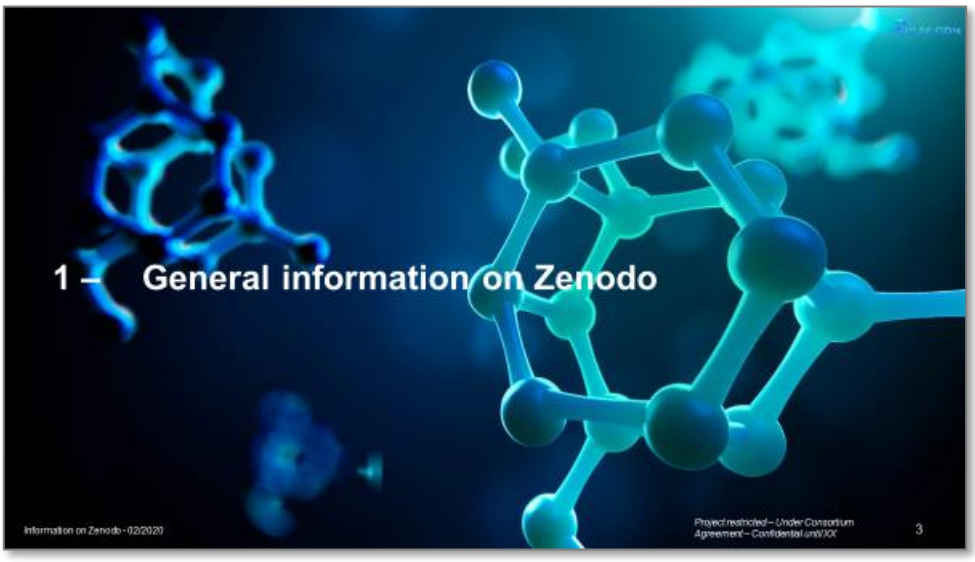
Do you make use of other national/funder/sectorial/departmental procedures for data management? If yes, which ones?

N/A

Annex


PULSE-COM
Information on Zenodo
zenodo
Jean HERISSON, Ayming
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 863227.


Summary
1
General information on Zenodo
2
Why is it mandatory to use Zenodo?
3
Practical information to use Zenodo
4
Annex
In slideshow mode, click on a figure to reach directly the associated section
Information on Zenodo - 02/2020
Project restricted – Under Consortium Agreement – Confidential until XX/
2



What is Zenodo?

- Zenodo is an interdisciplinary open data repository service maintained by CERN, Geneva. Datasets can be located via the Zenodo search engine.
- A digital object identifier (DOI) is automatically assigned to all Zenodo files, which can be uploaded in any file format. Data is stored in the CERN cloud infrastructure.
- Zenodo is compliant with the open data requirements of Horizon 2020, the EU Research and Innovation funding programme and OpenAIRE, the EC-funded initiative in support of the OA policies of the European Union.

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4

Introducing Zenodo

(All) Research / Shared
Your one stop research shop!
All research outputs from across all fields of research are welcome! Zenodo accepts any file format as well as both positive and negative results. They choose to promote peer-reviewed openly accessible research, and they curate the uploads posted on the front-page.

Citeable / Discoverable
Be found!
Zenodo assigns all publicly available uploads a Digital Object Identifier (DOI) to make the upload easily and uniquely citeable. Zenodo further supports harvesting of all content via the OAI-PMH protocol.

Communities
Create your own repository
Zenodo allows you to create your own collection and accept or reject uploads submitted to it. Creating a space for your next workshop or project has never been easier. Plus, everything is citeable and discoverable!

Safe
More than just a drop box!
Your research output is stored safely for the future in same cloud infrastructure as research data from CERN's Large Hadron Collider and using CERN's battle-tested repository software Invenio, which is used by some of the world's largest repositories such as INSPIRE HEP and CERN Document Server.

Reporting
Tell your funding agency!
Zenodo is integrated into reporting lines for research funded by the European Commission via OpenAIRE. Just upload your research to Zenodo, and we will take care of the reporting for you. We plan to expand this feature with further funding agencies in the future, so stay tuned!

Flexible Licensing
Not everything is under Creative Commons
Zenodo encourages you to share your research as openly as possible to maximize use and re-use of your research results. However, we also acknowledge that one size does not fit all. Therefore, we allow for uploading under a variety of different licenses and access levels*.
* You are responsible for respecting applicable copyright and license conditions for the files you upload.

