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DELIVERABLE

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D3.5: Report of the organization of several events (forums, workshops)

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Annexes = All annexed separate documents

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1 Summary

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 the purpose of triggering an implementation in aeronautics and air transport while achieving a balance between Open Science and IPR protection.

WP3 focuses on the identification of national, European and international partners in the aeronautics field and transport research in general, through organization of forums, workshops and other events to be able to exchange ideas and best practices on Open Science principles. The consortium also considers the collaboration with other transportation modes as a meaningful way to learn from each other and to exchange views. The activity is structured in three tasks:

T3.1: Preparation and implementation of the Forum

T3.2: Identification and engagement of international partners

T3.3: Consideration of other transport modes and inter-modality

This deliverable covers the activity in the task 3.1 referring to the organization and participation of OSCAR partners in several events. Initially planned as physical participation in actual physical events and organization of workshops, the year 2020 and the context of COVID-19 pandemic restrictions forced OSCAR partners to reconsider this activity and adapt very quickly to the new conditions by participating in virtual events. As it will be described in the following pages, this activity proved to be successful and reached its objective of exchanging ideas and promote best practices in Open Science principles through participation in events, either virtual or physical.

2 Objectives and task

2.1 Objectives of the related OSCAR WP and OSCAR task T3.1

The main goal of OSCAR is to pave the way towards Open Science in European aviation research by detailed analysis of the landscape and by developing, validating, and promoting a suitable Open Science concept with the purpose of triggering an implementation in aeronautics and air transport while achieving a balance between Open Science and IPR protection.

Objectives of the WP3

The objective of the WP3 is to organize and perform workshops with experts from identified regions.

The activity is focused on the identification of national, European and international partners in the aeronautics field and through organization of forums, workshops and other relevant events to be able to exchange ideas and best practices on Open Science principles.

Work Package 3 is composed of three tasks: T3.1 Preparation and implementation of The Forum (the activity presented in D3.1, D3.2 and D3.5 – the present deliverable); T3.2 Identification and engagement of international partners (activity presented in D3.3) and T3.3 Consideration of other transport modes and inter-modality (collaboration with the surface transport CSA) – the activity presented in deliverable D3.4

The activities of the Task 3.1 refers to the preparation and implementation of The Forum. The objective of this task is to create a forum for national and European stakeholders – public and private; and to exchange ideas and share best practices for operationalising Open Science principles in transport research through organization of events.
ONERA and INCAS will use their contacts both national and European (both of them being full members of EREA and having a long participation in EU projects) to attract participation to forums, workshops and other kind of events where the participants could share their experiences, best practices and recommendations.

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

Deliverable D3.5 Report of the organization of several events (forums, workshops) describes the way the OSCAR partners managed to achive the objective of the WP3, to organize and perform workshops with experts from identified regions, by attending several events. In the context of Coronavirus pandemic and all the imposed restrictions all the events that OSCAR team participated in, were organized as virtual events.

3 Approach and procedure

3.1 Work performed

The boundary conditions imposed by the ongoing COVID-19 pandemic causing restrictions in nearly all countries is having also huge impact on planned events. Air shows, scientific and aviation conferences, seminars, workshops or meetings were cancelled, postponed or became virtual events. The exchange between researchers has been reduced to on-line communication and e-mails. The cooperative research of international partners in joint projects is hampered by the restrictions.

This unprecedented situation, with events cancelled all over Europe impacted the initial plans of the OSCAR team. There were plans of participating in several events throughout the last year of 2020, plans that didn't came true because of the cancelation or because of turning into virtual events, of big events like ILA Berlin or the 10th EASN international Conference.

OSCAR team has also to align and cope with the current pandemic situation and adhere to the restrictions while overcoming obvious challenges. Virtual events and scheduled interviews could prove a suitable means to deliver the message on Open Science, across the European aeronautical community.

With that in mind, OSCAR team started the preparation of its workshops in the frame of these events: drafted the concepts, prepared the agendas and presentations and assembled the invitation lists.

Although at this stage of the project, the participation at ILA Berlin with an own dedicated Forum on Opens Science (as described below), would have brought significant input to OSCAR team, the fact that the 10th EASN Conference 2020 turned into a virtual event, gave the OSCAR team the opportunity to keep its plans of participating in this event, obviously the participation was adjusted to the virtual environment, which proves to be very challenging in term of organization, concept, organizing the agenda in a way to keep the audience interested, but also to ensure participation.

3.1.1 The Forum

Taking into account that the Launch of the ARCPORT Forum didn't have the desired outcome, in terms of participation and content, the OSCAR team felt the need to change the concept and go back to something more concrete and promoting meetings and dialogue during ILA 2020.

A "Forum presence" at the stand of Fraunhofer Space Alliance or at the Northern German chalet or the Fraunhofer Aviation chalet was later dismissed proving not to be the most cost effective way of interacting and delivering the message.

The next idea of the team was to have a kind of "OSCAR tour" to aviation and to the chalets in order to promote the approach. This was meant to be done with the help of interviews, filmed or recorded according to the participant convenience.

A short questionnaire was set-up in such a way it could be improved on the spot, as we received feedback.

The structure of the questionnaire already included in Deliverable D 3.1 is:

1. Name, Surname (not mandatory)
2. In which field do you work? (Academic, Industry, etc.) -
3. Where do you work (not mandatory)
4. What is your job / function (engineer, researcher, etc.)
5. Have you ever published in a journal, in proceedings or in a book?
    a. YES -> Have you ever published in an Open Access journal?
    If so, what benefits did you get from it? (Greater visibility, more citations, etc.)

    b. Have you ever deposit one of your paper in an Open Archive like ArXiV or HAL?

6. Why do you think Proceedings are less in Open Access than Journals?
7. Do you think that the current model of Scientific Publication is satisfying?
    What could be done to improve it?

8. Have you ever deposit your data in an Open Access platform like Zenodo or GitHub?
    Would you agree to open your data when possible? What help would you need for this?

9. What do you think of Open Science?
    a. Do you support Open Science and have experiences to share about it?
    b. In your opinion, what are the main obstacles to the implementation of Open Access in the field of Air transport research? (confidentiality, competiveness)
    c. Do you fear the non-reciprocity with other countries?

10. What guarantees would you need to publish in Open Access?
11. What tools or resources would you need to open your publications and data?

Unfortunately, this alternative concept was also compromised because of ILA2020 cancellation, due to the coronavirus crisis.

Consequently, the OSCAR team had to find solutions in participating at the upcoming events such as the 10th EASN International Conference on “Innovation in Aviation & Space to the Satisfaction of the European Citizens”, AITS 2021 Bremen Summit, or the pilot conference "Open Science, Why? How? How far?" organized by ONERA, all of them being virtual events.

3.1.2 EASN Conference 2020

The 10th EASN International Conference “Innovation in Aviation & Space to the Satisfaction of the European Citizens”[1] was initially planned to take place in Salerno in the first week of September but was later changed, due to the Covid 19 pandemic, into a fully virtual event which took place from the 2nd until the 4th of September. The conference managed to attract 350 participants, making this virtual gathering a real success. The agenda of the event included 9 Keynote Lectures, given by distinguished personalities of the European Aeronautics and Space Community, as well as 323 technical presentations throughout approximately 47 sessions. It was for the first time when the

[1] https://www.easn.net/?q=events_view_event&id=32

conference was organized in a virtual mode, and proved to be a real success story, like all the physical EASN conferences organized so far.

On the 4th of September, in day 3 of the Conference, OSCAR team organized its own session: “OSCAR Project Session” starting 14:30 up to 16:10. All OSCAR partners were presented with at least one representative, in total 6 OSCAR partners were participating to the session.

The agenda included four very well received presentations (all presentations will be annexed to this deliverable) and an open discussion session with the audience, as follows:

14:30 – 14:50	**Dipl. Ing. Gerhard Pauly** Open Science in Aeronautics Research – Why? How?
14:50 – 15:10	**Dr. Martin Spieck** Open Science in European Research voices and perceptions from the aviation & air transport community
15:10 -15:30	**Presented by Dr. Panagiota Polydoropoulou (prepared by Martin Maga et al)** Code of Conduct in Open Science – What is it and why is it good?
15:30 – 15:50	**Dr. Martin Spieck** Past and future: Some ideas how to tap the potential of Open Science for AAT research
15:50 -16:10	**Open Discussion with Audience**: “Open Science! How dare you to leave that benefit unused?”

The “OSCAR Project Session” was included in the regular program (**figure 1**) of the Conference and all participants to the conference could join. For the whole duration of the session, there was a participation of approximately 50 representatives of aviation stakeholders, including the OSCAR partners.

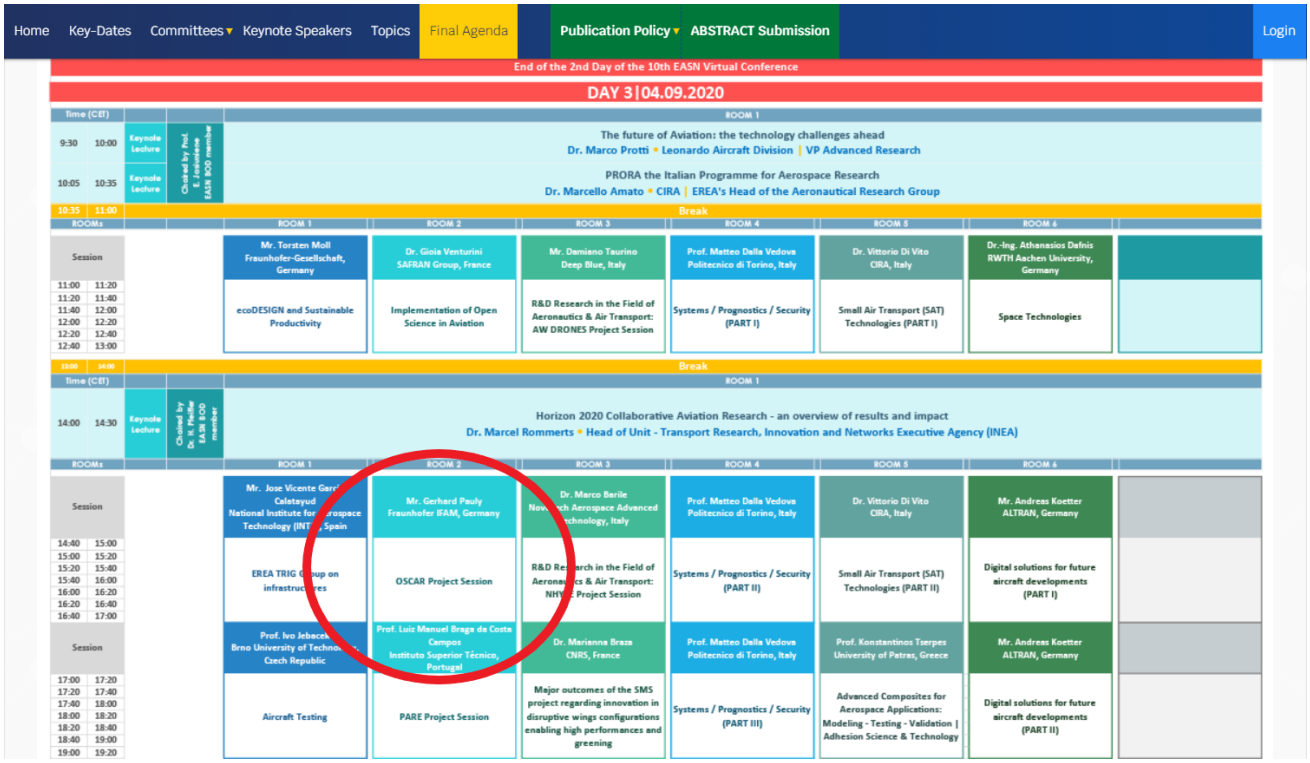


Figure 1. OSCAR time slot in the 2020 EASN conference

A few points were raised during the Open discussion session with the audience and they were addressed accordingly by the OSCAR team.

The presentations held in the “OSCAR Project Session” at the EASN Conference can be found in the Annexes section.

3.1.3 AITS 2021 BREMEN SUMMIT

The Aeronautics & Space Innovative Technology Summit[2] took place digitally on February 23-25, 2021. AITS Bremen is viewed as a top business convention for the application of innovative technologies in the aeronautics, space and defense industries. AITS Bremen manages to attract top level executives from leading companies in aeronautics, with regional and global outreach and with unique capabilities and know-how.

OSCAR was represented at this on-line conference by the Coordinator, Dipl..Ing. Gerhard Pauly (Fraunhofer IFAM), presenting OSCAR’s main up to date achievements and results through a dedicated presentation on “Open Science and Aeronautics Research” (presentation in the Annex) and a subsequent panel discussion focusing on “Building the Research and Innovation Network of the Future”. Experts shared views on: How are international programmes addressing global challenges and European industrial competitiveness? Cutting-edge R&D on the frontier of new concepts and solutions; Talent development as a strategic growth factor for industry.

