DELIVERABLE 5.1

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Preliminary assessment of pilot cases

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Content list

1 Summary

This deliverable is part of the OSCAR project (Open ScienCe Aeronautic &Air transport Research). The main goal of the OSCAR project is to initiate and deliver an optimized open science concept to European transport with special focus on Aeronautic and Air Transport (AAT) research.

To achieve this goal and sub-goals of the projects, the objective of WP5 is to test a draft version of the code of conduct (CoC) into pilot cases and to provide recommendations to mature it and to deliver a final code of conduct, which will support the implementation of open science principles in European AAT sector.

Deliverable 5.1 consists in an analysis of the implementation of the draft code (deliverable 4.3 V.1.0.0 dated 2020-08.28) into current European research projects. The main goal of this deliverable is to deliver findings of the simulation of the assessment of the draft code in selected European research projects as pilot cases.

This deliverable shall also include additional information as attachments to this deliverable:

- Attachment 1 – List of pilot cases per types
- Attachment 2 – Template of analysis form
- Attachment 3 – General summary of the analysis of pilot cases

2 Objectives and tasks

2.1 Objectives of the related OSCAR WP5 and OSCAR deliverable 5.1

The objective of WP5 is to validate the OSCAR open science code of conduct through an iterative approach starting with “simulated” application on projects.

The first version of the OSCAR open science code of conduct was subject to D.4.3 issued on August 28, 2020. This is a 12 pages short document.

The final objective is to have 15 pages short open science code of conduct that will contain about five open science principles including explanations and examples.

The OSCAR open science code of conduct should be easy to use and tailor-made for the European AAT landscape. It shall enable the AAT community to better understand open science and codes of conduct (Section 1.3 “Key Results” of the D4.4 “*Recommendations for implementing the OSCAR open science code of conduct*”).

The objective of D5.1 is to examine the impact of the code of conduct on the project’s implementation i.e. IPR issues, publications, and other dissemination activities and provide inputs for potential modifications and fine adjustment of the developed code of conduct.

In that perspective, ongoing or recent research projects were used as pilot cases by "virtually" applying the developed code of conduct and examining its effects on the projects implementation. Research projects are only projects in which OSCAR partners are or had been partners. Research projects selected were based on the availability and willingness of partners to participate in such a study.

The code of conduct was tested with each of the three types of projects: IA, RIA and CSA (other ones were considering as minor relevant in AAT research) through the selection of pilot cases into those three categories.

At the beginning of the project, the code of conduct was supposed to be integrated into existing Consortium Agreement Models (CAMs) and it was the objective of D4.4. to provide modified CAMs.

For several reasons further explained in section 1.4 "*Changes to the deliverables 4.4. at hand*" of D.4.4. OSCAR partners decided to change the purpose and title of 4.4. from "*Modified Consortium Agreement Models*" to "*Recommendations for implementing the OSCAR open science code of conduct*".

D.4.4. final version 1.0 was issued on November 30, 2020 during the course of our work of analysis of the preliminary version of the code of conduct.

This a key document for the implementation of open science and the code of conduct in European research projects. Among other useful information, it provides further explanations on codes of conduct, open science, common misconceptions about open science. It definitely helps to clarify some concepts and misunderstanding about open science.

Nevertheless, the main objective of D.5.1 remains the assessment of the open science code of conduct in pilot cases and we decided to stick to this first objective in this deliverable. We will only take into consideration some insights from this deliverable 4.4 in our analysis.

D.5.1 is the first step of the analysis and shall give rise to recommendations for modifications in the developed Code of conduct (D.5.2). We will further take into consideration the work done in D.4.4.to the purpose of D5.2.

2.2 Relevance and contribution of the deliverable to the objectives of OSCAR

The main goal of the OSCAR project is to initiate and deliver an optimized Open Science concept to European transport with special focus on AAT research with triggering an implementation in aeronautics and air transport.

WP5 deals with demonstration and validation of the OSCAR Open Science Code of conduct in pilot projects from the AAT sector. This Deliverable 5.1 is part of the development of the OSCAR code of conduct and shall contribute to develop a more mature version of the code of conduct.

3 Approach adopted and work performed

3.1 Approach adopted

As provided under section 1.4 of D.4.3, the scope of the open science code of conduct "*is to offer the opportunity to all scientists and research organisations to voluntarily commit themselves to the ethical values, principles rules, norms, standards and ideals expressed in the code*".

In its first version, the code of conduct contains three main parts.

1. A general one that includes the purpose of the code, the scope, the status and implementation of the code of conduct, open science & society and open science & science.
2. A second part with the principles of open science (see description below)
3. A last provision about the enforcement of the code

and the appendix 4 that provides for a definition of open science, a list of categories of open science and a list of the five schools of thought and links to different information on open science.

The principles of open science are formulated in the section 2 of the code of conduct as follows:

- **Openness and open communication**: Our research and scientific practice is characterized by openness and open communication. By openness, we mean the habits of thought and action that emphasizes the plurality of perspectives, inclusiveness and free sharing. In the pursuit of our activities as scientists and researchers, we commit ourselves to be as open as possible.