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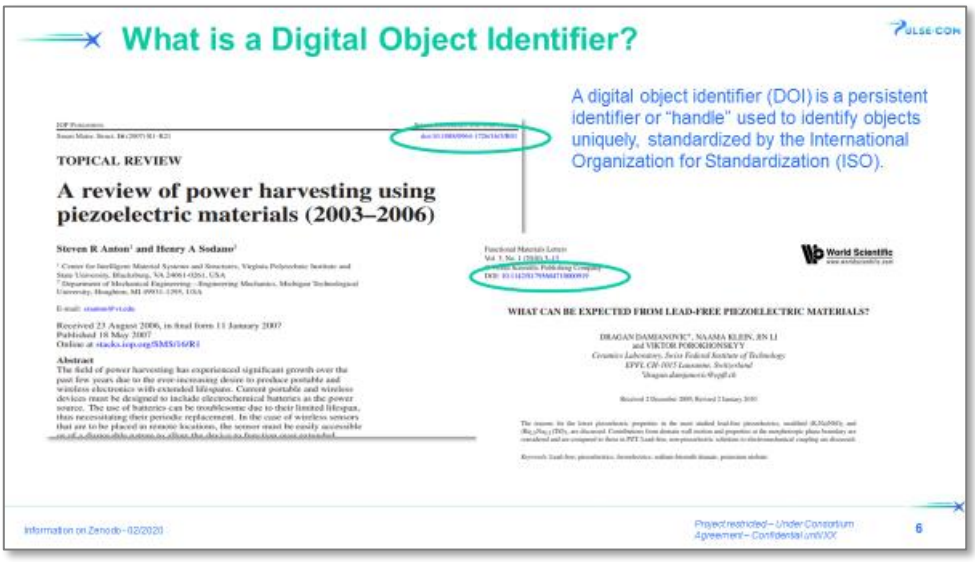
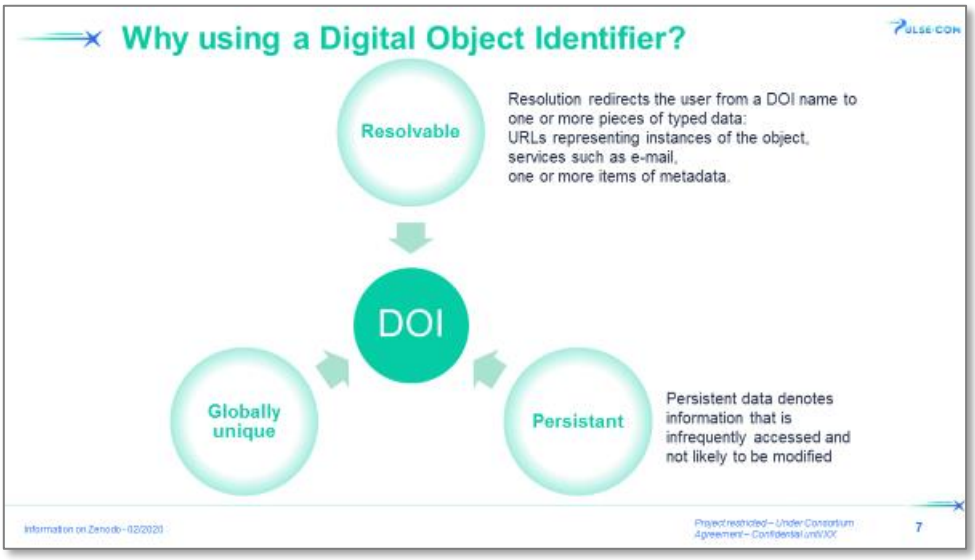
5


What is a Digital Object Identifier?
A digital object identifier (DOI) is a persistent identifier or "handle" used to identify objects uniquely, standardized by the International Organization for Standardization (ISO).
TOPICAL REVIEW
A review of power harvesting using piezoelectric materials (2003–2006)
Steven R Anton and Henry A Sodano
WHAT CAN BE EXPECTED FROM LEAD-FREE PIEZOELECTRIC MATERIALS?
Information on Zenodo - 02/2020
Project restricted – Under Consortium Agreement – Confidential, n°XX
6