[2] https://bremen.bciaerospace.com/

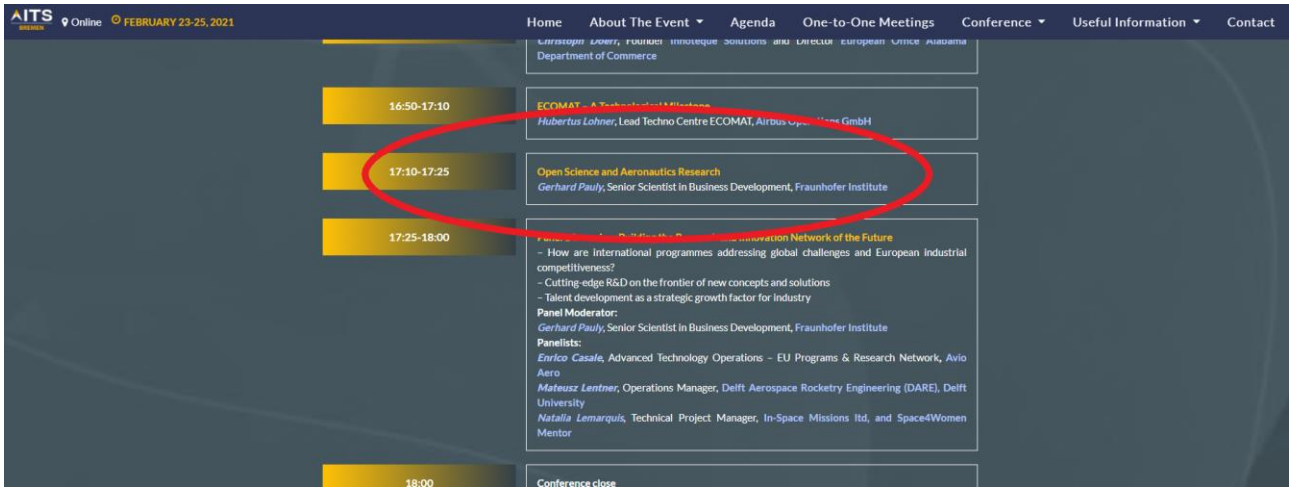


Figure 2. AITS 2021 BREMEN SUMMIT

The presentation held by OSCAR Coordinator in the AITS 2021 Bremen Summit can be found in the Annexes section.

3.1.4 "Open Science, Why? How? How far?"

On 13th of February 2020 at ONERA Palaiseau, it was organized a pilot conference entitled "Open Science, Why? How? How far?" with the participation of the Open Science Advisor for the French Ministry of Higher Education, Research and Innovation, Mr. Marin Dacos.

OSCAR consortium was represented by Marie Claire Coet and Cecile Andre, ONERA representatives in OSCAR Consortium.

The conference, hosted by ONERA gathered researchers from ONERA and representatives from research institutes in the local area.

The main goal of this conference was to propose an event formula that could be organized and implemented also in other EU countries:

- Invite as keynote speaker a local (national) expert in Open Science area
- The event to be hosted by an aeronautics and air transport research entity
- The conference to be organized in the native language, eliminating the potential language barriers and enabling an easier understanding of the concepts and interactions between participants and speakers.

3.2 OSCAR Closing event

At the end of last year, already few big events in Europe announced will be cancelled or organized as virtual events: in December it was announced that Paris Air Show was cancelled for 2021 due to pandemic uncertainty. Also, Clean Sky[3] announced that its spring event will turn into a virtual one, after they have cancelled entirely their event in spring 2020. Also, the European Commission

[3] https://www.cleansky.eu/event/clean-aviation-for-a-competitive-green-recovery-in-europe-innovative-ideas-take-flight

announced its event, on European Research and Innovation Days[4], 23rd - 24th of June 2021 to be also a fully virtual event.

Although the vaccination process has started all over the Europe and there are clear signs that the pandemic situation will improve, as we can notice the big events are still put on hold or turned into virtual mode.

Smaller events are also following the same trend, and at this moment, the organization of a physical event can't be considered as certain and in order to ensure good participation and dissemination of the OSCAR findings, a joint closing event is considered.

Another project that answered to the same topic call MG-4-2-2018 – Building Open Science Platforms in transport research and like OSCAR is a 30 months H2020 Coordination and support Action that started on the 1st of January 2019 is called BE-OPEN.

During the implementation of OSCAR, we have been in contact with the colleagues in BE-OPEN[5] project exchanging views and best practices: organized some common webinars in order to give a general presentation of the project introduce OSCAR's activities and share views on the encountered challenges.

Continuing the good collaboration already started with BE-OPEN consortium, OSCAR team has contacted BE-OPEN project to have a joint event, to address Challenges of OS and about how to implement OS in Horizon Europe proposals and future projects. Both projects will present their findings and success stories. Further details on the concept of the event will be developed together with the BE-OPEN team. The banner for the event was created for this event can be seen in **figure 3.**

Figure 3. OSCAR BE-OPEN event banner.

[4] https://research-innovation-days.ec.europa.eu/

[5] https://beopen-project.eu/ BE-OPEN is a 30-months Horizon 2020 Coordination and Support Action that started on 01 January 2019, and addresses the call MG-4-2-2018 Building Open Science platforms in transport research.

4 Results

4.1 Comparison of planned activities and performed work

As described above, in order to adapt to the current pandemic situation, the initial plan has changed several times. OSCAR team started by focusing on organizing workshops and attending European conferences and events, which was a success in the end, managing to participate in few virtual events, the 10th EASN International Conference Virtual Conference, AITS 2021 Bremen Summit and a pilot conference "Open Science, Why? How? How far?"

Despite the initial plans didn't came true due to the COVID-19 restrictions, OSCAR team managed to overcome the obstacles created by cancelled events, by participating in few virtual events where the objective of exchange ideas and best practices was very well achieved.

4.2 Comparison of objectives and achievements made

The objectives of this deliverable was to **exchange ideas and best practices on Open Science principles** through organization of forums, workshops and other relevant events.

Participating in virtual events proved to be successful, **OSCAR team managing to achieve the objective of this task to exchange ideas and share best practices** for operationalising Open Science principles in transport research. Because of the virtual events, the **OSCAR message might have reached more people than in usual physical events.** It was noticed in many virtual events that actually the participation was broader than in physical events, as participants do not need to take time and resources to travel, and in many cases to the virtual events had no participation fee or the participation fee was reduced significantly compared to physical attendance.

During the 10th EASN International Conference, the OSCAR presented its findings and expertise related to the open Science concept to approximately 50 persons participating to the dedicated OSCAR session.

AITS 2021 Bremen Summit was attended by more than 400 senior level executives and leading industry professionals, to discuss cutting edge solutions, technologies, trends and best practices in the aeronautics, space and defence supply chains as well as key innovations in advanced manufacturing. This was a great opportunity for OSCAR to its concepts and findings.

5 Conclusions

Despite this unprecedented situation that impacted all levels of our life, OSCAR consortium managed to go forward and achieve all its objectives, although sometimes had to rethink its activities. All major goals were achieved despite several setbacks, in some cases certain obstacles and challenges pushed the OSCAR team to find novel ways of tackling emerging issues. Participating in virtual events with own workshops or presenting OSCAR concept in conferences, organizing scheduled interviews and planed surveys offered the consortium the possibility to better understand the difference in target audience reach and also the advantages and disadvantages of not communicating in person. One slight disadvantage of this kind of events is that the interactions among participants is reduced, but there are also some advantages. It was noticed in many virtual

events that actually the participation was broader than in physical events, as participants do not need to take time and resources to travel, and in many cases to the virtual events had no participation fee or the participation fee was reduced significantly compared to physical attendance. From this point of view this fact was in the advantage of the OSCAR team providing more participants to the workshops and presentations allowing a broader share of the OSCAR concept.

6 Annexes

Presentations at the EASN Conference:

1. Open Science in Aeronautics Research – Why? How? - **Dipl. Ing. Gerhard Pauly,** Coordinator of OSCAR
2. Open Science in European Research voices and perceptions from the aviation & air transport community - **Dr. Martin Spieck**
3. Code of Conduct in Open Science – What is it and why is it good? – Presented by **Dr. Panagiota Polydoropoulou (prepared by Martin Maga et al)**
4. Past and future: Some ideas how to tap the potential of Open Science for AAT research **- Dr. Martin Spieck**

Presentation at AITS 2021 Bremen Summit

5. Open Science in Aeronautics Research – Why? How? - **Dipl. Ing. Gerhard Pauly,** Coordinator of OSCAR

Open ScienCe Aeronautic & Air Transport Research

Open Science in Aeronautics Research – Why? How?

Virtual EASN conference 2020-09-02 to -04

Gerhard Pauly / Fraunhofer IFAM

Fraunhofer IFAM

"This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 824350"

OSCAR @ EASN – Agenda

Time	Topic	Lead
14:30 – 14:50	Open Science in Aeronautics Research - Why? How?	Fraunhofer – Gerhard PAULY
14:50 – 15:10	Open Science in European research: voices and perceptions from the aviation & air transport community	Thelsys – Martin SPIECK
15:10 – 15:30	Code of Conduct in Open Science – What is it and why is it good?	UPAT – Panagiota POLYDOROPOULOU
15:30 – 15:50	Past and future: Some ideas how to tap the potential of Open Science for AAT research	Thelsys – Martin SPIECK
15:50 – 16:10	Open Science! How dare you to leave that benefit unused?	Fraunhofer – Gerhard PAULY

Large challenges - examples

- Computers & operation systems → Berkeley Software Distribution Unix, ARM
  - Commercial relevance: mac OS, Android
  - Commercial relevance: Apple switches to ARM CPUs
- Decarbonization
  - Automotive: Battery mobility? Hydrogen mobility? Infrastructure? Acceptance?
  - Automotive: Autonomous driving? What's needed?
  - Aeronautics: Climate crisis + corona … where to go? Which way to go? How to overcome the current economic disaster?
- Future aviation
  - How to address innovative technologies?
  - How to include all stakeholders to get things done?
  - How to deal with challenging competitors?

Current situation

- Participation rules (RfP) of Horizon 2020 / Horizon Europe
  - Provide legal framework to projects
  - Open access to scientific publication obligatory (MGA article 29.2)
  - Broader open science approach not explicitly mentioned
- Consortium agreement models
  - CAMs are fully independent from EC
  - CAMs translate legal framework to project specific internal agreements
  - Current CAMs address open science implicitly
  - Current CAMs do not address digitization as base element to make open science happen

Current situation

- Awareness of the complexity problem by all stakeholders
  - Information – what's open science,
  - Benefit
  - How to deal with open science
- Open science code of conduct
  - Principles
- Guidance for implementation
  - How to apply open science approaches in projects
- Participation rules (RfP) of Horizon Europe
  - Legal framework addressing open science which allows to be translated into flexible CAMs
  - Legal framework to be applied in concrete consortium agreements

2 Principles of open science

2.1 Principle 1: 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.

2.2 Principle 2: 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.

2.3 Principle 3: 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 inclusiv6Syn420Fe as possible and make our research as reusable as possible.

2.4 Principle 4: 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 pertubations 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.