- **Transparency**: Our research and scientific practice is characterized by transparency. By transparency, we mean the behaviour of being explicit at all levels of communication with the aim of traceability and comprehensibility. In the pursuit of our activities as scientists and researchers, we commit ourselves to be as transparent as possible.
- **Reusability and inclusiveness:** Our research and scientific practice is characterized by reusability and inclusiveness. By inclusiveness, we mean the behaviour of including equally a plurality of different people and their social background and worldviews into our social and professional practices. By reusability, we mean one outcome of being inclusive. In the pursuit of our activities as scientists and researchers, we commit ourselves to be as inclusive as possible and make our research as reusable as possible
- **Reproducibility and robustness**: Our research and scientific practice is characterized by reproducibility and robustness. By robustness, we mean the quality of our actions, methods and results of withstanding perturbations and stresses over time. By reproducibility we mean one outcome of doing robust research. In the pursuit of our activities as scientists and researchers, we commit ourselves to thrive for reproducibility and robustness.
- **Fairness and responsibility**: Our research and scientific practice is characterized by fairness and responsibility. By fairness, we mean the general validity of rules, duties and rights for all individuals in the same manner. By responsibility, we mean the behaviour of accepting the consequences of her or his owns actions and to act accordingly. In the pursuit of our activities as scientists and researchers, we commit ourselves to proactively exercising fair and responsible behaviour.

Of course, these proposed principles make no claim to completeness or correctness. Furthermore, the principles listed here are to be regarded as provisional, as they will probably be, further conceptually adjusted in the further course of the project.

At the beginning, it was not clear to what extent such principles influence European projects or how they can be sensibly implemented. In order to solve this challenge we reflected and discussed the following two questions:

(a) In what concrete ways can the OSCAR code be implemented in European AAT projects?
(b) How does the concept or principle of openness affect European AAT projects?

(a) In what concrete ways can the OSCAR code be implemented in European AAT projects?

A concrete application of the draft code of conduct into a project means its implementation in the project documentation such as contractual documentation or some deliverables like the obligatory project coordination deliverables.

Each European research project is subject to the following contractual documentation:

- the grant agreement between the European Commission and the consortium (i)
- the consortium agreement between members of the consortium (beneficiaries) (ii)

(i) **The grant agreement** sets out the rights and obligations and the terms and conditions applicable to the grant awarded to the beneficiaries. This is a document issued by the European Commission in application of the European regulation establishing the framework program[1].

Each grant agreement is based on the Model Grant Agreement (MGA)[2]. The MGA is quite a standard document. There are only possible options but no room for negotiations between the European commission and the consortium. We decided not to include this document in our review of the pilot cases as it is a "standard" document provided by the EC with no possible modification requested by members of the consortium.

A detailed analysis of provisions applicable to open science in the MGA is subject to section 4.8 of the Deliverable 4.4 "Open science and EU policies".

(ii) **The consortium agreement** is a contractual document negotiated between consortium members and may be subject to amendments. It must be noted that usually consortium agreements are based on templates such as IMG4 or DESCA[3] templates generally negotiated between beneficiaries but with few edits.

Nevertheless, we decided to review the consortium agreement as it is subject to negotiations and then it may integrate provisions agreed between beneficiaries about open science.

(b) How does the concept or principle of openness affect European AAT projects?

Open science is more than some principles to be integrated into contractual documentation but a way of doing science characterized by different practises. One of the aims of OSCAR is to develop a code that helps researchers and engineers to implement open science in their European research projects. For that reason, it shall have impact on decisions taken by the consortium to open up project results during the project lifecycle.

The explanation of the work carried out and the overview of the progress, how the action is being implemented and what has already been achieved (as compared to the objectives, milestones and deliverables described in Annex 1) is subject to a technical report. This report shall include a dissemination and exploitation plan (DEP) and also a data management plan (DMP) if foreseen in annex 1 of the grant agreement.

The DEP and DMP appeared to be the most relevant documents to test the implementation of open science principles as those documents are the concrete translation of the dissemination strategy of a consortium and the data policy of the project.

When those documents do not exist, it can be useful to refer to the proposal submitted by the consortium to the European Commission that does contain an "Impact" section dealing with dissemination actions and other actions to maximize the impact of the results of the project.

[1] Regulation (EU) N° 1290/2013 of the European Parliament and of the Council of 11 December 2013 laying down the rules for participation and dissemination in "Horizon 2020 – the framework Programme for Research and Innovation (2014-2020) and repealing Regulation (EC) N°1906/2006

[2] Model Grant Agreement https://ec.europa.eu/research/participants/data/ref/h2020/mga/gga/h2020-mga-gga-multi_en.pdf

[3] Latest version of the DESCA template is available on http://www.desca-agreement.eu/

For the above-mentioned reasons, we decided that the reviewed documentation for each pilot case will be:

- the consortium agreement (CA)
- the DEP if any or the appropriate section of the proposal
- the DMP if any or the appropriate section of the proposal
- if necessary, the proposal.

3.2 Work performed

Work was performed in 3 steps.