Why using a Digital Object Identifier?
Resolvable
Resolution redirects the user from a DOI name to one or more pieces of typed data:
URLs representing instances of the object,
services such as e-mail,
one or more items of metadata.
DOI
Globally unique
Persistant
Persistent data denotes information that is infrequently accessed and not likely to be modified
Information on Zenodo - 02/2020
Project restricted – Under Consortium Agreement – Confidential, n°XX
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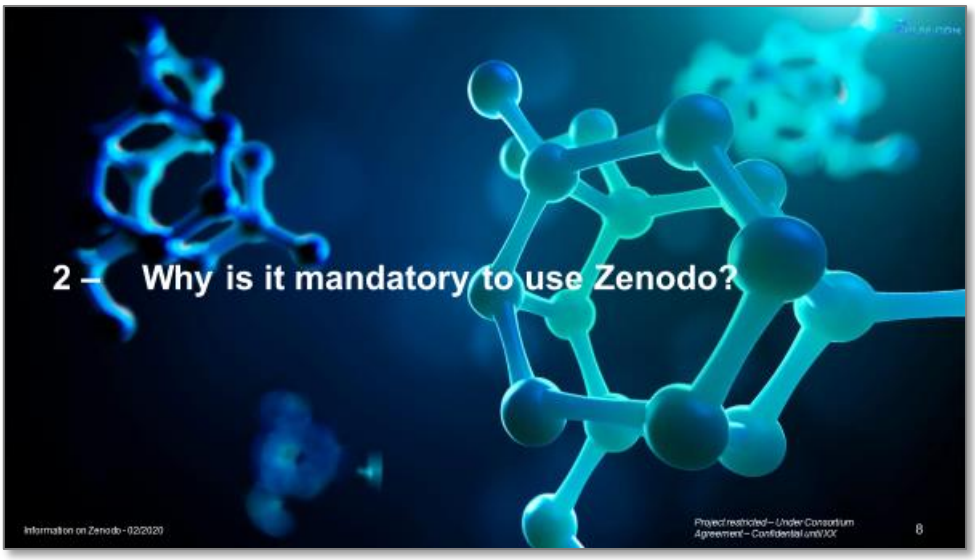
2 – Why is it mandatory to use Zenodo?
Information on Zenodo - 02/2020
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EC rule – Grant Agreement

29.2 Open access to **scientific publications**

Each beneficiary must ensure open access (free of charge online access for any user) to all **peer-reviewed scientific publications** relating to its results.

In particular, it must:

a) as soon as possible and at the latest on publication, deposit a **machine-readable electronic copy of the published version** or final peer-reviewed manuscript accepted for publication in a repository for scientific publications;

Moreover, the beneficiary must aim to deposit at the same time the **research data needed to validate the results** presented in the deposited scientific publications.

b) ensure open access to the deposited publication — via the repository — at the latest:

i. on publication, if an electronic version is available for free via the publisher, or

ii. **within six months of publication** (twelve months for publications in the social sciences and humanities) in any other case.

c) ensure open access — via the repository — to the **bibliographic metadata** that identify the deposited publication. The bibliographic metadata must be in a standard format and must include all of the following:

- the terms "European Union (EU)" and "Horizon 2020";
- the name of the action, acronym and grant number;
- the publication date, and length of embargo period if applicable, and
- a persistent identifier.

Information on Zenodo - 02/2020 — Reminder — Project restricted – Under Consortium Agreement – Confidential until XX — 9

Task 5.2 Dissemination

The results of the project will be disseminated using publications in high impact scientific and industrial journals. **An open access repository will be used and the gold open access route will be chosen for most scientific publications.** All partners will individually contribute to the dissemination activities of the project (publications, presentations at conferences, lectures / training for students). This will be coordinated and managed by the Dissemination and Communication manager (AYM).

- Gold Open Access: Publications will be made available Open Access directly at the publisher (conditions from their site). In that case, also research data must be available somewhere.
- Open Access must be given at the latest on publication.
- The publication fee will be covered by the author institutions and can be considered as eligible cost for the project.
- Get sure that the data are FAIR (Findable, Accessible, Interoperable and reusable).

IMPORTANT: Publications on PULSE-COM website does not meet long-term preservation requirements while ZENODO does.

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Data principles: FAIR

Findable Accessible Interoperable Reusable

Findable

F1. (meta)data are assigned a globally unique and eternally persistent identifier.

F2. data are described with rich metadata.

F3. (meta)data are registered or indexed in a searchable resource.

F4. metadata specify the data identifier.

Accessible

A1 (meta)data are retrievable by their identifier using a standardized communications protocol.

A1.1 the protocol is open, free, and universally implementable.

A1.2 the protocol allows for an authentication and authorization procedure, where necessary.

A2 metadata are accessible, even when the data are no longer available.

Interoperable

I1. (meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.

I2. (meta)data use vocabularies that follow FAIR principles.

I3. (meta)data include qualified references to other (meta)data.

Re-usable

R1. meta(data) have a plurality of accurate and relevant attributes.

R1.1. (meta)data are released with a clear and accessible data usage license.

R1.2. (meta)data are associated with their provenance.

R1.3. (meta)data meet domain-relevant community standards.