2.5 Principle 5: FAIRNESS AND RESPONSIBILITY

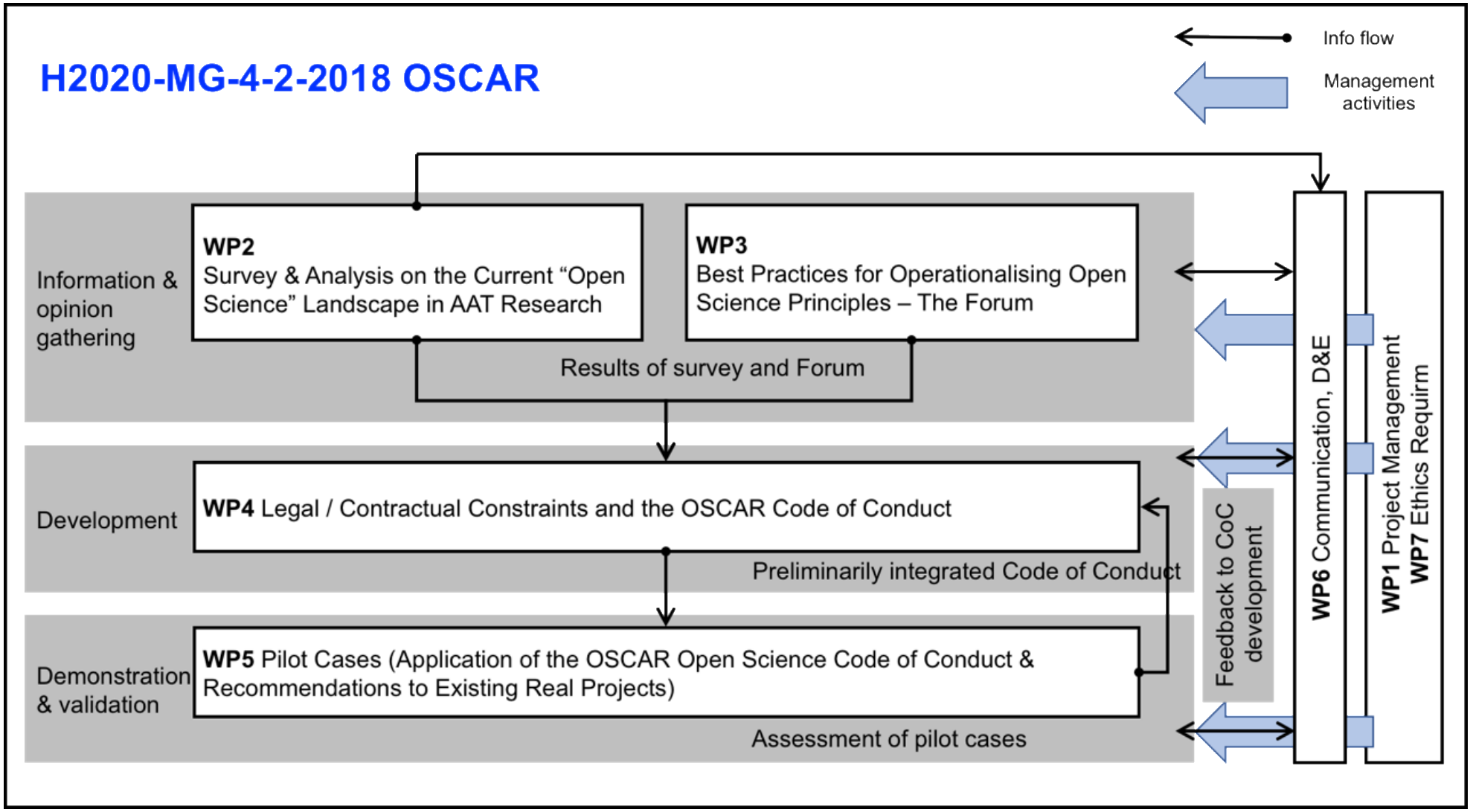
Our research and scientific practice is characterized by fairness and responsibility. By fairness we mean the general validity of rules, duties and rights for all individuals in the same manner. By responsibility, we mean the behaviour of accepting the consequences of her or his owns actions and to act accordingly. In the pursuit of our activities as scientists and researchers, we commit ourselves to proactively exercising fair and responsible behaviour.

OSCAR @ EASN – How? 4/4

Next steps

- Finalization of the Guidance for implementation
- Improvement of the open science code of conduct
- Simulation: what could open science mean in concrete AAT projects work?
- Provision of experiences and results gained to the European Commission

OSCAR @ EASN – Intro & Fact Sheet 1/3



Call: H2020 - 2018 Mobility for Growth

Topic: MG-04-02-2018 - Building Open Science platforms in transport research

Specific Challenge:

"*The rapid development of digital technologies and new collaborative tools are the basis of an on-going transformation and opening up of science and research, referred to as Open science.*"

Expected impact:

"*Actions are expected to lead to setting up a community of transport research organisations willing to work on the basis of a commonly agreed Open Science Code of Conduct.*"

Current situation:

Need to mobilise resources in transport research in order to address global challenges in a more efficient way than today.

Main goal:

To initiate and to deliver an OS concept suitable to the European AAT research environment

… meaning …

→ An analysis of the current OS situation in the European aviation sector
→ An OS concept promoted and known in the European aviation sector
→ A balance between OS approaches and IPR requirements
→ Implementation guidance by means of a Code of Conduct
→ Validation of the OS approach in selected test projects

Grant Agreement data:

7 work packages
26 deliverables, 6 milestones, 8 critical implementation risks
Effort 157,8 person months, Budget 1,553,711.25 €
Duration 30 months (2019-01-01 to 2021-06-30) → to be extended to 2021-09-30

The OSCAR team – 7 partners:

→ 1 HES (UPAT)
→ 3 REC (Fraunhofer, INCAS, ONERA)
→ 2 SME (EASN-TIS, Thelsys)
→ 1 IND (SAFRAN)

The OSCAR team – 5 countries:

Belgium, France, Germany, Greece, Romania

Background:

→ FP6 SCRATCH (support to SMEs)
→ FP7 CooperatEUS (collaboration EU-US)
→ FP7+ SUNJET (collaboration EU-JP)
→ H2020 RADIAN
→ wide experience in
European AAT research since the 1990s,
including RIA, IA, CSA, and Clean Sky

OSCAR collaborates with BE OPEN (GA 824323, coordinated by CERTH, Greece) to avoid duplications and to gain synergies

Thank you!

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Open ScienCe Aeronautic & Air Transport Research

Open Science in European Research: Voices and Perceptions from the Aviation & Air Transport Community

10th EASN Virtual International Conference
2 – 4 September 2020

Martin Spieck, Diana Penzien, Sabine Spieck

Thelsys GmbH

"This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 824350"

Open Science and Europe‘s Long Term Goals

But what do the people in the AAT community think about that?
EUROPEAN
OPEN SCIENCE
scientific process
OECD
as soon as

The Outreach

OSCAR Mini Survey

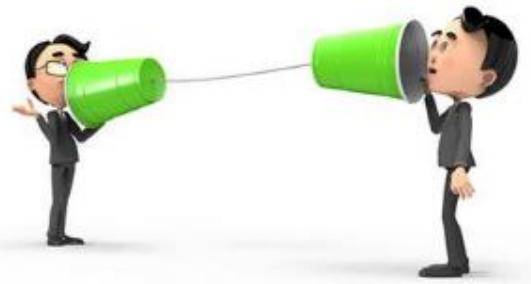
- getting responses from as many people as possible
- low barrier – quick and easy to answer
- highlighting the most…
  … important,
  … urgent,
  … controversial issues
- getting the „general mood“ of the AAT community

OSCAR Big Survey

- going to more details and depth
- less multiple choice, more options to differenciate and bring up own ideas
- capturing the various currents of opinion
- highlighting the needs, requirements, expectations and hopes of stakeholders

OSCAR Structured Interviews

- completing the picture gained by the Mini Survey and the Big Survey
- follow up on specific points which were raised in the surveys
- get individual answers on whether, why and how OS could work for aeronautics



Fact sheet: Mini-Survey

Key figures of the Mini-Survey

- 14 easy questions
- Time: max. 5 minutes
- Open: 20 May, 2019
- Closed: 30 June, 2019
- Participants: 258
- Tool: Limequery / Limesurvey

Key facts of participants

- GEN: 70% male / 30% female
- AGE: n/a
- ORG: Research / air transportation
- CAT: Public research
- PROF: Scientist, researcher, middle management
- LOC: mainly France, Germany, Romania, Greece

What OSCAR learned from the Mini-Survey

- Open Science is already important to the business (great / some significance)
- Open Access, Open Source and Open Data are already familiar concepts
- Ca. 40 % are aware of the overall concept of Open Science
- 5% of the participants are interested to learn more about Open Science
- Open Peer Review, Open Projects / Citizen Science are not familiar
- Time, support and “web platform to share” are primarily necessary to make their experiences available to the public
- Barrier / Challenge: Language!

The Outreach

OSCAR Mini Survey

- getting responses from as many people as possible
- low barrier – quick and easy to answer
- highlighting the most…
  … important,
  … urgent,
  … controversial issues
- getting the „general mood“ of the AAT community

OSCAR Big Survey

- going to more details and depth
- less multiple choice, more options to differenciate and bring up own ideas
- capturing the various currents of opinion
- highlighting the needs, requirements, expectations and hopes of stakeholders

OSCAR Structured Interviews

- completing the picture gained by the Mini Survey and the Big Survey
- follow up on specific points which were raised in the surveys
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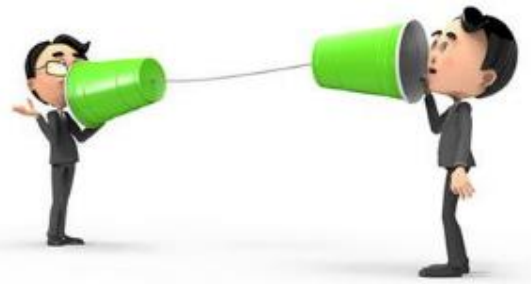

Fact sheet: Big Survey

Key figures of the Big Survey

- 40 (complex) questions in 5 groups
- Time: app. 25-30 minutes
- Open: 1 Dec, 2019
- Closed: 31 March, 2020
- Participants:
  - 137 in total
  - 38 surveys incl. statistical data
- Tool: Limequery / Limesurvey

Key facts of participants

- GEN: mainly male
- AGE: mainly 31 – 65 years old
- ORG: Industry / research est./ higher education
- CAT: Research & innovation
- PROF: Scientist, researcher, middle management
- LOC: n/a

General remarks

- Open Access, Open Source, Open Data and Open Software are already familiar / relevant concepts.
- Open Peer Review, Open Tool, Open Projects / Citizen Science are not.
- Language should be English! (priority of agility over convenience)

Concerns

- The concept of Open Science is viewed very critically in AAT research.
- Protection of IP and prevention of plagiarism are major concerns.
- The participants expect manipulation & hacking, quality management, data abuse as risks in the implementation of Open Science in EU.

Access

- There is a 100% need for access regulation to Open Science.
- European users are considered trustworthy. Access could be linked to European passport for individuals / PIC number for organisations.

Trust

- Data / information must be correct and evaluable forever – including a quality stamp.
- The participants agree that avatars and anonymous accounts are not acceptable when working with Open Science.
- Date of publication, name of the author and company/organisation, and user rating of Open Science contributions should be made public and traceable.
- Participants consider the information in Open Science to be trustworthy if it is published by: European agency and/or national authority.

Support

- The EU, public bodies and national governments should provide capacity and space for digital content.
- The participants expect the EU/EC to provide:
  IT support/OS platform, guidelines/standards, substancial financial support.
- Time (= spare time), financial support and a “web platform to share” are major requirements for professionals to make constributions for Open Science.

The Outreach

OSCAR Mini Survey

- getting responses from as many people as possible
- low barrier – quick and easy to answer
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  … important,
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OSCAR Structured Interviews

- completing the picture gained by the Mini Survey and the Big Survey
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- get individual answers on whether, why and how OS could work for aeronautics

Key figures of the Interviews

- Complex Q&A scheme in 5 groups
- Time: app. 30 minutes minimum; with “open end feature”
- Open: 1 Aug, 2020 (ongoing activity)
- Closed: 30 Sep, 2020
- more than 100 interview partners identified
- app. 25% completed

Key objectives of the Interviews

- Common thread to ensure that…
  - all topics of interest are touched
  - answers are consistent enough to be analysed systematically
- Open questions in dialogue form
- 2-3 levels of follow-up questions to each main question
- Interviewer may also follow up with own questions and comments if interviewee has much to contribute to a topic

Interesting points-of-view: Optimism

„Open Science is about **working together across „boundaries“** to solve a problem that cannot be solved alone (i.e. not by an individual, a reserach department, an organisation), but need input in the form of knowledge, ideas and work from different areas and/or sources.“

„ Open Science is basicaly random and not standardized, but **it's importance is overwhelming**. It boosts all projects from a very early stage. It is always easier to do interactive meetings in early project phases and rely on Open Science resources like applets or just pdf files (papers or presentations).

Free compilers, free CAD software, computing tools, numerical routines are part of the infrastructure of Open Science and provide serious industrial support. **Any future without them is impossible to be imagined.**“

Interesting points-of-view: Pessimism

„ Manufacturers are constantly adjusting how much know-how they have to open up so to maintain the competitive edge on one hand, and be customer-focused on the other. **Open Science will not change the way this is being handled**, as stakes are too high.“

„ AAT research is often focussed on applications (applied research), therefore it can be close to industrial development with **associated confidentiality issues**. Furthermore, aeronautics is strategic for some nations, thus limiting the concept of Open Science.“

„Open Science will put those with advanced know-how at disadvantage. Other, less advanced players will be able to catch up quickly. **This hurts innovative organisations.**“

„Open Science **benefits only big players** who have already invested in Big Data and AI, giving them a competitive advantage over smaller or emerging players.“

Interesting points-of-view: Access & confidentiality

„The conflict between openness for dynamic progress and protection of vital interests is **difficult to solve**. No idea how...“

„**Access to Open Science cannot be securely regulated**. Once information and know-how can be accessed by European stakeholders, every professional player in the world who is really interested will be able to get it one way or another.“

„The problem with more Open Science is in **particular with the USA**. Nobody expects a fair & balanced exchange of know-how with China, who are as protective. And history shows that reasonable scientific/technical interaction with Russia can be arranged on a case-to-case basis. But scientific „exchange“ with USA has been a one-way street at all times (not only since Trump). Strangely, European researchers have been enthusiastic about sharing their results with the USA, and still continue to do so.“

Interesting points-of-view: Disruption & breakthrough innovation

„The existing network landscape in AAT leads to a very efficient „more-of-the-same“ research: excellent incremental, mono-disciplinary optimisations of existing technology, **but litte else**.“

“Open Science is one of the **hopes to achieve disruptive and/or large-leap** evolutionary concepts towards „zero-emission aviation“.