- Selection of pilot cases for simulation
- Setting up of a template for analysis of pilot cases based on the draft CoC V1.0
- Analysis of pilot cases

3.1.1. Selection of pilot cases for simulation

The selection was done on the basis of the 3 different types of research projects in European context. First, we had to deal with the following issues:

- Process: How we will conduct this assessment from a practical point of view? Shall we contact identified coordinators of selected projects and ask them to test the code of conduct into the documentation of their project or shall we handle it by ourselves? We discussed this issue among the OSCAR partners and finally decided to conduct the assessment by our own and to contact coordinators only for some questions if needed. The main reason was that performing this assessment would probably have bored coordinators. Another reason was that based on reviewing the documentation by our own will probably provide us with more information without being filtered by a third party such as the coordinator.
- Confidentiality: Each of the documentation to be analysed, any document exchanges between beneficiaries of a project are not publicly accessible. Having non-disclosure agreements (NDAs) between project coordinators and OSCAR members was not an option as it is very constraining. It could have refrained project coordinators from accepting to assess pilot cases into their projects.

  Therefore, the best solution was to perform the analysis with pilot cases, to which the OSCAR partners have access because of own project participation.

We set up a list of projects in which each partner (see Attachment 1) was involved so we were able to review 19 projects. For confidentiality purposes, we do not mention the name of those projects in the attachments.

3.1.2. Set up of a template for analysis of pilot cases based on the draft CoC V.1.0

In order to reach our objective to assess the draft open science code into pilot cases, we decided to set up a template for analysis.

The template provides recommendations for each type of document to review. It includes a list of questions that could be relevant for checking the implementation of the code of conduct into the projects. This is only a template that could be helpful for OSCAR project partners, but each partner may conduct the analysis through another methodology.

Answers to the questions included in the template are only information extracted from projects and which are non-confidential. Only the OSCAR project partner, who is a member of the selected project, have access to the respective project documentation.

We paid duly attention to respect confidentiality constraints during the analysis process.

3.3.3. Analysis of Pilot cases

Each OSCAR project partner conducted the analysis of its own pilot cases based on the template we provided and delivered its conclusions to SAFRAN for final assessment into this deliverable.

The template (see attachment 2) of analysis form is set up in 4 parts as follows:

- **General information** about the project such as type of project, finishing date of the project, documentation reviewed.

  Answers to these questions shall provide information about the expected level of openness:
  - nature of the project (RIA, IA, CSA) could impact the degree of openness of information,
  - the status (i.e. is it a recent project or not) can provide explanations about the existence of DEP and DMP as we know that open access to data requirements were introduced by the EC in the course of the H2020 program.
  - existence of documentation such as DEP or DMP

- **Consortium agreements**: We capitalized on the results of the analysis of the six major consortium agreement models (CAMs) conducted by OSCAR partners in deliverable D 2.3[4]. One conclusion of this deliverable is that we should focus on the existing four categories of provisions: intellectual property, open data, open source software as well as ethics and responsibility. Accordingly the review of consortium agreements shall consist in checking if there are existing provisions and/or open science references into the fourth categories (intellectual property provisions, open source software, open data and ethics). Especially, concerning the intellectual property provisions, we paid particular attention to the implementation (or not) of the article 29 of the MGA “Dissemination actions- Open Access-Visibility of EU fundings”[5] and in particular articles. 29.1 to 29.3:
  - Article 29.1 Obligation to disseminate results
  - Article 29.2 Open Access to scientific publications
  - Article 29.3 Open Access to research data

- **DMP** (or impact section of the proposal): we drafted a list of questions to figure out if open science principles may affect European research projects.

  First, there are general questions about the document such as: Is there a very detailed analysis work package per work package of data that may be accessible in open access? What is the estimated percentage of open data? What are the main reasons for opting out?

  Then, based on the DMP template issued by the European Commission[6], we tried to figure out in which sections open science principles of the code of conduct could be implemented.

[4] See D2.3 “Qualitive and quantitative content analysis of five representative consortium agreement models”

[5] Model Grant Agreement https://ec.europa.eu/research/participants/data/ref/h2020/mga/gga/h2020-mga-gga-multi_en.pdf

[6] https://ec.europa.eu/research/participants/data/ref/h2020/other/gm/reporting/h2020-tpl-oa-data-mgt-plan-annotated_en.pdf

This template provides for the following information:

*1. **Data Summary***
*2. **FAIR data***
2. 1. Making data findable, including provisions for metadata
2.2. Making data openly accessible
2.3. Making data interoperable
2.4. Increase data re-use (through clarifying licences)
3. Allocation of resources
4. Data security
5. Ethical aspects
6. Other issues

First, it was not obvious in which section open science could be reflected. We could provide some recommendations for some principles such as openness & open communication, reusability & inclusiveness but others such as reproducibility& robustness, transparency or fairness & responsibility to identify.

For each principle, the reviewer had to check if it is implemented in the DMP.

- **DEP**: we did not provide guidance about the analysis of this document. In our opinion, the review of the DEP may only be useful in order to better understand the objectives of the project and the related strategy of dissemination led by the consortium members.

3.3 Further inputs

In the performance of our analysis, we had to take into consideration the following preliminary findings:

- **Dissemination actions are mandatory** under European framework programs. According to article 29.1 of the MGA[7]: "*Unless it goes against their legitimate interests, each beneficiary must- as soon as possible- disseminate its results by disclosing them to the public by appropriate means (other than those resulting from protecting or exploiting the results), including in scientific publications*".