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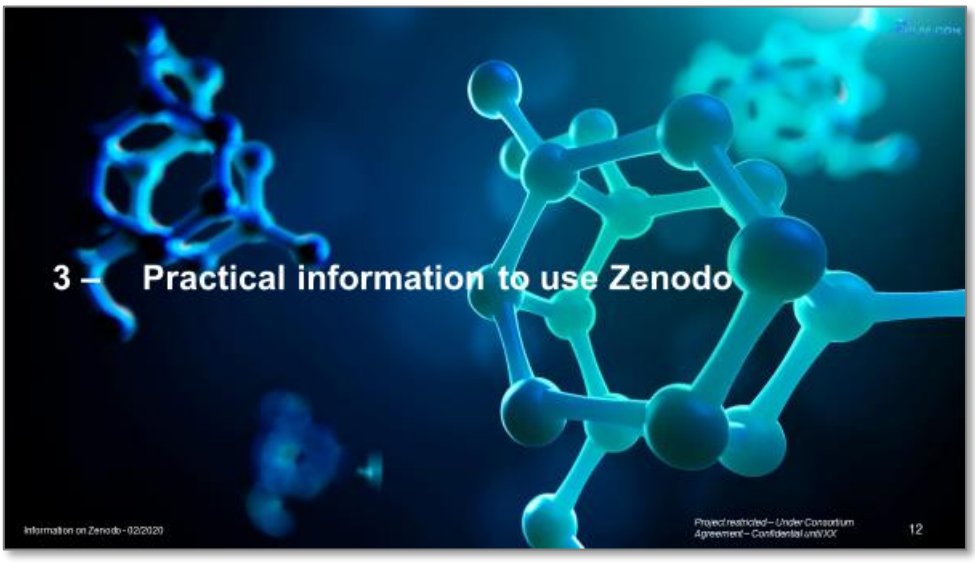
3 – Practical information to use Zenodo
Information on Zenodo - 02/2020
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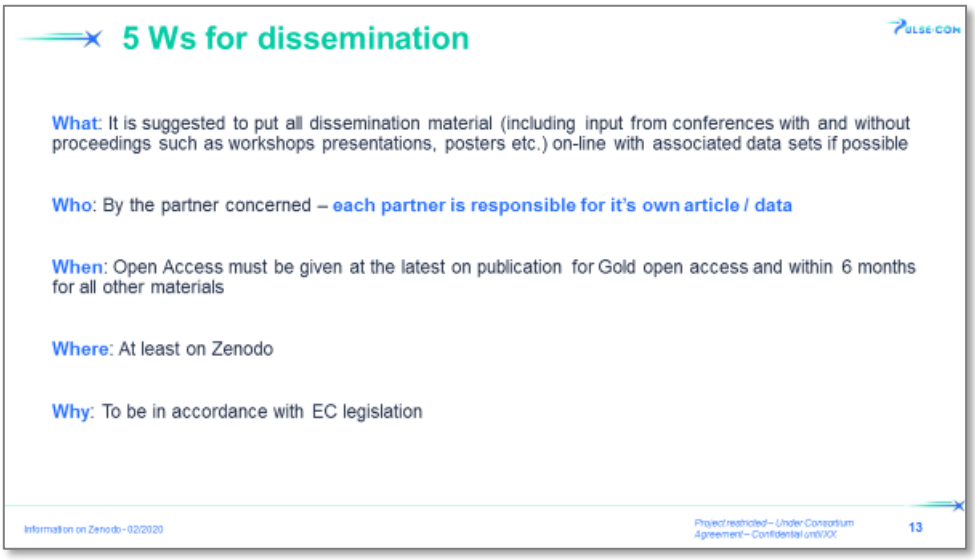
5 Ws for dissemination
What: It is suggested to put all dissemination material (including input from conferences with and without proceedings such as workshops presentations, posters etc.) on-line with associated data sets if possible
Who: By the partner concerned – each partner is responsible for it's own article / data
When: Open Access must be given at the latest on publication for Gold open access and within 6 months for all other materials
Where: At least on Zenodo
Why: To be in accordance with EC legislation
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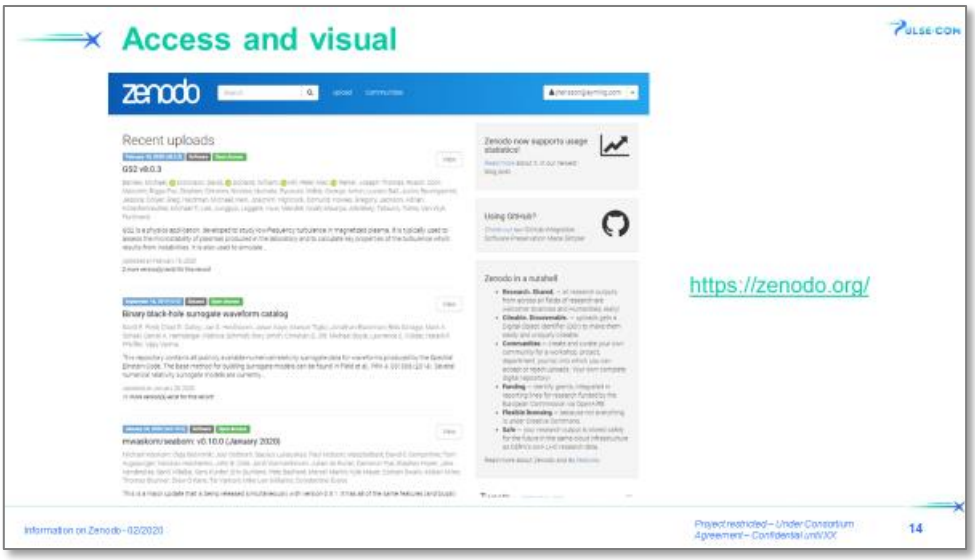
13