„**Open Science needs incentives** so that really disruptive, holistic ideas are being rewarded. A possible mechanism could be similar to venture capital. As aviation is not attractive for VCs (high investments, high risks, many regulations, products not scalable which limits the possible ROI), the concept would have to be adapted to AAT.

The EC could play a vital role in it: not to fully finance an innovative product like VCs, but to fund enough to get innovative concept over the first „valley of death“ between a preliminary study and a more thorough analysis and development of the necessary (underlying) knowledge.“

Interviews: The Take-Away

Drawbacks

- More work, no support by management
- Open Science landscape is too heterogeneous to be efficient and fun to work with.
- Quality of content varies, cannot be depended on
- Access cannot be reasonably regulated (e.g. restricted to European orgs who also contribute)

Chances

- Making research better: more dynamic, efficient, interdisciplinary, disruptive,…
- State-of-the-art is easier to access: better for education, finding niches and open challenges,…
- Becoming more attractive for the “best & brightest” talents in a world of increasing barriers

Fears

- Losing the grip of one’s Intellectual Property: as a company (loss of competitiveness) and as a scientist (loss of reputation)
- Approach of EU will be too rigid, demanding, regulated, unbalanced and underfinanced to unlock the potential of Open Science

Hopes

- Open Science can be the driver to really address the enormous challenges aviation is facing
- Strengthening reason-based cooperation again across the frontiers which are being erected today
- Key to master the transition to a digital and greener society in Europe

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Thank you!

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Open ScienCe Aeronautic & Air Transport Research

Open science code of conduct

What it is and why it is good

Fraunhofer IRB

Martin Maga, Agnes Grützner, Dr. Tina Klages

"This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 824350"

Agenda

Part I: Background, definitions and objectives

- A. What is open science?
- B. What is a code of conduct?

Part II: The OSCAR open science code of conduct

Part III: Conclusions

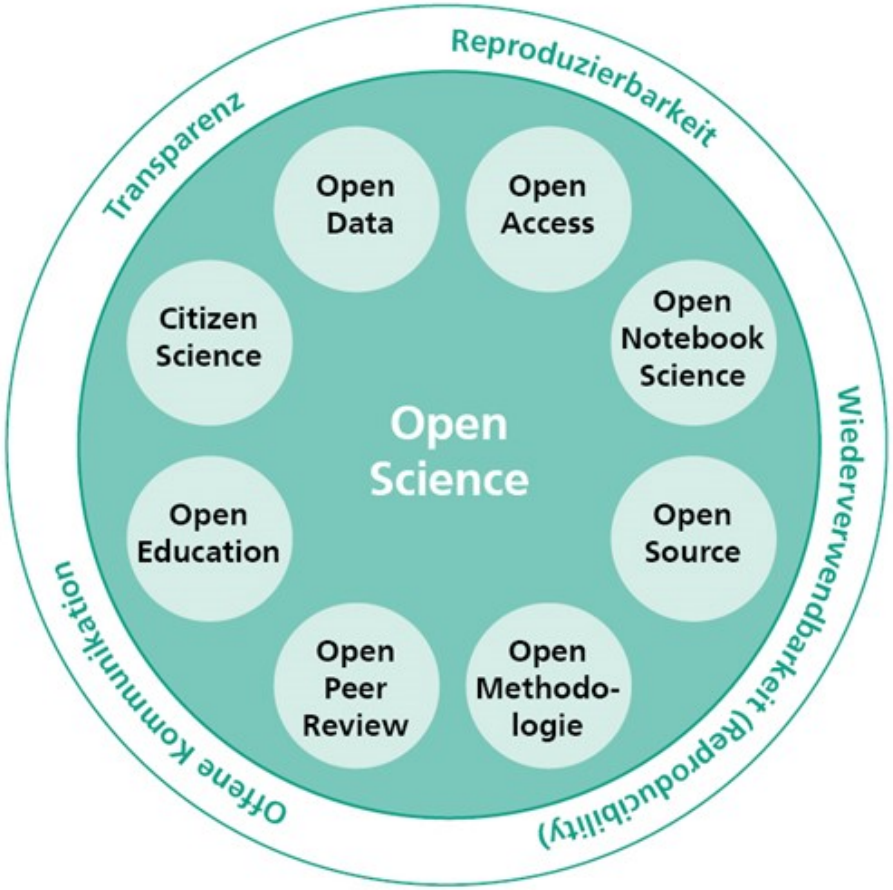
Open science code of conduct

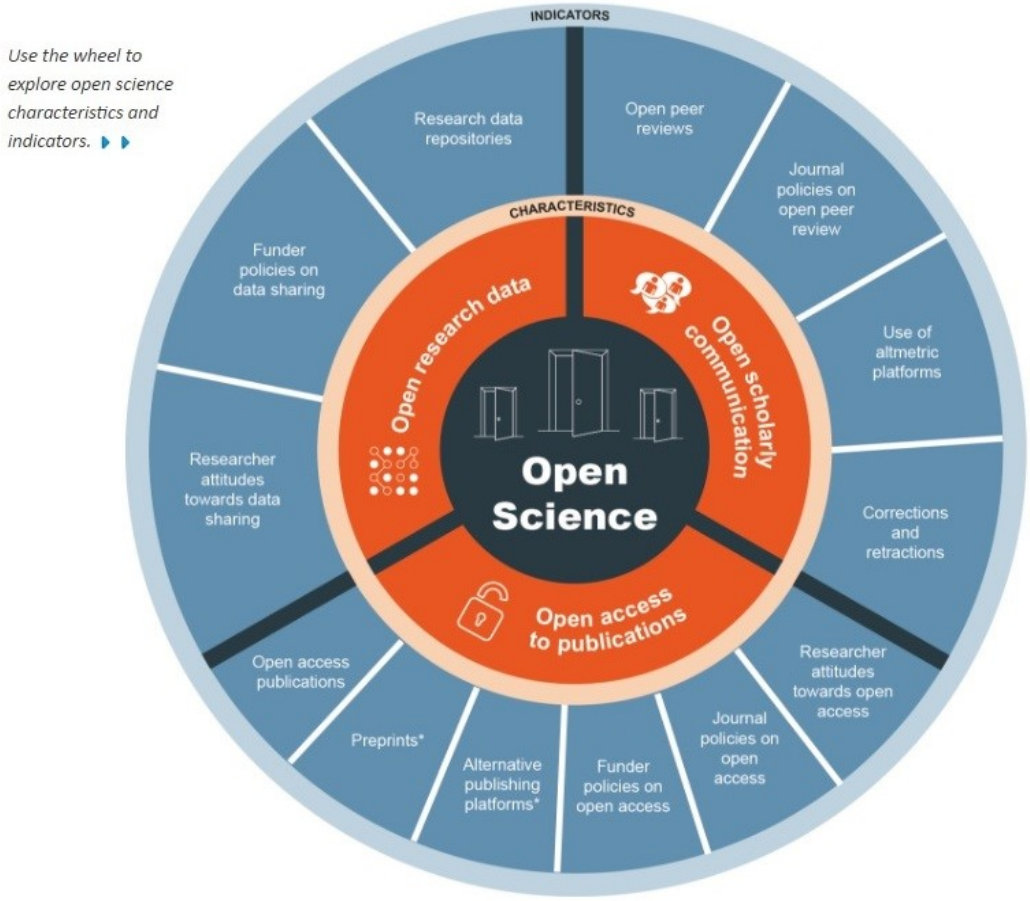
Open science is **a way of doing science**.

The **scientific process** should
be **as open as possible**
for as many as possible.

Source: [2,8,10,14]

Part I.A: What is open science? Dimensions

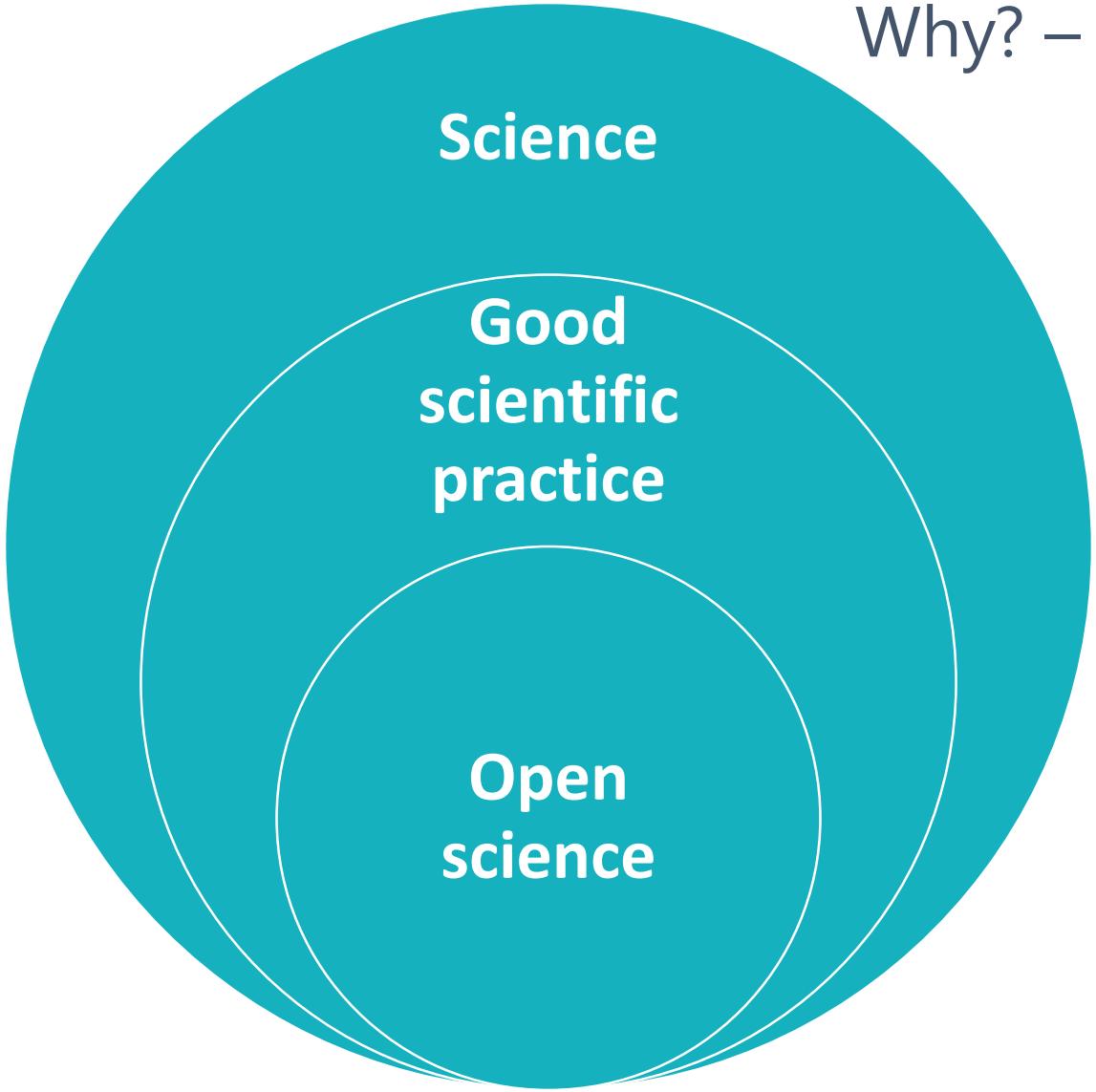




* These indicators are for both open access to publications and open scholarly communication.

