



RADIOBLOCKS

Project ID: 101093934

# Data Management Plan

<i>Deliverable:</i>	D1.3
<i>Lead beneficiary:</i>	JIV-ERIC
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# 1. Executive Summary

As stated in the Horizon Europe Programme Guide, Data Management Plans (DMPs) are mandatory for all projects generating or reusing data. Additionally, it is recommended that open access is provided to research outputs beyond publications and data and that they are shared as early and openly as possible. A DMP should address the following aspects: data set description, standards and metadata, name(s) and persistent identifier(s) for the data sets, curation and preservation methodology, data sharing methodology, output management for research outputs other than data and publications and finally costs and personnel related to research data management.

It should be stressed that the RADIOBLOCKS project deals with technological innovations for radio astronomy and thus is not expected to generate any data sets in the traditional meaning of the word, such as sets of observational data or large-scale simulations. Furthermore, no GDPR issues of any kind are expected.

Instead, this DMP will deal with “other research outputs”, as mentioned in section 3 of the Horizon Europe Data Management Plan Template:

*“In addition to the management of data, beneficiaries should also consider and plan for the management of other research outputs that may be generated or re-used throughout their projects. Such outputs can be either digital (e.g. software, workflows, protocols models, etc.) or physical (e.g. new materials, antibodies, reagents, samples, etc.).”*

*Beneficiaries should consider which of the questions pertaining to FAIR data above, can apply to the management of other research outputs, and should strive to provide sufficient detail on how their research outputs will be managed and shared, or made available for re-use, in line with the FAIR principles.”*

This DMP will describe the exact nature of the expected outputs of the various Work Packages (WPs) of the RADIOBLOCKS project, and how these outputs will be stored and shared, where possible, in agreement with the FAIR principle (Findable, Accessible, Interoperable, Reusable).

The RADIOBLOCKS results management plan will be implemented in the form of a deliverables page on the RADIOBLOCKS website, containing all the submitted deliverable and milestones reports, with their own DOIs, with links to a RADIOBLOCKS ZENODO community containing all deliverables and their associated products and publications, also with their DOIs. Newer versions of software, developed after the end of the project, can very simply be added to ZENODO as an update to the deliverable submitted during the project.

Together with the RADIOBLOCKS Dissemination Plan (D1.2), the data management plan will ensure the widest possible visibility and reusability of its project results.

## 2. Project output

An initial inventory of expected RADIOBLOCKS outputs was made from a survey conducted amongst all partners in month two of the project. For each of the outputs, the partners were asked to indicate its open-source/open-access policy, if restrictions towards free and open-access apply, and, for software outputs, under which (open-source) license the outputs will be published. The main results of the survey, split across the five Work Packages of RADIOBLOCKS, are summarized in Table 1.

Table 1: Results of research output survey

Work Package	Results	Open (source, access)	Number of Partners in WP	Number of respondents (% of total)
<b>1: Management</b>	Reports, plans, dissemination materials	y	1	100
<b>2: Novel Detectors and Components</b>	Reports, hardware prototypes, hardware designs, publications	y	16	63
<b>3: Digital Receivers</b>	Reports, hardware designs, software, publications	y	5	80
<b>4: Data Transport and Correlation</b>	Reports, software, firmware, publications	y	9	100
<b>5: Data Processing Toolkit for Advanced Radio Astronomy</b>	Reports, software, firmware, publications	y	13	62

As can be seen, the number of respondents was high, with an average response percentage of more than 80%. It must be noted that many of the partners that did not respond are involved in tasks without formal responsibility for any deliverables or outputs, and as such follow the decisions of the lead institutes. Furthermore, all partners in WP5, including those that did not participate in the survey, have committed themselves in the proposal to publishing all results under an open-source license.

This survey shows that the expected project output types are, including the deliverables and milestones:

- reports
- plans
- hardware designs
- hardware prototypes
- software
- firmware
- publications.

For simplicity, in the rest of the document the term “software” will cover both soft- and firmware.

## Software

As far as software is concerned, both WP4 and WP5 are fully committed to having all their results published under an open-source license. The type of license may depend on the re-use of existing software; for new developments, the WPs can choose the most suitable license (suggestions are GPLv3, MIT, BSD, Apache2.0, in no particular order). This also holds for software produced in WP3, although here one of the five partners has not (yet) responded. It is understood that all software will be accompanied by adequate documentation which will be an essential and integral part of the final software products.

## Hardware

Development, design, prototyping, and testing of hardware take place in WPs 2 and 3. For hardware, the situation concerning open access needs more attention. Although all respondents in WP2 did in principle agree to provide open access to the project results (keeping in mind only 63% of the partners did respond), some potential causes for access restrictions were identified, including but not limited to::

- export restrictions
- patent applications
- use of background IP
- the fact that some of the hardware is developed jointly by several partners, which complicates a unified response.