  Additional dissemination obligations can be foreseen in the work programme. It is a reason why, there are always dissemination actions planned. It can be at minimum in the proposal and at the most in a very detailed dissemination and exploitation plan as a deliverable of the project.

  As it will be shown later, we found at least dissemination actions such as conferences, public discussions, publications, and websites in each pilot case. Although we can consider that these dissemination actions contribute to open science, we focused our analysis on the implementation of open access through other ways such as publication or research data or open source.

[7] Model Grant Agreement https://ec.europa.eu/research/participants/data/ref/h2020/mga/gga/h2020-mga-gga-multi_en.pdf

- **There are no general provision relating to open science and open science principles into the H2020 Rules for Participation**[8]. There are no provision relating to open source as well. Only provision applicable to scientific publications and research data is to be found in art. 43 of the Rules for Participation of 11 December 2013. The Rules for participation constitute the legal basis for European Research program. As those rules are flowdowned by the European Commission into the MGA and then between the beneficiaries in the CAs, it can be an explanation for the lack of references to open science concepts in European research projects.

- **For EU projects, open access to scientific publications and open access to research data are very recent concepts**: The concept of open access to scientific publications was widespread at the beginning of the H2020 program and the **open access to research data was mainly implemented in the course of the program** during summer 2016 (WP 2015-2016 published on July 25,2016.[9] It can explain the lack of references to open access to research data in documentation applicable to some projects.

- **Consortium Agreements are based on models** that are usually drafted before the entry into force of the framework program. These models (especially the main ones which were analysed in deliverable 2.3, IMG 4 and DESCA) do not include provisions on open access.

These findings are key point to bear in mind during the analysis of the pilot cases as they may impact the content of the documentation to review.

4 Results

4.1 General comments

We were able to review 19 European research projects. A full chart summarizing the review of the 19 pilot cases is in Attachment 3.

On the basis of the 19 projects, it must be underlined that:

- only 12 CAs include a provision about the “obligation to disseminate results” and only 5 of them a provision about open access to publications
- **no CA provides for open access of research data or open source provision**
- only 11 projects include a DMP[10]
- all the projects have dissemination objectives but only 10 have a DEP

With regards to open science principles, we observed the followings:

- **Openness & open communication** is a principle that seems commonly described in the contractual documentation especially in the DMP or the DEP (on a basis of 19 projects, 11 projects provides for openness and open communication – others are most of the time N/A i.e. because of a lack of documentation)
- **Reusability & inclusiveness** is also well integrated especially about conditions of reusability of data through different types of licences.

[8] Regulation (EU) N° 1290/2013 of the European Parliament and of the Council of 11 December 2013 laying down the rules for participation and dissemination in “Horizon 2020 – the framework Programme for Research and Innovation (2014-2020) and repealing Regulation (EC) N°1906/2006

[9] https://ec.europa.eu/research/participants/data/ref/h2020/wp/2016_2017/main/h2020-wp1617-climate_en.pdf).it.

[10] Absence of DMP does not necessary mean that there is no DMP but it could be explained by the fact that the partner was not provided with a DMP because our internal contacts don’t know about the existence of one DMP or because there is no specific DMP drawn up.

- **Other principles such as transparency, reproducibility & robustness or fairness & responsibility** seem to be poorly integrated into the documentation. For the first two principles, one reason is likely the misunderstanding of the concept.

It must be stressed that there is a part of subjectivity in our analysis. The analysis was conducted by OSCAR project partners and there is a part of their perception of the open science principles implementation into the conclusions.

Sometimes, one could not retrieve a principle in the documentation because the principle is not so easy to understand or implicitly mentioned and especially on the way it can be transcript into the documentation.

4.2 Results per type of projects

4.2.1 Pilot case: Research and Innovation Action (RIA)

RIA are low TRL projects by nature (usually up to TRL4) where key players are mostly universities and research establishments and industry involved as end-users.

Usually, the produced results are published with limited restrictions from the project consortium, something that is depicted in the project CA. They seem to be a preferential type of projects for implementing an open science policy.

We were able to review 9 RIA projects.

- **CAs**:

Surprisingly the CAs were poor in terms of provision applicable to open access even open access to publications (only 2 CAs on a basis of 9 include provisions with regards to open access to publications). One explanation comes from the templates commonly used by consortia. As previously mentioned in section 3.3 of this deliverable, the most common CAs i.e. IMG4 and DESCA, were not referring to Article 29.2 of the H2020 MGA about open access to publications.

It must be outlined that 4 consortium agreements do not even include a provision with regards to dissemination as well (article 29.1 of the MGA[11]).

None of the projects provided rules for open source obligations nor ethic (except one consortium on ethic) obligations.

- **DMPs**:

We were provided with DMPs only for 4 projects, generally the most recent projects ending in 2022 or 2023.

It must be considered that the five other projects are either projects ending at the latest in 2020 or just began (the consortium agreement was not finalized yet).