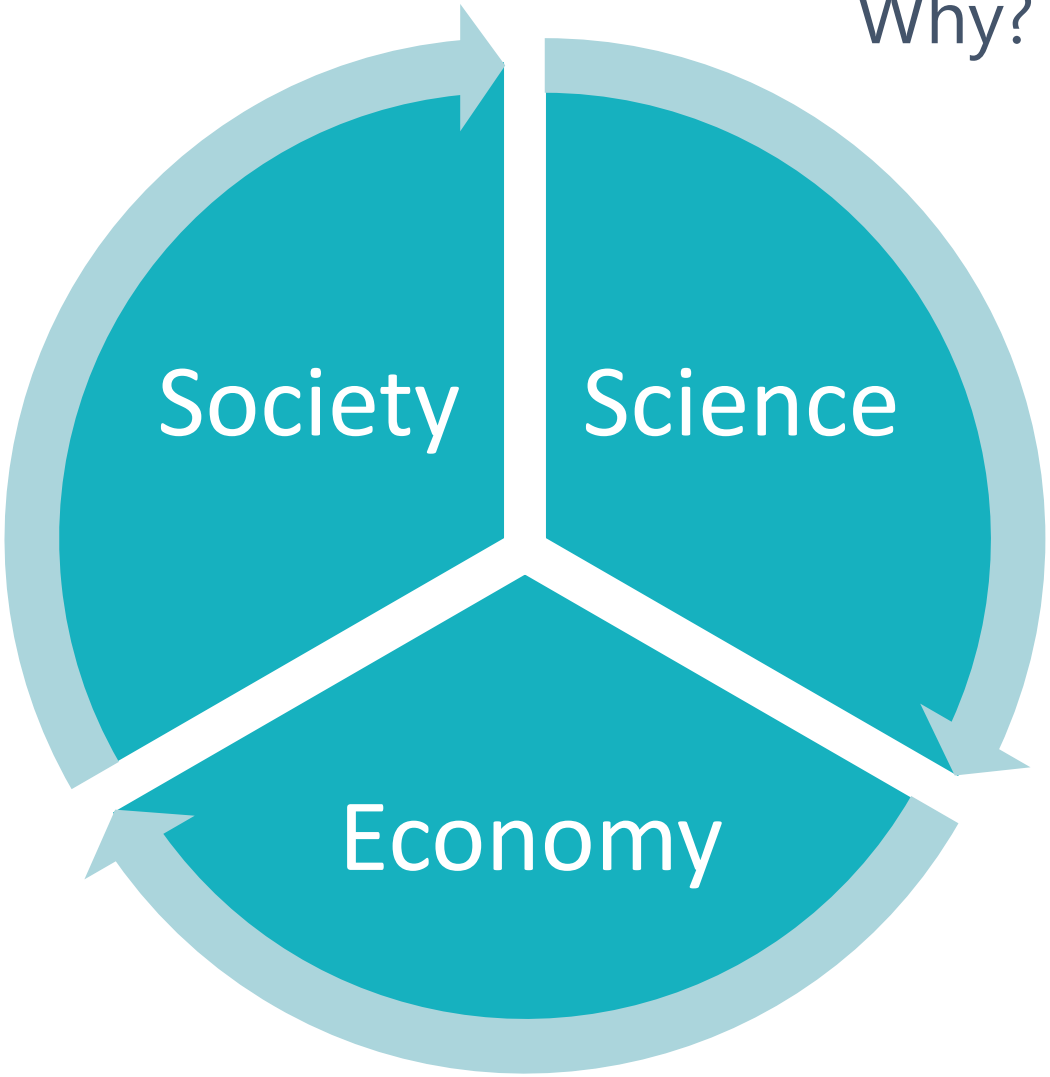
Source: [1,4,14]

Part I.A: What is open science?
Why? – Because science!



Source: [24]

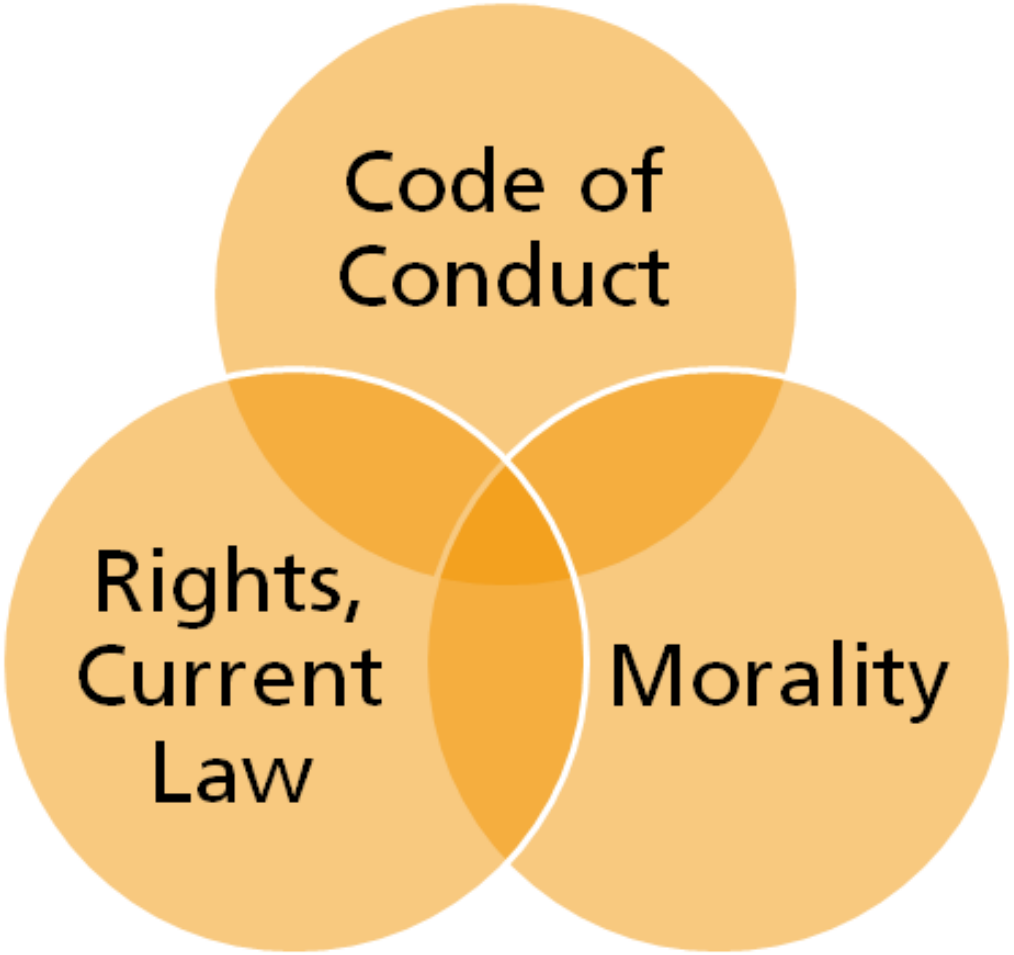
Part I.A: What is open science?
Why? – Because society!



- A **code of conduct** is
  - an explicit codification and
  - **voluntary self-commitment** of morally relevant
    - **values**,
    - **norms** and
    - **best practices**,
  - that is not legally binding in itself.

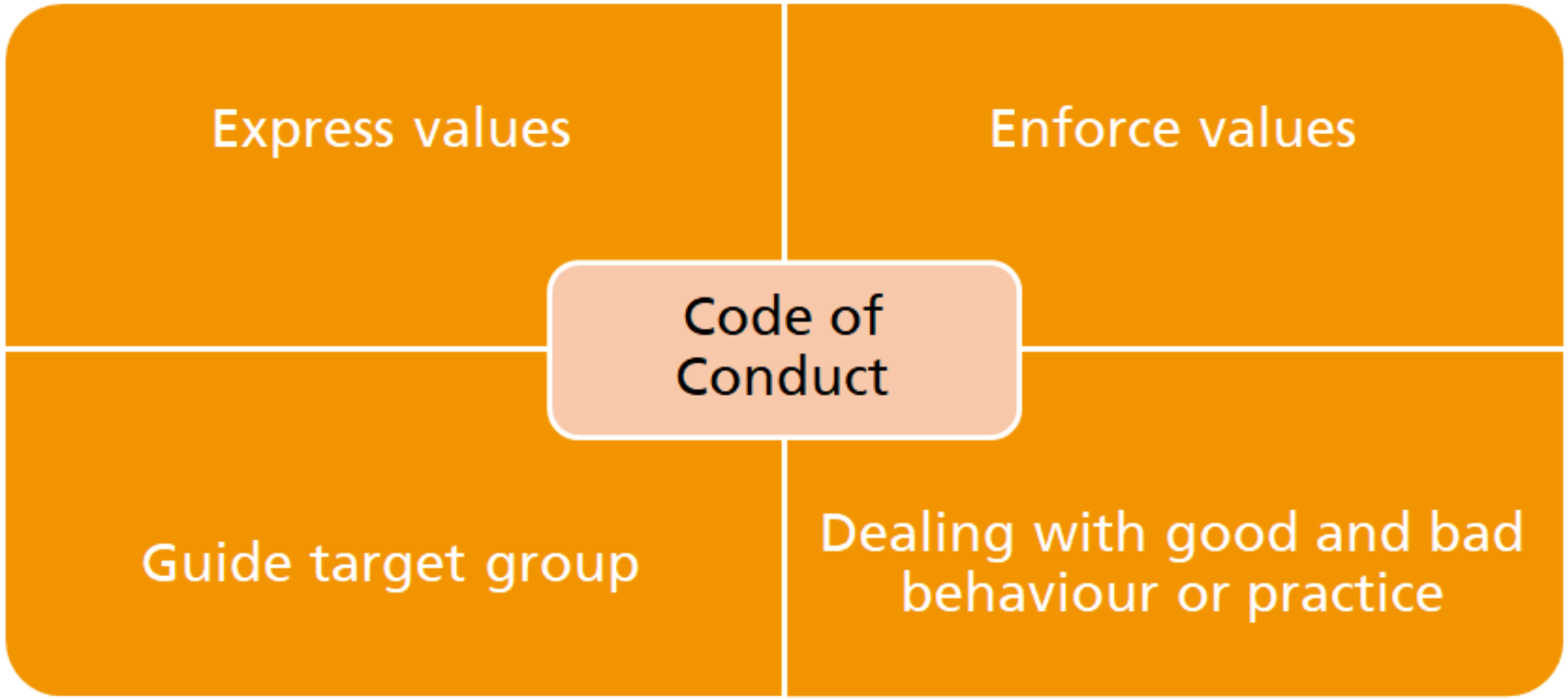
Source: [22]

Part I.B: What is a code of conduct?
Dimensions



Source: [17,18,19,20,22,23,]

Part I.B: What is a code of conduct? Why?



Source: [2,8,10,14]

Aspirational codes of conduct or

Rule-based codes of conduct

Source: [21]

Top-down (leadership, authoritative) approach or

Bottom-up (community driven, peer-regulated) approach.

Source: [21]

	Aspiratiaonal	Rule-based
Bottom-up	• Liberal yet vague • Hard to develop	• Restrictive yet clear • Hard to develop
Top-down	• Liberal yet vague • Easy to develop	• Restrictive yet clear • Easy to develop

Part I.B: What is a code of conduct? Examples

Guidelines for Safeguarding Good Research Practice

Code of Conduct

DFG

ents

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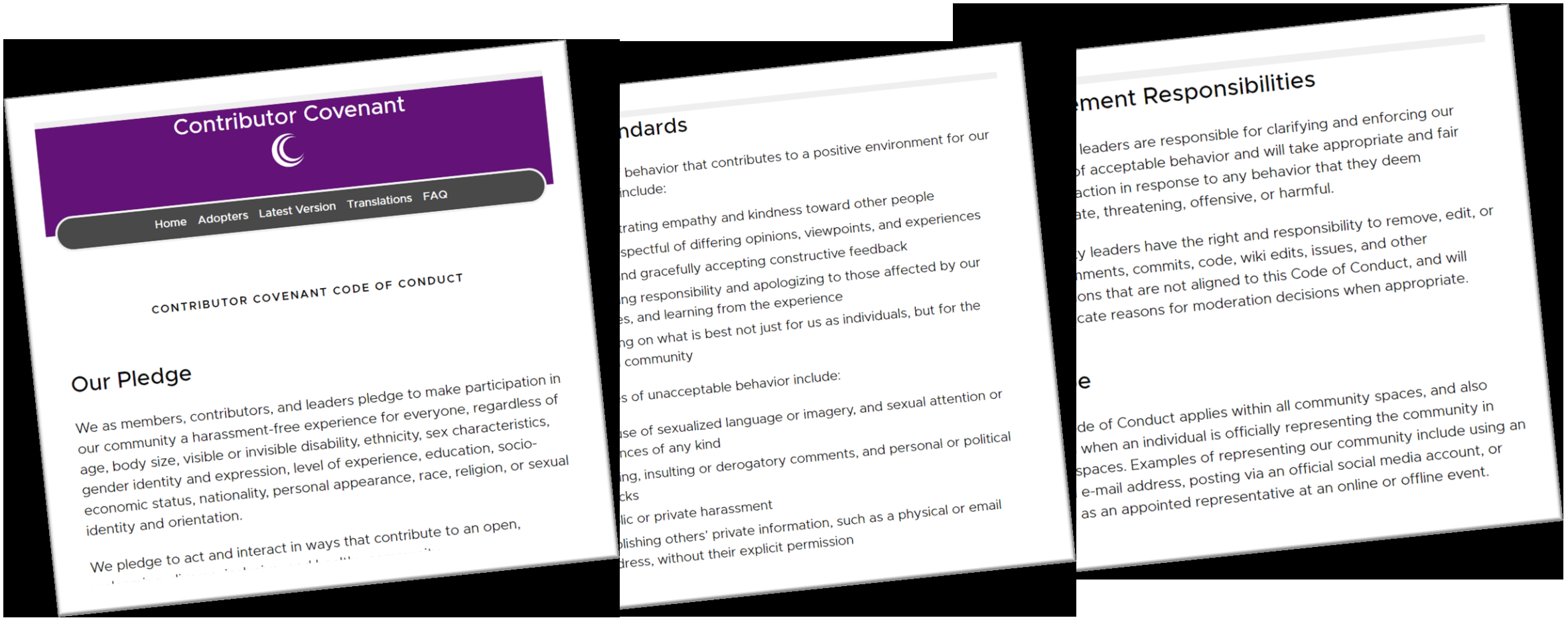
Figure 1: Structure of the DFG Code of Conduct Guidelines for Safeguarding Good Research Practice