Access and visual
zenodo
Recent uploads
https://zenodo.org/
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PULSE-COM community
zenodo
Communities created and curated by Zenodo users
PULSE-COM
1 - First log in
2 - Click on Communities
3 -Search for PULSE-COM
4 – Click on View on the PULSE-COM community
Information on Zenodo - 02/2020
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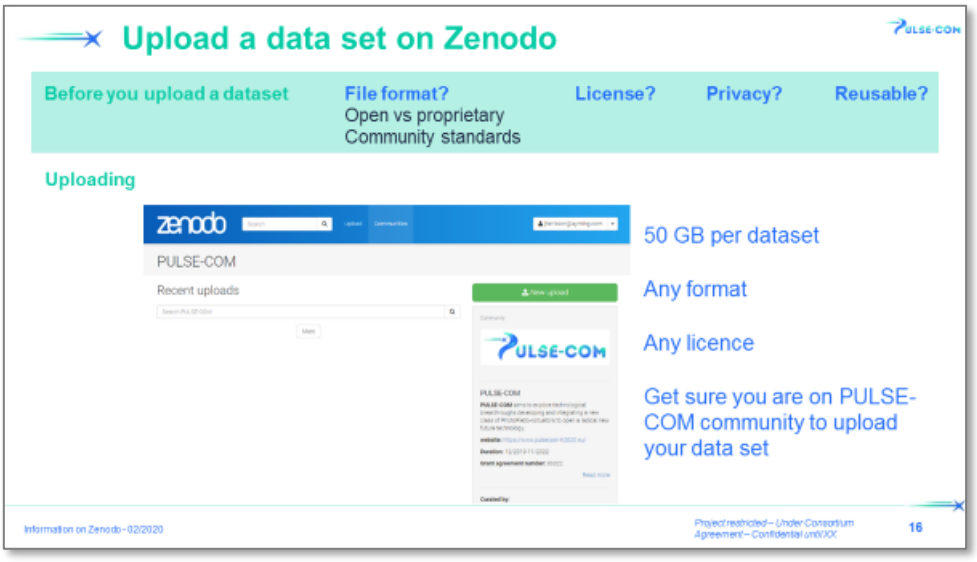
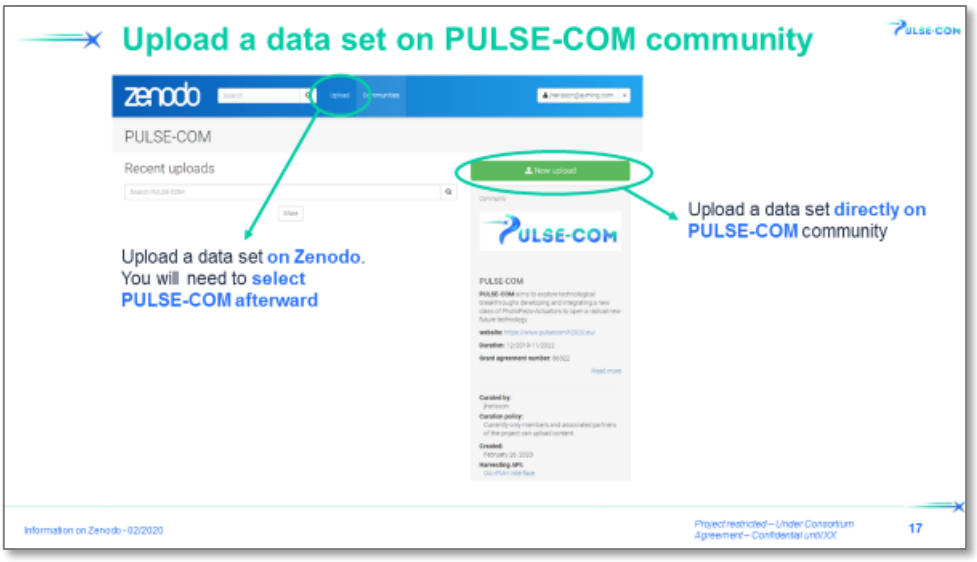