As previously mentioned, the EC introduced open access to research data regime as an “opt out” regime and generalized the use of the DMP during the summer 2016. Modification of the Article 29.3 of the MGA applicable to Open Access to research data was only subject to the amendment of the V5.0 of the MGA entry into force on July 3, 2018[12]. In that context, it is not surprising that projects ending into 2018 or 2020 do not have a DMP.

[11] Model Grant Agreement https://ec.europa.eu/research/participants/data/ref/h2020/mga/gga/h2020-mga-gga-multi_en.pdf

[12] See AMGA https://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/amga/h2020-amga_en.pdf

One project has no DMP but the DEP provides for the obligation to comply with ethical principles and research integrity in a quite detailed way and refers to the European Code of Conduct for Research Integrity of ALLEA especially the following essential principles:

"- *honesty; reliability; objectivity; impartiality; open communication; duty of care; fairness and - responsibility for future science generations."*[13]

When there is a DMP and although some projects have dissemination goals, DMP are generally drafted with very short provisions such as type/ format/ type of data to be collected, data security, ethical aspects (generally to exclude ethics aspects). It is very limited answer to questions provided by the EC in its DMP template.

There are neither detailed analysis of data collected (either workpackage/workpackage or by nature of datasets) nor fine-tuned implementation of open science principles into the management of the openness of data.

One DMP has no FAIR section included and provides that the consortium will not make use of publicly available or confidential datasets.

One reason could be the early stage of these projects and we can expect that the data management will be updated.

Only one DMP can be considered as reflecting a strategy of openness.

How Open Science principles of the draft CoC are implemented in the this project?[14]

- **Openness & open communication**:

Openness can be found in the section 2 that is a "Data Summary" describing types of data collected, targeted users of the collected data, type & format of data, size of data. It reflects efforts made by beneficiaries to open data per categories. 3 origins of datasets (experimental data, simulation results and full property database) and associated types of data are detailed.

About the "data to be publicly available", the DMP provides that publications will be made according the Consortium Agreement provisions and for other data:

"*Partners strive for maximum openness of data collected and generated during the project but reserve the right to evaluate which data will be made publicly available along with the time for publication on a case by case basis. The "Guidelines for FAIR Data Management in Horizon 2020" recognize the need to balance openness and protection of scientific information, commercialization and Intellectual Property Rights (IPR), privacy concerns, security as well as data management and preservation questions. It is expected that the dominant causes for enforcing data access restriction during XXX will be protection of IPR and commercialization strategies. It is also expected that the openness stance regarding individual items can be reviewed and updated periodically. For example, test results or experimental protocols can be made publicly available after the consortium has filed for the corresponding patents*.

The decision as to data openness and availability time will be made through a vote held by the steering board. If the amount and quality of data is deemed to require an extraordinary board consultation, a meeting will be scheduled at the earliest convenience. Otherwise the steering board will hold a vote in the frame of the scheduled consortium meetings."

[13] The European Code of Conduct for Research Integrity ref ISBN 978-3-00-055767-5 ©ALLEA - All European Academies, Berlin 2017

[14] You will find hereafter some extracts from a DMP for illustration purpose only – direct sources not mentioned for confidentiality reasons.

There are no further details in the DMP about openness of data category per category but it is expressively mentioned that it is the first version of the DMP and that "*future releases of this deliverable will be accompanied by a strategy for the generation and management of IP to ensure e.g. that the XX partners can exploit the results in commercially viable technologies and products*"[i].

Most of the time reference to open communication is made in the FAIR Section of the DMP especially the "Making data openly accessible" section. It is mainly a reference to the repository where publication, metadata and data will be accessible. It is the case in this project, it refers to Zenodo as repository (Nota: the others projects were reviewed as well).

- **Transparency:** We did not find explicit references to transparency.

It seems to be the same for the others projects. It must be noted that we generally answered "don't know" in the pilot cases analysis form about this principle.

- **Reusability & inclusiveness:**

We could find in section 3.4 named "*increase data re-use (through clarifying licenses)*" clarification on rules applicable to the **reusability of data** and **inclusiveness**:

- There will be partition of the repository space with open area and restricted access area "*with the aim to transfer as much data as possible to the open area at the earliest convenience".*
- Sharing of data with restricted access will be possible only by the depositor's approval.

The data produced and/or used in the project will be useable by third parties, both during and after the end of the project as far as it is placed in the open area of the Zenodo repository.

Access by third parties will be encouraged through dissemination initiatives for example by sharing the repository address (esp. DOI-address) and basic access instructions during conference presentations.

- **Reproducibility & robustness:** This principle couldn't be found in the DMP of this project nor in other DMPs reviewed

- **Fairness & responsibility:** This principle couldn't be find in the DMP of the project nor in other DMPs of other research projects we reviewed

* * *

While RIA projects are supposed to be a preferential type of projects for implementing open science, we must note that pilot cases we analyzed did not reflect this assumption.

We could not find real strategy of openness in the pilot cases but only very short provisions about open access to data.

With regards to open science principles: **openness & open communication** and **reusability & inclusiveness** principles are quite well implemented but others principles seem to be missing in the 4 pilot cases with a DMP.