Source: [16]

Part I.B: What is a code of conduct?
Examples



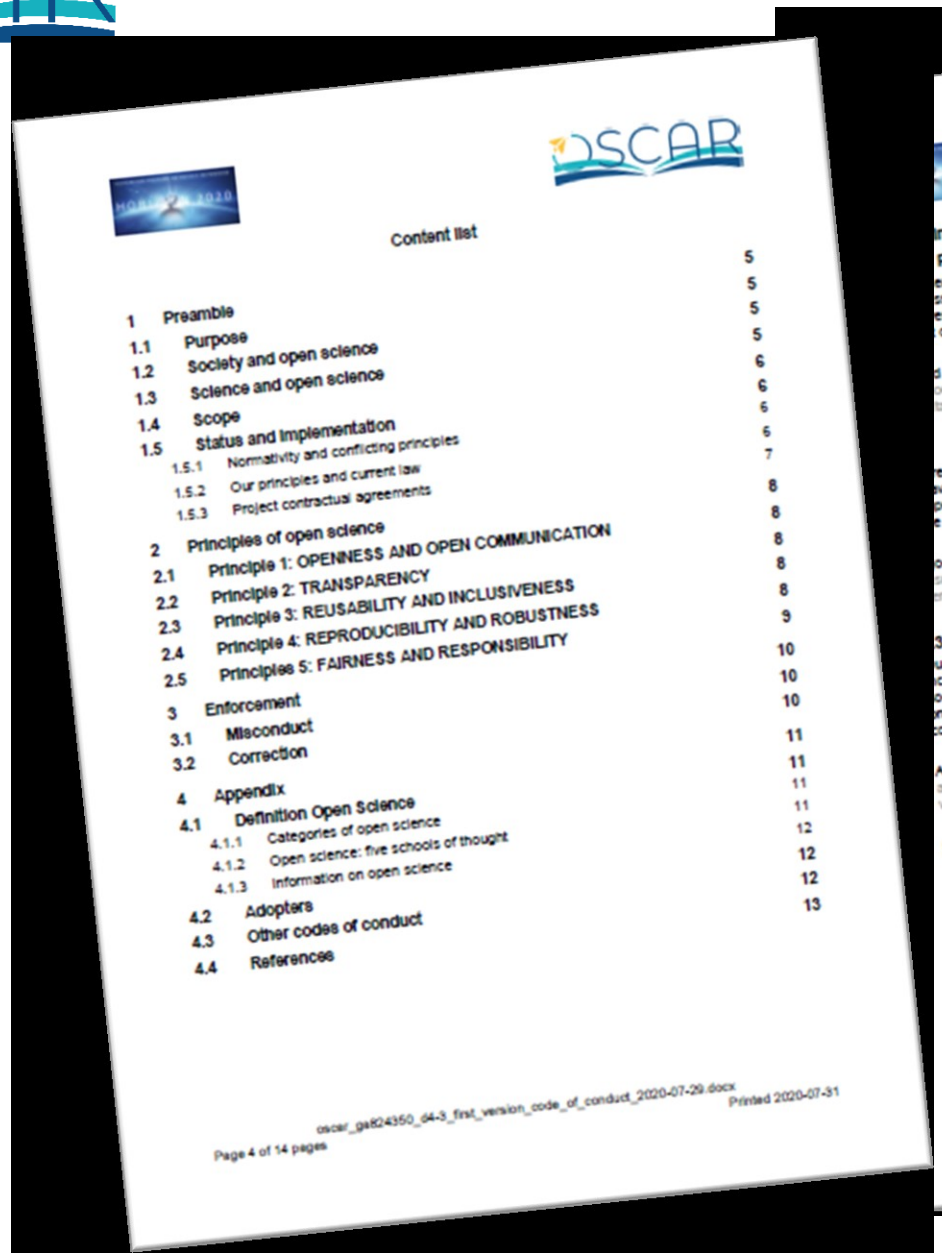
Source: [15]

Open science code of conduct

- *First open science code of conduct* in Europe
- Easy to use *tailored* for the European AAT research landscape
- Rule-based
- Hybrid bottom-up, top-down approach
- Focus on open science principles

Source: [24]

Part II: The OSCAR open science code of conduct
First version



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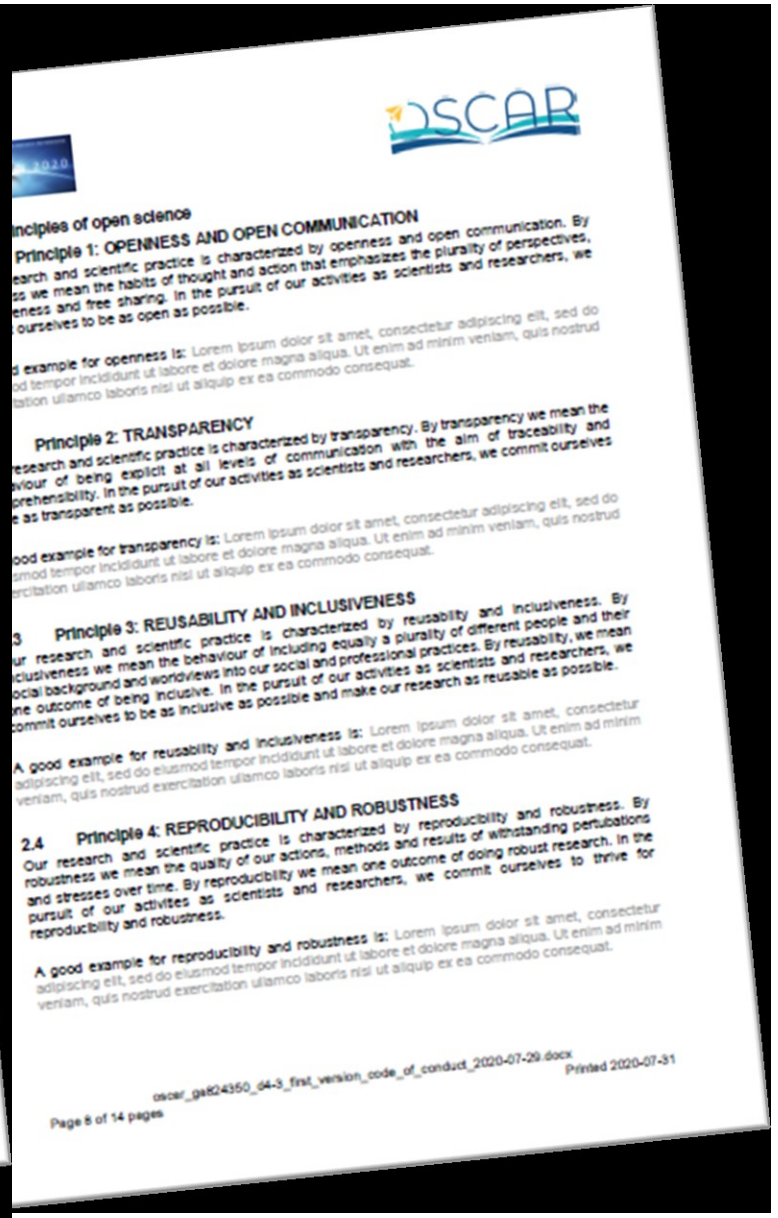
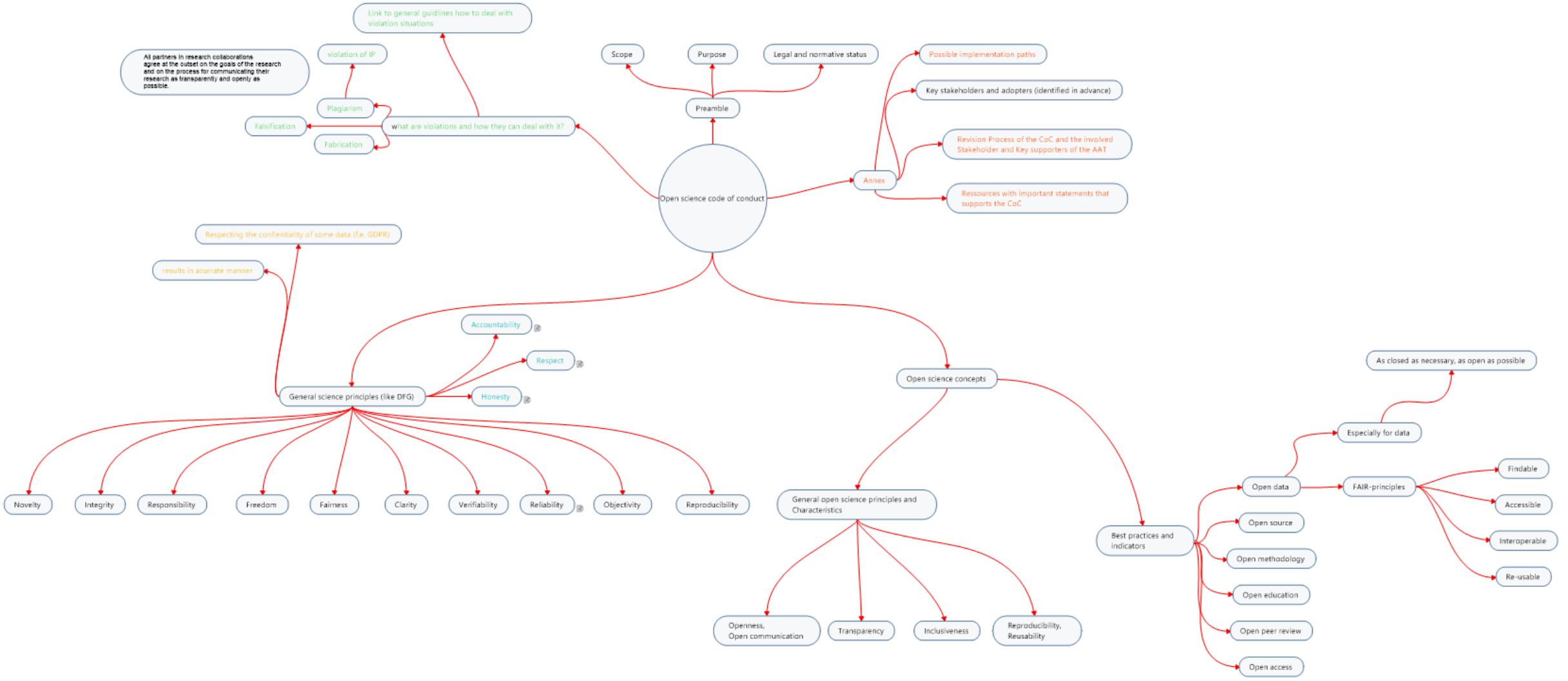
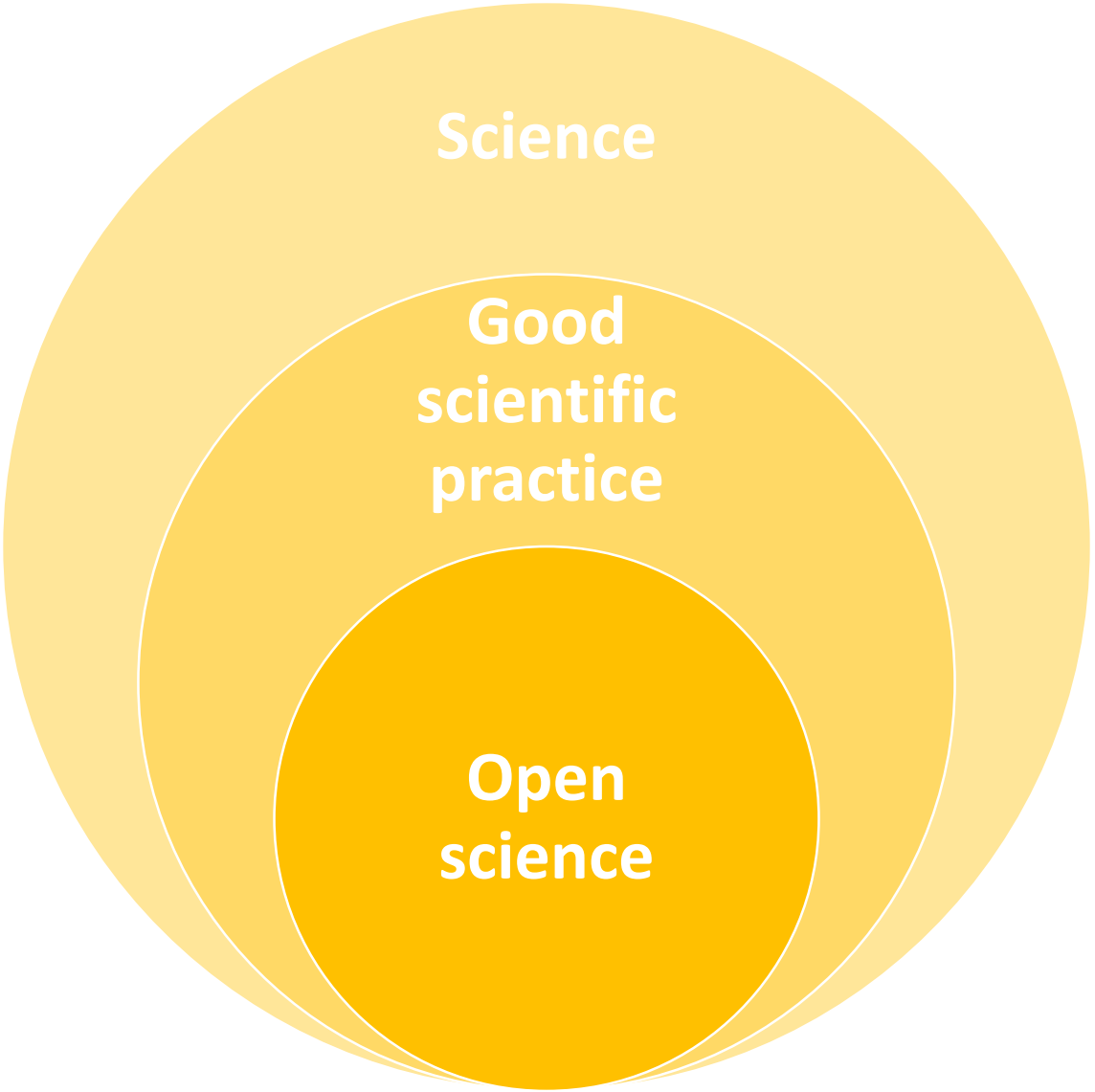