Upload a data set on Zenodo
Before you upload a dataset
File format?
Open vs proprietary
Community standards
License?
Privacy?
Reusable?
Uploading
zenodo
PULSE-COM
Recent uploads
50 GB per dataset
Any format
Any licence
Get sure you are on PULSE-COM community to upload your data set
Information on Zenodo - 02/2020
16


Upload a data set on PULSE-COM community
zenodo
PULSE-COM
Recent uploads
Upload a data set on Zenodo.
You will need to select PULSE-COM afterward
Upload a data set directly on PULSE-COM community
Information on Zenodo - 02/2020
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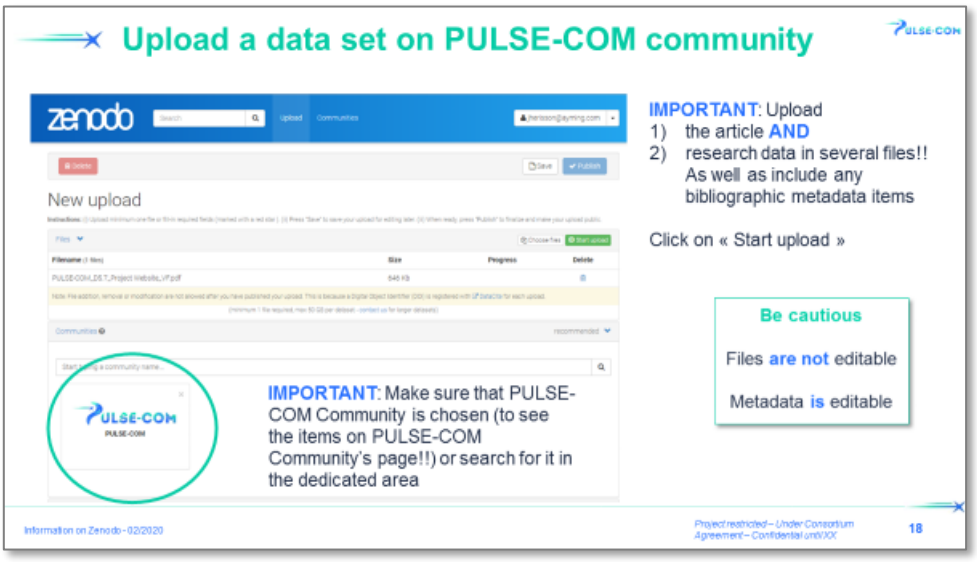
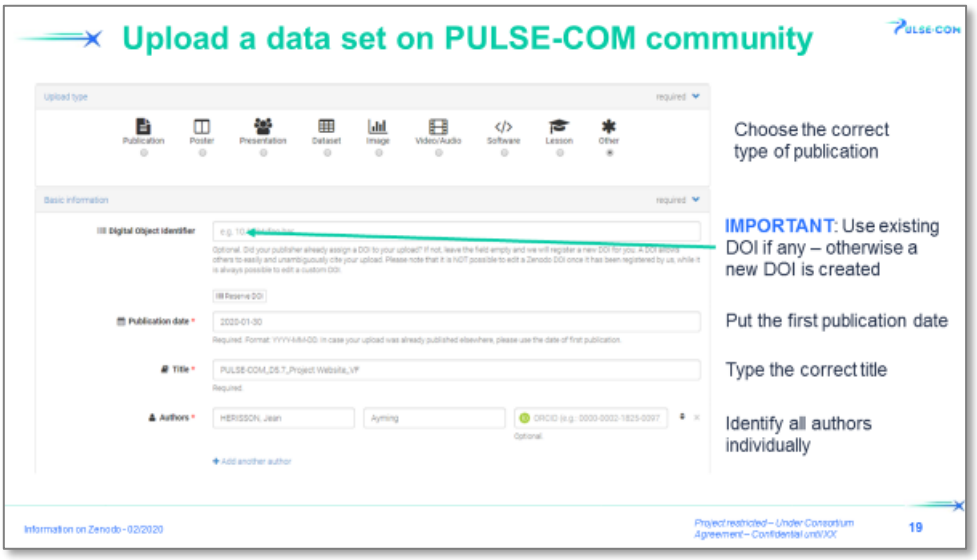