4.2.2 Pilot case: Innovation Action (IA)

IA type of projects typically include medium to high TRL research activities in the range of TRL4 to TRL6 and sometimes higher. They include closer-to-the-market activities including prototyping, testing, demonstrating, piloting and scaling-up etc. for new or improved products, processes or

services. Industries and SMEs are obviously more attracted to this type of projects, while research establishments can offer their services for the project implementation.
Academia is required to respond to focused research requirements to achieve project objectives.

Obviously, research results produced in the context of these projects are linked closer to the financial interest and competitiveness of industries and SMEs involved. Usually, extended restrictions for the publication of results exist, while IPRs issues are handled in a sensitive way.

We could only reviewed 4 IA pilot projects. 2 of them had no DMP and we were provided with few documentation.

- **CAs**

One project has no consortium agreement but only a cooperation agreement with very restrictive provisions probably reflecting a specific situation.

The three other consortium agreements include a provision with regards to obligations of dissemination (article 29.1 MGA) but only one agreement provides for open access to publications.

No one has a provision on open access to research data, open source or ethic.

- **DMPs:**

We were only provided with two DMPs.

The first one has with very restrictive provisions:

- The DMP provides expressively that the deliverables listed and "all data generated during the project" will be confidential.
- Although the project has an educational objective, concerns to protect industrial property are clearly displayed in the dissemination and exploitation plan. Especially a communication process is detailed and the "***publication or communication may be postponed if real and serious reasons require this***, *if the information contained in the proposed publication or communication should be* ***the subject matter of industrial property protection***."[15]

The second one is a project with real commercial exploitation perspectives. The DMP is based on the European Commission (EC) DMP template[16]:

- **Openness & open communication**:

We could find the following kind of commitments:

- Besides opening data linked to peer-reviewed articles, commitment of beneficiaries to do their best to identify research data that could be opened to the scientific community.
- Research data linked to exploitable results will not be put into the open domain if they compromise its commercialization prospects or have inadequate protection.

There is a process shortly described to validate the openness of data.

Although, the DMP is an EC DMP template, it must be noted a real effort in identifying any kind of data that may be subject to openness and reasons for opting out were duly justified for each category of data. Main reasons for opting out were the followings: the aim of the results is to bring competitive

[15] Extract from a DMP for illustration purposes only – direct source not mentioned for confidentiality reasons

[16] https://ec.europa.eu/research/participants/data/ref/h2020/other/gm/reporting/h2020-tpl-oa-data-mgt-plan-annotated_en.pdf

advantage on new technologies / sensitive information / IP protection under evaluation / commercial exploitation planned. At the end, we noticed a very few percentage of data was eligible for openness (approximatively less than 10%).

It must be underlined that although there is an effort made to open some categories of data, reusability can be subject to licenses with some restrictions in terms of exploitation. Those restrictions may not be fully compliant with the principles applicable to open access as provided by the European Commission in the H2020 regulation (Art. 29.3 (a) of the MGA[17]: "*deposit in a research data repository and take measures to make it possible for third parties to access, mine, exploit, reproduce and disseminate*").

- **Transparency**: We couldn't find reference to this principle

Reusability & inclusiveness: Reusability could be found in the specification that each dataset will be subject to licenses. It must be noted that if Creative Commons Licenses (CCL) are encouraged, there is no restriction applicable in terms of category: "*Each Dataset will specify the licence used. Dataset responsible will be encouraged to use Creative Commons license, such as CC BY, CC0, CC BY-SA, that permit different condition of use and distribution of the data*"[18].

- **Reproductibility & robustness**:

We could not find any correspondence of these principles in the DMP.

- **Fairness & responsibility**:

The DMP provides for a dedicated organization in order to address the responsibility point.

* * *

As a general conclusion on IA pilot cases, it was surprisingly type of projects where we could find a very detailed DMP. In this case, the DMP is used as a tool to justify the decision not to open data.

4.2.3 Pilot case: Coordination and Support Action CSA

CSA are typically projects of public interests. CSA projects do not usually include technological results. This type of projects are typically adapted to implement open science principles.

We reviewed 6 CSA pilot cases including the OSCAR project.

- **CAs:**

On a basis of 6 CAs, 5 were based on the DESCA model consortium agreement.

Most of the agreements include a provision to dissemination obligations (4 of them).

We could not find references to open access to publications or to research data in any of the Consortium Agreements. There is no provisions about open source or ethic as well.

- **DMPs:**

5 projects have a DMP:

[17] https://ec.europa.eu/research/participants/data/ref/h2020/mga/gga/h2020-mga-gga-multi_en.pdf

[18] Extract from a DMP for illustration purposes only – direct source not mentioned for confidentiality reasons

- **Openness & open communication:**

We found statements such as "*we aim to make open as much data as possible given current storage and IPR limitations*." or references to European regulations "*In line with EU regulations, XXX will endeavour to make data as openly accessible as possible*"[19].

The OSCAR project provides for explanations and requirements of EU projects but this is not specific to the project. There is a reference to the Fraunhofer research data repository Fordatis where selected project data will be published by the end of the project.

- **Transparency:**

Especially one project has very detailed data summary section. It is provided partner by partner and each partner provides for the management of its data in a quite detailed way. So it reflects efforts made by the consortium to be transparent in the management of the data.