Part II: First version of the OSCAR open science code of conduct

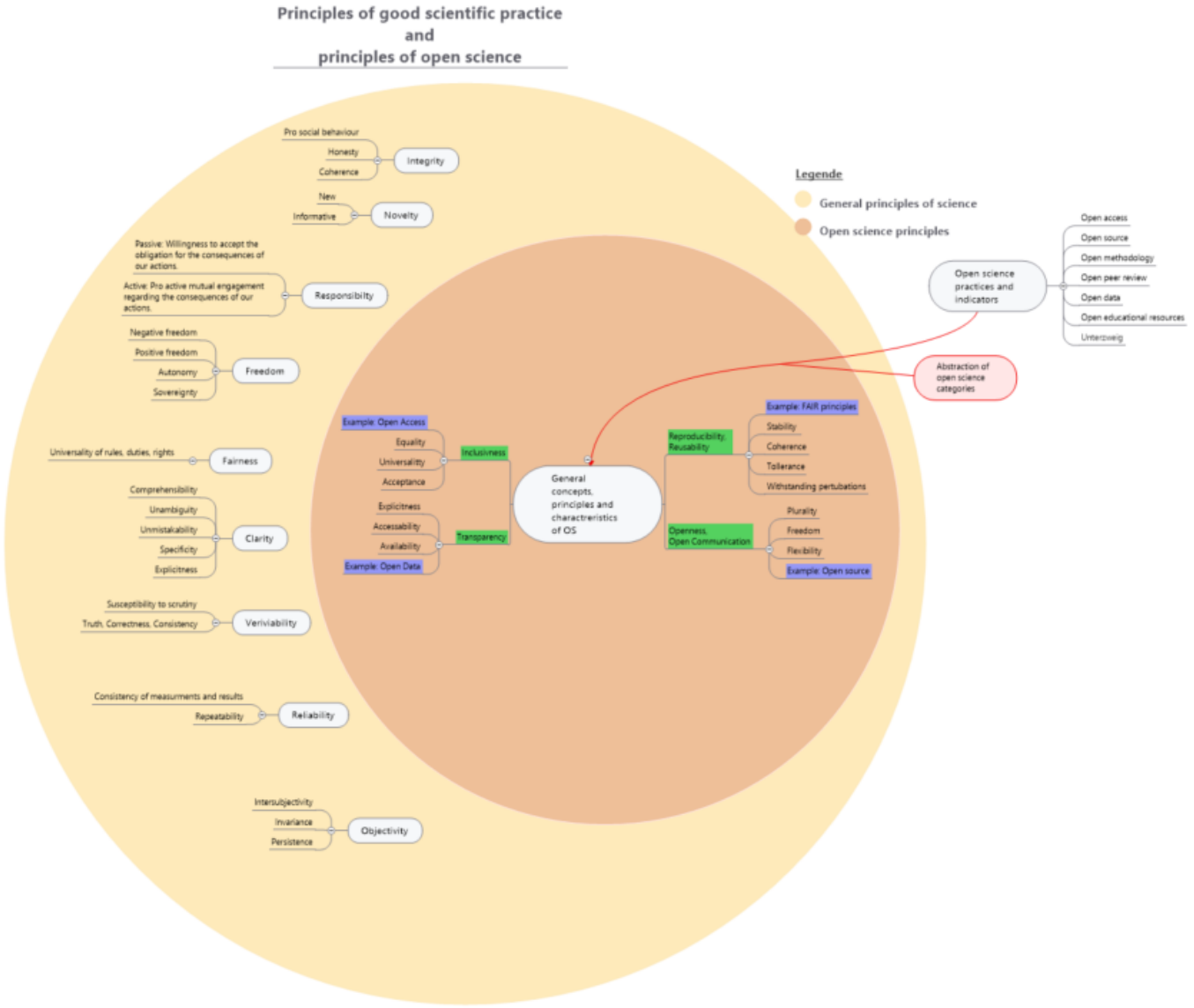
Key components





Source: [24]

Part II: First version of the OSCAR open science code of conduct
Principles



Source: [24]

Intro

Principles

Enforcement

User stories

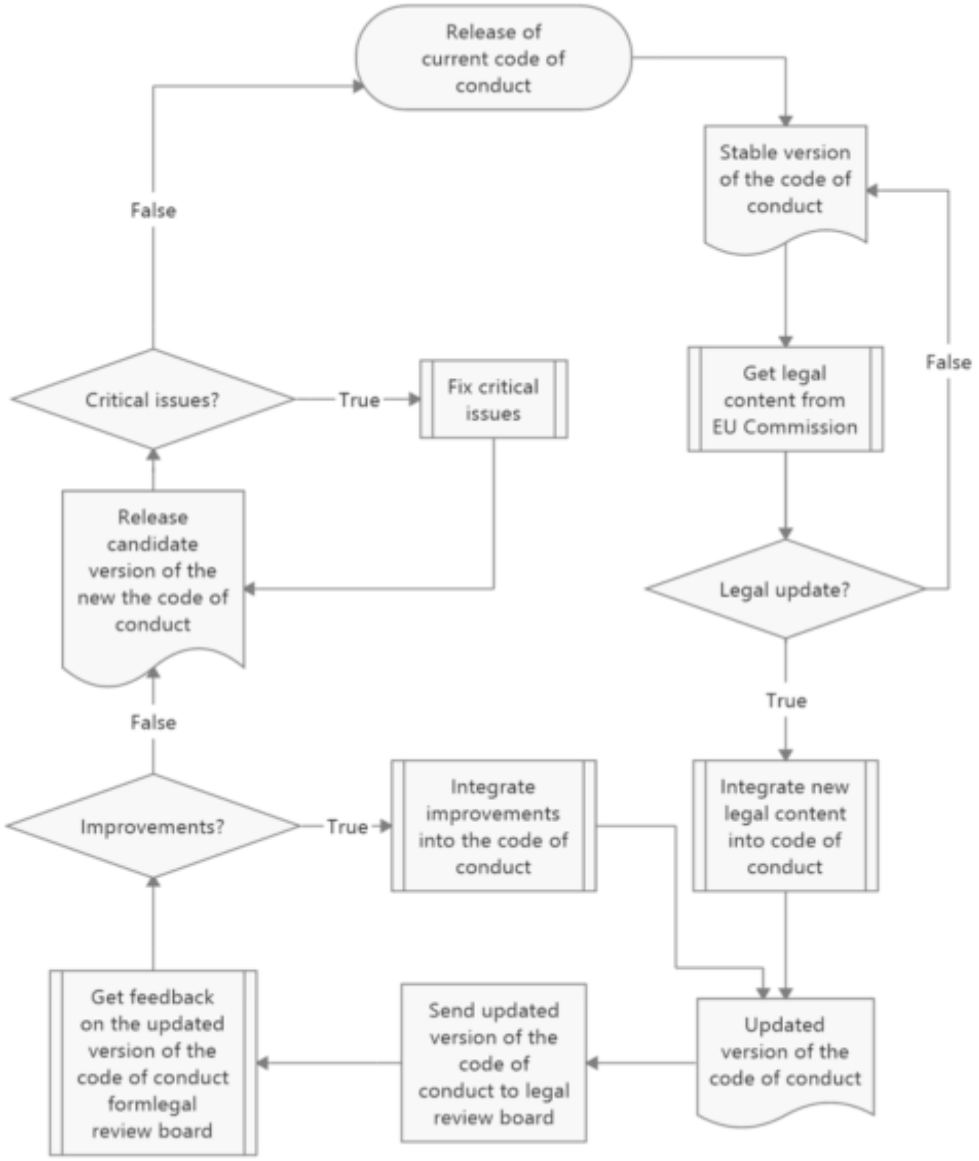
- Principle 1: OPENNESS AND OPEN COMMUNICATION
- Principle 2: TRANSPARENCY
- Principle 3: REUSABILITY AND INCLUSIVENESS
- Principle 4: REPRODUCIBILITY AND ROBUSTNESS
- Principle 5: FAIRNESS AND RESPONSIBILITY

Principle 1: 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.

Part II: First version of the OSCAR open science code of conduct

Maintenance workflow



Next steps

Lessons learned: We will identify and incorporate lessons learned by other code of conduct projects.

Best practices: We will integrate the best practices using de facto standards of existing code of conduct projects.

Maintenance workflow: We will integrate our code of conduct development and maintenance workflow with the existing workflows of the European Commission.

Opt-in, opt-out, hybrid model: We will develop an additional framework for clean, simple, flexible opt-in, opt-out models for integrating open science in AAT projects.

Communication strategy: We will develop communication strategies that take into account the specific modalities of the European Commission and the main stakeholders in the European AAT research landscape. (See deliverable D2.1)

Early adopters: We will try to find early adopters that are willing to simulate the integration of our code of conduct into their project. (See deliverable D2.1)

- Open science is science done right!
- Codes of conduct are very helpful!
- Developing a open science code of conduct is hard.

- An open science code of conduct can help the AAT community to regain trust.
- An open science code of conduct can help the AAT community to accelerate innovation cycles.

[1] AIMS. 2020. Open Science Monitor. http://aims.fao.org/activity/blog/open-science-monitor-access-data-and-trends-open-science.

[2] Bezjak, Sonja, April Clyburne-Sherin, Philipp Conzett, Pedro Fernandes, Edit Görögh, Kerstin Helbig, Bianca Kramer, et al. 2018. *Open Science Training Handbook*. Zenodo. https://doi.org/10.5281/ZENODO.1212496.

[3] Brüggemann J, Crosetto P, Meub L, Bizer K. Intellectual property rights hinder sequential innovation. Experimental evidence. Research Policy 2016;45(10):2054–68.

[15] Contributor Covenant. 2020. https://www.contributor-covenant.org/version/2/0/code_of_conduct/

[16] Deutsche Forschungsgemeinschaft (DFG). 2019. Guidelines for Safeguarding, Good Research Practice, Code of Conduct. https://www.dfg.de/download/pdf/foerderung/rechtliche_rahmenbedingungen/gute_wissenschaftliche_praxis/kodex_gwp_en.pdf

[4] European Commission. 2020. European Open science monitor. https://ec.europa.eu/info/research-and-innovation/strategy/goals-research-and-innovation-policy/open-science/open-science-monitor_en.

[5] European Commission. 2020b. Data management. https://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/open-access-data-management/data-management_en.htm.