Upload a data set on PULSE-COM community
New upload
IMPORTANT: Upload
1) the article AND
2) research data in several files!! As well as include any bibliographic metadata items
Click on « Start upload »
Be cautious
Files are not editable
Metadata is editable
IMPORTANT: Make sure that PULSE-COM Community is chosen (to see the items on PULSE-COM Community's page!!) or search for it in the dedicated area
Information on Zenodo - 02/2020
18


Upload a data set on PULSE-COM community
Choose the correct type of publication
IMPORTANT: Use existing DOI if any – otherwise a new DOI is created
Put the first publication date
Type the correct title
Identify all authors individually
Information on Zenodo - 02/2020
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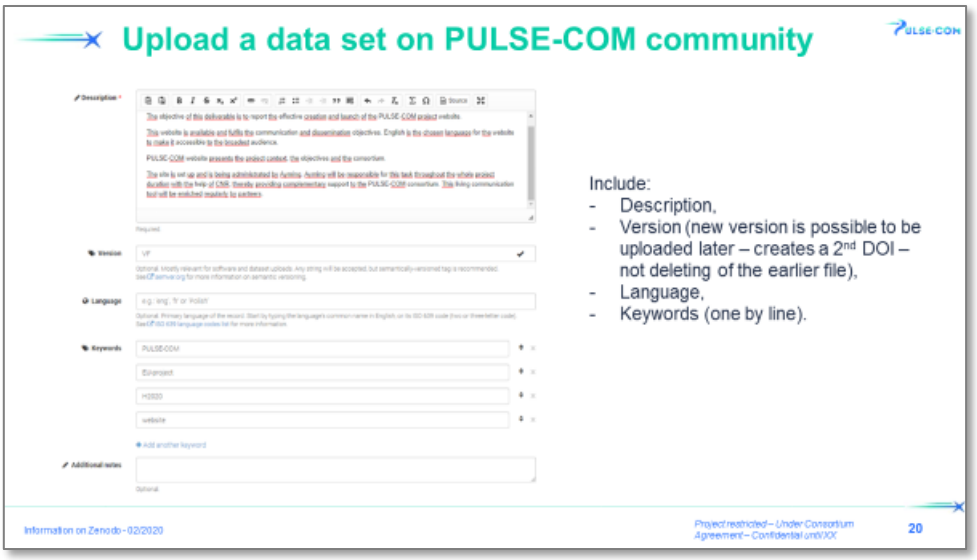
Upload a data set on PULSE-COM community
Include:
- Description,
- Version (new version is possible to be uploaded later – creates a 2nd DOI – not deleting of the earlier file),
- Language,
- Keywords (one by line).
Information on Zenodo - 02/2020
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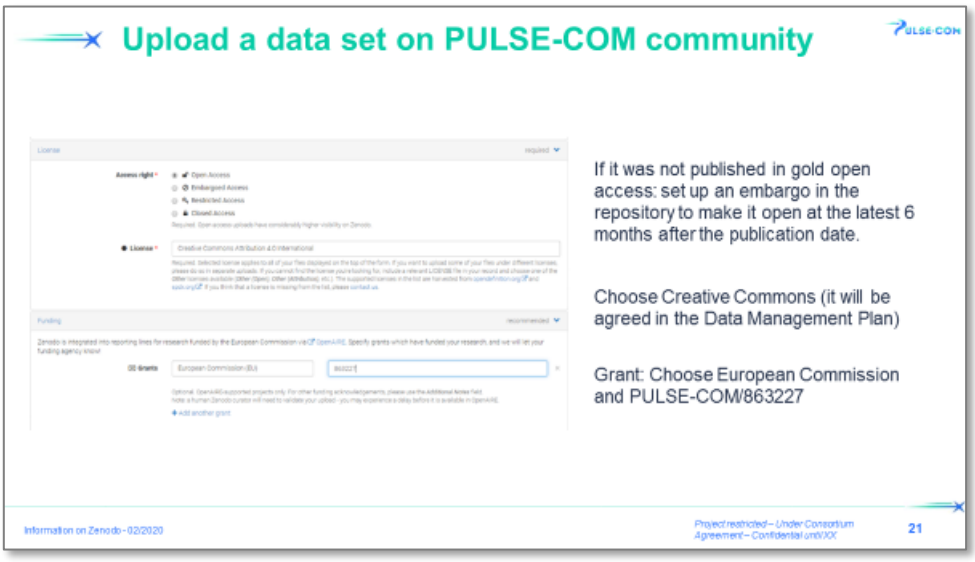
Upload a data set on PULSE-COM community
If it was not published in gold open access: set up an embargo in the repository to make it open at the latest 6 months after the publication date.
Choose Creative Commons (it will be agreed in the Data Management Plan)
Grant: Choose European Commission and PULSE-COM/863227
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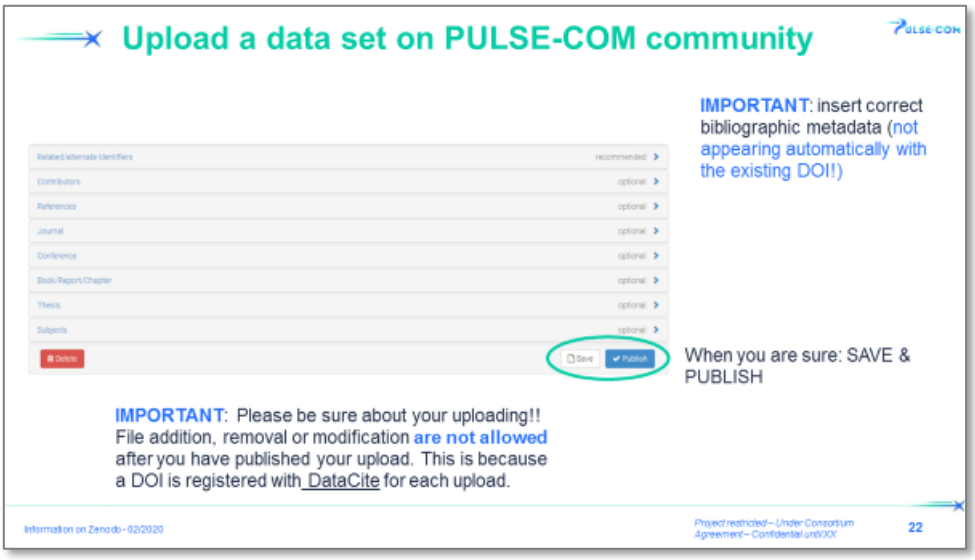
Upload a data set on PULSE-COM community
IMPORTANT: insert correct bibliographic metadata (not appearing automatically with the existing DOI!)
When you are sure: SAVE & PUBLISH
IMPORTANT: Please be sure about your uploading!! File addition, removal or modification are not allowed after you have published your upload. This is because a DOI is registered with DataCite for each upload.
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Information on Zenodo - 02/2020
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Dissemination procedure