- **Reusability & inclusiveness:**

Almost all DMPs provide a license for reusability of data. Sometimes it is only referring to a license without any further information, sometimes it refers to CCO license. The OSCAR project refers to the ODC-ODbL License.

One DMP provides that the disclosed project data will be subject to agreement before disclosure and then will be freely accessible during a period of four years after the project.

- **Reproducibility & robustness**

We couldn't find these principles in the DMPs we reviewed

- **Fairness & responsibility:**

Fair and responsible use of data are implicitly covered by the part "ethics" in the OSCAR project e.g by fostering that without permission of the interviewee there will be no publication of the data and the data will be published in anonymized form.

* * *

Surprisingly, the projects are not as open as we could have imagine especially with regard to the management of data:

- Most of the Open Science principles are detailed (except reproducibility & robustness) in the form of generally valid formulations and no particular fitting to the specificities of the projects
- Although the project type aims to maximize dissemination and increase the public awareness, there are some restrictions on data and deliverables because of confidentiality or intellectual property reasons.

[19] Extract from a DMP for illustration purposes only – direct source not mentioned for confidentiality reasons

5 Conclusions

As a general comment, we observe that open science is currently not very well implemented in the European research projects we reviewed. This finding is applicable independent of the TRL and the nature of the projects (IA, RIA, CSA).

Indeed, we found very few references to open science in the consortium agreements. With regards to DMPs, they basically tend to be compliant with the FAIR principles referring very briefly implicitly or expressively to main principles. When there is a very detailed analysis of data per work package or per nature the disclosure of such data is either subject to restrictions or to licences that may not be compliant with open access principles.

When open science principles are implemented, we observed that some principles seem to be better understood and translated into the documentation than others. Especially the transparency and the reusability & robustness principles seem to be very difficult to implement. To be better promoted, open science definitely has to be better understood by the stakeholders.

We observe three main factors to explain this situation:

- **A lack of promotion of the open science in the applicable reglementation**: Open science was not really promoted by the European Commission during the H2020 program: There are misunderstandings from stakeholders especially from the industry's side, which is not familiar of the open science, its rationales and applications. Industry seems very reluctant to the implementation of open science so far. It explains that it is then not very well implemented.
- **A lack of flexibility**: Rules applicable to open science in the European reglementation are binary: whether you open your publications, data etc.. to share it freely to anyone without any control or limitation on the use or you close it because it may harm your commercial interest, intellectual property rights or any other legitimate reasons you can demonstrate. This lack of flexibility is reflected in some DMPs where only few data is finally opened.
- **A reluctance by default from stakeholders** especially industry. This is likely a consequence of the two first factors.

Those factors should be taken into consideration in improving our code of conduct. As the aim of the OSCAR open science code is to be tailor-made for the European AAT landscape, it shall take into consideration the above mentioned factors and better address AAT community concerns in implementing open science. Open science principles should be documented with some examples or concrete applications that help researchers to better understand principles and that way to adhere to it.

6 References

- Regulation (EU) N° 1290/2013 of the European Parliament and of the Council of 11 December 2013 laying down the rules for participation and dissemination in "Horizon 2020 – the framework Programme for Research and Innovation (2014-2020) and repealing Regulation (EC) N°1906/2006
- Model Grant agreement https://ec.europa.eu/research/participants/data/ref/h2020/mga/gga/h2020-mga-gga-multi_en.pdf
- Annotated Model Grant Agreement

  https://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/amga/h2020-amga_en.pdf
- DESCA Consortium Agreement latest version: http://www.desca-agreement.eu/
- EC Data Management plan

  https://ec.europa.eu/research/participants/data/ref/h2020/other/gm/reporting/h2020-tpl-oa-data-mgt-plan-annotated_en.pdf
- WP 2015-2016 published on July 25,2016 https://ec.europa.eu/research/participants/data/ref/h2020/wp/2016_2017/main/h2020-wp1617-climate_en.pdf).it
- The European Code of Conduct for Research Integrity ref ISBN 978-3-00-055767-5 ©ALLEA - All European Academies, Berlin 2017

Attachment 1 – Final list of pilot cases

Partner	RIA	IA	CSA	Total
SAFRAN	4	1	3	8
THELSYS				
EASN-TIS	3			3
UPAT	2	1	1	4
INCAS				
ONERA		2	1	3
Fraunhofer			1 (Oscar project)	1
Total	9	4	6	19

Attachment 2 – Template of analysis form

Type of project : (select) **IA/RIA/CSA**

Stop date of the project:

Documentation to review: (click the box)

☐Consortium Agreement
☐DMP
☐Dissemination and Exploitation Plan
Other: |please indicate]

Consortium Agreement :

Nota:
- Based on conclusions of 2.3: The most efficient categories to focus on in order to implement Open Science are Intellectual property, Open Source software, Open data, Ethics and responsibility
- Consortium agreement are usually based on templates so for each kind of template it's more or less always the same document that is finally executed
- Implementation of the CoC into CA will be done by providing a proposal of new provisions to be added into the fourth categories ⇒ there is a very limited impact of the Code of conduct into the CA as a CA includes unchanging standard provisions.