These legitimate issues will have to be further discussed among the members of these WPs and monitored throughout the project. The RADIOBLOCKS management will continue to try to convince all partners to make as much of the research results open access, following the EC guideline “as open as possible, as closed as necessary”.

### 3. Ownership and sharing of results

All aspects related to the ownership and sharing of results among the partners have been covered extensively in the RADIOBLOCKS Consortium Agreement, which was signed by all partners before the start of the project.

## 4. Organization and storage

### 4.1. Development and documentation

In RADIOBLOCKS, software developments will take place using cloud-based collaborative version-controlled platforms (such as GitHub or GitLab). This method of collaboration is well-established and is very well-suited for a distributed project that aims at producing a coherent set of software building blocks. Documentation will be an integral part of the final product, going well beyond the minimal standard README files, and will ensure that external users will be able to make full use of the functionality of the RADIOBLOCKS products.

Hardware development will take place in a distributed fashion, coordinated through frequent WP meetings and internal communications. It should be noted that the majority of the partners involved in this part of the project have a long and successful history of collaboration. Documentation will depend on the level of open access but will at the very least include the deliverable documents and any scientific/technical publications.

### 4.2. Preservation and archiving

The project outputs in the form of code, plans, or reports in any digital form, submitted as a milestone or deliverable of the project, will have to be stored in a repository that supports the FAIR principles, and preferably be connected to the European Open Science Cloud (EOSC). For this purpose, the ZENODO repository has been selected.

ZENODO is a general-purpose open repository developed under the European OpenAIRE program and operated by CERN. It allows researchers to deposit research papers, data sets, research software, reports, and any other research-related digital artefacts. This enables researchers to preserve and share their research output from any science, regardless of the size and format. ZENODO is an innovative and easy to use web-platform that allows for the upload, curation, and sharing of research data through an easy-to-use web interface and integration with other collaboration and data sharing services. ZENODO ensures the discovery and citability of the research output by assigning a persistent Digital Object Identifier (DOI) to every upload, as well as promoting software citation and preservation through one-click integration with GitHub. ZENODO is also one of the repositories connected to the European

Open Science Cloud (EOSC), which will further enhance the accessibility and usefulness of the RADIOBLOCKS results. The RADIOBLOCKS output will be preserved on the ZENODIO platform after the project end date.

Storing results in ZENODO immediately takes care of the Findable and Accessible aspects of FAIR. Reports and publications are not and cannot be Interoperable or Reusable. Software modules, written in standard well-documented programming languages, only depend on proper documentation to be Reusable, the writing of which will be enforced during the project. The software developed within RADIOBLOCKS will be interoperable by design since it consists of fundamental “blocks” for radio astronomical facilities. However, wider interoperability, as meant in FAIR, with external platforms or software packages, is something outside of the project’s scope.

### 4.3. RADIOBLOCKS website

All deliverables and milestones, whether they relate to hardware prototypes, components or designs, software or firmware modules, toolkits, or algorithms, will involve reports that will be submitted to the EC. These reports, together with the plans and dissemination materials generated in WP1, will be made available on a publicly accessible “deliverables and milestones” page on the RADIOBLOCKS website.

In the ZENODO repository, a RADIOBLOCKS community will be created and managed by the RADIOBLOCKS coordinator. All the deliverables and milestones and associated materials, such as software, designs, test reports, interim reports, and publications, will be stored in that community. The RADIOBLOCKS website will contain, besides the reports, links to all associated results, including their DOIs.

The RADIOBLOCKS webpage will be kept updated and maintained by JIV-ERIC for the duration of the project and beyond that. Several years after the end of the project, the website will turn into a static site.

## 5. Resources

Throughout the RADIOBLOCKS project, its management will take care of receiving, checking and submitting deliverables to the EC, archiving them on the project website and making sure all results are uploaded into ZENODO. The WP leaders will be responsible for sending any additional materials related to the deliverables to the management, who will also archive these in ZENODO. After the end of the project, the JIVE outreach officer will actively maintain the website for at least three years, after which the site will be hosted as a static site by the ASTRON (the host institute of JIV-ERIC) ICT department for as long as the institutes exist. New versions of the software, possibly developed through new collaborations, will be traceable

through their DOIs back to the original RADIOBLOCKS community in ZENODO. It is not foreseen that any additional budget will need to be allocated.

## 6. Review and updates

As the results generated during the four years of this project may change over time, due to changes in focus or unexpected developments, this DMP will be a living document that will permanently be on the agenda of the meetings of the Executive Board and discussed and amended as needed.