- **Contractual references**
  - Article 29.1 GA - Obligation to disseminate results
  - Article 8.4 CAg - Dissemination of the results
  - During the project, and up to 1 year after the end of the project, all publications need to be internally validated
  - Obligation to display the EU emblem in all supports
- **People involved**
  - Primary Author of the publication = main contact for the publication
  - Reviewer
  - Dissemination and communication Manager: Fabienne Brutin and Jean Herisson / Ayming
  - WP5 leader: Mateusz Wlazło / CBRTP
  - The coordination board
- **Mandatory acknowledgements**
  - (publications) *"This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 863227".*
  - (patents) *"The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 863227."*

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Dissemination procedure (1/2)

1- Scientific publication or patent should be put on **Aymingsphere** and information emailed by the primary author for approval at the latest **45 days prior to the submission deadline** to:

- The project Coordination Board:
- the Project Coordinator, Lucia PETTI;
- the Project Scientific Coordinator, Riccardo Castagna;
- the Advisor from ENEA, Giuseppe Nenna;
- the Project Manager, from Ayming, Fabienne Brutin, and her deputy Jean Herisson.
- The WP5 leader, Mateusz Wlazlo, and his deputy, Grzegorz Kołodziej.

Mailing list to be used:
l.petti@isasi.cnr.it, r.castagna@isasi.cnr.it, giuseppe.nenna@enea.it, fbrutin@ayming.com, jherisson@ayming.com, mateusz.wlazlo@cbrtp.pl, grzegorz.kolodziej@cbrtp.pl.

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Dissemination procedure (2/2)

2- The WP5 leader or his deputy (or by default one member of the Coordination Board) sends an email to all partners for approval (SB representatives and deputies). Any comments or objections should be sent to the primary author and the persons listed above in 1.

- If objections are raised, the involved parties shall discuss how to solve the issues within a reasonable time frame;
- If no comments or objections are made within 30 calendar days, then the communication is automatically approved.
- Any dissemination material submitted by the primary author for approval less than 30 days prior to submission deadline will NOT be considered/approved. Applicants will have a NO GO from the Supervision and Coordination Boards. It is of Partners representatives responsibilities to make sure this information is shared among the partners teams.

3- The primary author submits the final version on Aymingsphere and email the persons listed in 1;

4- The WP5 leader ensures the update of PULSE-COM dissemination table (to be prepared + put on aymingsphere);

5- Ayming team ensures the update of the PULSE-COM website.

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