A this stage of the project, the assessment of the Code of conduct into consortium agreements shall consist in checking if there are references to Open Science into the fourth categories.

- **Type of CA** (DESCA/IMG4/other)

Do provisions contain references to Open Science principles:

- **Intellectual property provision** (Results, Access Rights) :

Do provisions contain references to Open Science principles	☐Yes	☐No
Is there a reference to Article 29 of the MGA	☐Yes	☐No
Is there a reference to article 29.2 of the MGA	☐Yes	☐No
Is there a reference to article 29.3 of the MGA	☐Yes	☐No

Other comment:

- **Open Source Software (OSS)**:
  Is there a clause of OSS ☐Yes ☐No
  Other comment:

- **Open data**:
  Is there a clause of Open data ☐Yes ☐No
  Other comment:

- **Ethics:**
  Is there a clause of Ethics ☐Yes ☐No
  Other comment:

DMP/ Impact section of the proposal:

General questions:

- It the DMP based on the EC DMP template? ☐Yes ☐No

If No, please explain the reasons/differences:

- Estimated percentage of open data :
- Is the DMP very detailed WP per WP? ☐Yes ☐No
- Main reason to Opt Out:
- Period when the reviewed DMP occurs/ Update number:
- Differences between the proposal and the DMP: [if possible]

Other:

The DMP template issued by the EC provides for the following types of information:
2. ***Data Summary***
2. ***FAIR data***
2. 1. Making data findable, including provisions for metadata
2.2. Making data openly accessible
2.3. Making data interoperable
2.4. Increase data re-use (through clarifying licences)
3. Allocation of resources
4. Data security
5. Ethical aspects
6. Other issues

Open Science may mainly be implemented through the provisions in bold.

Based on the content of the DMP and especially the above mentioned provisions, do you think the following principles are implemented:

- **Openess &Open Communication principle (you can find rationale about openness in the Data summary):**
  ☐Yes ☐No ☐Don't know
  Other comment:

- **Transparency (Data summary section?):**
  ☐Yes ☐No ☐Don't know
  Other comment: no specific

- **Reusability & inclusiveness** (you can find implementation of this principle into the FAIR section)
  ☐Yes ☐No ☐Don't know
  Other comment:

- **Reproducibility & robustness** (you can find implementation of this principle into the FAIR section)
  ☐Yes ☐No ☐Don't know
  Other comment:

- **Fairness &responsibility** (Data summary section?):

☐Yes ☐No ☐Don’t know
Other comment:

Dissemination and exploitation plan / Exploitation section of the proposal :

- Expected TRL of the project:
- Any other useful information:

C2 - Restricted

Attachment 3 – General summary of the analysis of pilot cases[ii]

			CA		other	DMP					
Nature of the projects	**End of the projects**	**Dissemination (art. 29.1)**	**Publication (art. 29.2)**	**Other OS principles**	**Diss. & exploit. Plan**	**DMP**	**Openness/ Open communication**	**Transparency**	**Reusability & inclusiveness**	**Reproducibility & robustness**	**Fairness & responsibility**
RIA E 1	22.08.31	yes	no	no	proposal	yes	yes	Dont' know	yes	Don't know	Don't know
RIA E 2	22.08.31	no	no	no	proposal	yes	no	no	no	no	no
RIA E 3	23.12.31	no	no	no	proposal	yes	yes	Don't know	yes	Don't know	Don't know
RIA U 1	20.10.31	yes	**yes**	no	no	yes	N/A	yes	N/A	N/A	N/A
RIA U 2	18.04.30	yes	**yes**	no	plan	no	yes	yes	N/A	N/A	N/A
RIA S 1	20.10.31	yes	no	no	plan	no	yes	Don't know	yes	no	Don't know
RIA S 2	20.08.31	yes	no	no	plan	no	yes	N/A	N/A	N/A	N/A
RIA S 3	23.12.31	no	no	no	plan	no	N/A	N/A	N/A	N/A	N/A
RIA S 4	18.12.31	no	no	no	plan	no	N/A	N/A	N/A	N/A	N/A
IA S	21.12.31	yes	no	no	proposal	Yes	yes	Don't know	yes	Dont' know	Don't know
IA U	22.03.31	yes	**yes**	no	plan	No	N/A	yes	N/A	N/A	N/A?
IA O 1	20.11.10	yes	no	no	no	No	N/A	N/A	N/A	N/A	N/A
IA O 2	21.11.30	N/A	N/A	N/A	Plan	yes	yes	yes	Don't kow	no	**no**
CSA S 1	17.10.01	yes	no	no	Plan	Yes	yes	yes	yes	no	**yes**
CSA S 2	23.12.31	yes	yes	no	No	Yes	yes	Don't know	yes	Don't know	**yes**
CSA S 3	21.08.31	yes	yes	no	No	Yes	yes	no	yes	Don't know	**yes**
CSA F	21.06.30	yes	no	no	Plan	Yes	yes	yes	yes	no	**yes**
CSA O	21.09.30	no	no	no	Plan	Yes	yes	yes	yes	no	Don't know
CSA U	15.04.30	no	no	no	no	No	N/A	N/A	N/A	N/A	N/A

[i]

[ii] N/A means not applicable because we were not provided with applicable documentation