[6] European Commission. 2017. IPR, Technology Transfer & Open Science. https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106998/kj1a28661enn.pdf.

[7] European Commission. 2020c. Responsible research and innovation. https://ec.europa.eu/programmes/horizon2020/en/h2020-section/responsible-research-innovation.

[8] Fecher, Benedikt, and Sascha Friesike. 2014. 'Open Science: One Term, Five Schools of Thought'. In *Opening Science: The Evolving Guide on How the Internet Is Changing Research, Collaboration and Scholarly Publishing*, edited by Sönke Bartling and Sascha Friesike, 17–47. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-00026-8_2.

[9] FIZ Karlsruhe – Leibniz-Institut für Informationsinfrastruktur. Defensivpublikationen – Angriff ist die beste Verteidigung. [June 06, 2018]; Available from: https://www.fiz-karlsruhe.de/de/benefiz/archiv/defensivpublikationen-angriff-ist-die-beste-verteidigung.html.

[10] FOSTER. 2020. https://www.fosteropenscience.eu/foster-taxonomy/open-science.

[11] Fraser, Nicholas. 2019. https://www.biorxiv.org/content/10.1101/673665v1.

[17] Gert, Bernard, and Joshua Gert. 2017. 'The Definition of Morality'. In *The Stanford Encyclopedia of Philosophy*, edited by Edward N. Zalta, Fall 2017. Metaphysics Research Lab, Stanford University. https://plato.stanford.edu/archives/fall2017/entries/morality-definition/.

[12] Heller MA. Can Patents Deter Innovation? The Anticommons in Biomedical Research. Science 1998;280(5364):698–701.

[18] Jenkins, Matthew. 2015. *Codes of Conduct Topic Guide*. Edited by Transparency International. Berlin: Anti-Corruption Helpdesk.

[19] Koh, Benjamin, and Pat McConnell. 2018. 'Bank Codes of Conduct: Add Bars to the Window Dressing and Make Them Legally Binding'. The Conversation. 2018. http://theconversation.com/bank-codes-of-conduct-add-bars-to-the-window-dressing-and-make-them-legally-binding-105391.

[24] Laine, Heidi. 2018. 'Open Science and Codes of Conduct on Research Integrity'. *Informaatiotutkimus* 37 (4). https://doi.org/10.23978/inf.77414.

[20] Nijhof, Andre, Stephan Cludts, Olaf Fisscher, and Albertus Laan. 2003. 'Measuring the Implementation of Codes of Conduct. An Assessment Method Based on a Process Approach of the Responsible Organisation'. *Journal of Business Ethics*, no. 45: 65–78.

[13] Stracke, Christian. 2020. Open Science and Radical Solutions for Diversity, Equity and Quality in Research. https://link.springer.com/chapter/10.1007/978-981-15-4276-3_2

[21] Whitton, Howard. 2009. 'Beyond the Code of Conduct: Building Ethical Competence in Public Officials'. *U4 Brief* 2009:19. https://www.cmi.no/publications/3455-beyond-the-code-of-conduct.

[14] Wikipedia. 2020a. 'Open Science'. In *Wikipedia*. https://en.wikipedia.org/w/index.php?title=Open_science&oldid=937016095.

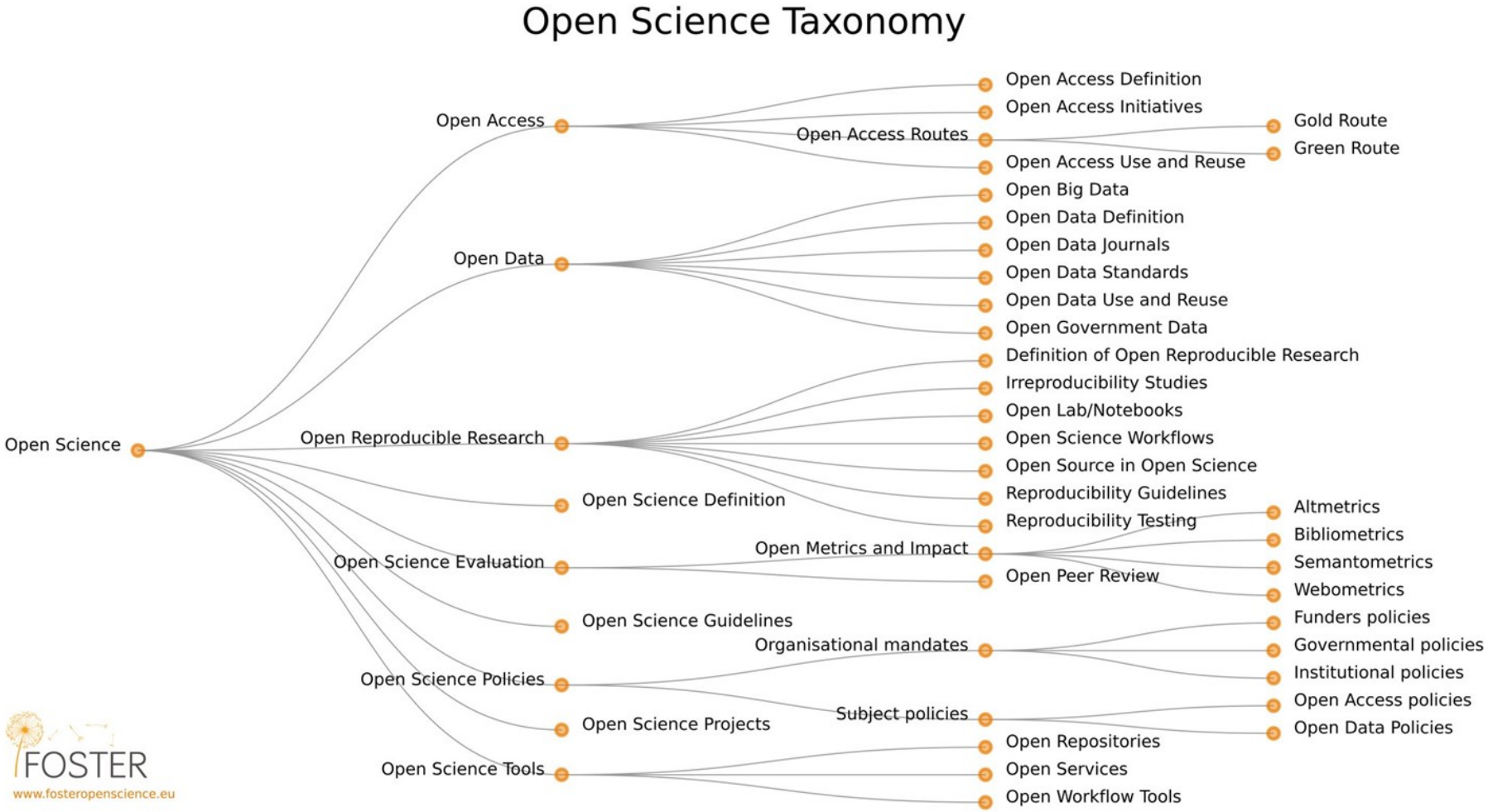
[22] Wikipedia. 2020b. 'Code of conduct'. In *Wikipedia*. https://en.wikipedia.org/wiki/Code_of_conduct

[23] Wikipedia. 2020c. 'Governance, Risk Management, and Compliance'. In *Wikipedia*. https://en.wikipedia.org/w/index.php?title=Governance,_risk_management,_and_compliance&oldid=961669426.

Backup slides

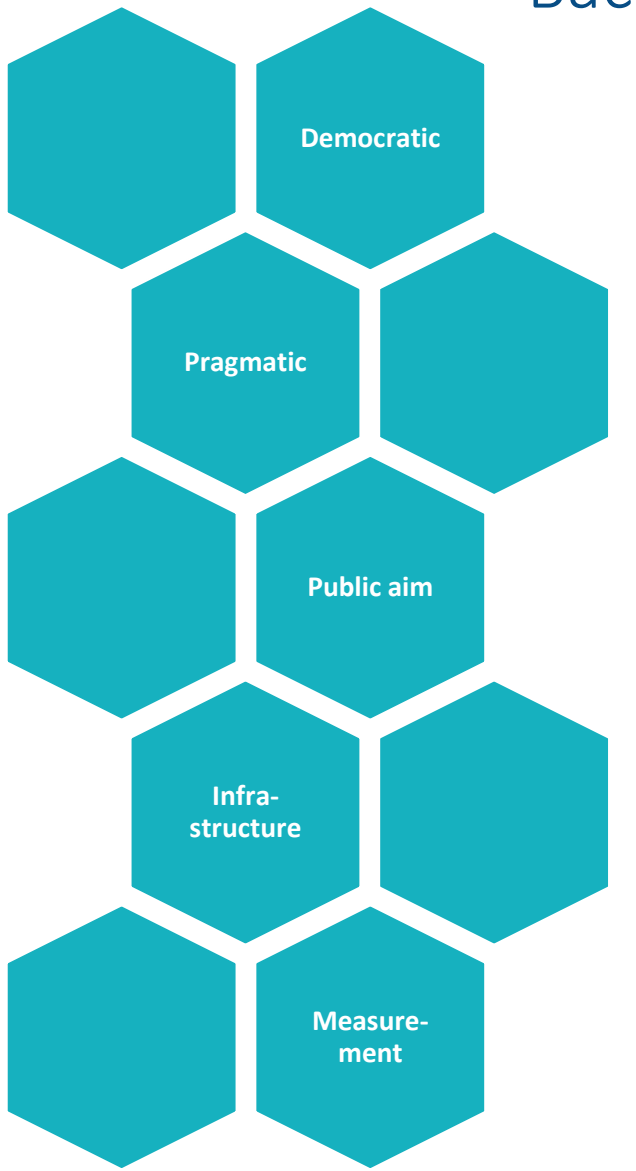
More on open science

Backup: What is open science? Taxonomy



Source: [10]

Backup: What is open science? Taxonomy



Source: [8]

False: Open access and open science are the same.

True: Open access is **not** open science.

False: Open science leads to a loss of quality in science.

True: Open science leads to **more quality** in science.

Source: [3,9,11,13]

False: Open science and IPR are not compatible.

True: Open science **is** compatible with IPR.

Source: [5,6]

Backup: **Challenges and opportunities?** Common misconceptions

- “[W]hile open access to research data […] becomes applicable by default in Horizon 2020, the Commission also recognises that there are good reasons to keep some or even all research data generated in a project closed.” [5]

- The European Commission endorses the principle *as open as possible, as closed as necessary* “and focuses on encouraging sound data management as an essential part of research best practice.” [5]

- “There are no incompatibilities between IPR and Open Science. On the contrary the IPR framework, if correctly defined from the onset, becomes an essential tool to regulate open science and ensure that the efforts from different contributors are correctly rewarded.” [6]

Source: [4]

Backup: Challenges and opportunities? Challenges

- Rapid rate of change of open science in the European research landscape
- Competitive thinking/mindset
- Only Open Access is widly known
- Misconceptions of the relation between Open Science and intellectual property
- There is the fear of losing IP to its competitors

Backup: Challenges and opportunities? Opportunities

- Open Access is **already in the GAM and RfP**
- Open Data could **minimise the time until project partners can work together**
- Open Science is **compatible with** the current **CAMS** (D2.3)
- **Faster innovation cycles** and easier communication (needed to reduce CO2 emissions)
- **Risk distribution** of cost intensive AAT projects (example: COVID-19 research)
- OA publications are **more visible** than regular publications
- **Regain trust** (Boeing 737 max)

Source: [3,9,11,12,13]

- Open science is science done right.
- Open science goes hand in hand with **digitalisation**.
- Open science is **compatible** with the conventional scientific practices **including IPR** management.
- Open science offers plenty of **solutions** to challenges that cannot be postponed like:
  - **More trust,**
  - **Improved quality and**
  - **Faster innovations cycles**.
- **Open science is the future!**

[1] AIMS. 2020. Open Science Monitor. http://aims.fao.org/activity/blog/open-science-monitor-access-data-and-trends-open-science.

[2] Bezjak, Sonja, April Clyburne-Sherin, Philipp Conzett, Pedro Fernandes, Edit Görögh, Kerstin Helbig, Bianca Kramer, et al. 2018. *Open Science Training Handbook*. Zenodo. https://doi.org/10.5281/ZENODO.1212496.

[3] Brüggemann J, Crosetto P, Meub L, Bizer K. Intellectual property rights hinder sequential innovation. Experimental evidence. Research Policy 2016;45(10):2054–68.

[15] Contributor Covenant. 2020. https://www.contributor-covenant.org/version/2/0/code_of_conduct/

[16] Deutsche Forschungsgemeinschaft (DFG). 2019. Guidelines for Safeguarding, Good Research Practice, Code of Conduct. https://www.dfg.de/download/pdf/foerderung/rechtliche_rahmenbedingungen/gute_wissenschaftliche_praxis/kodex_gwp_en.pdf

[4] European Commission. 2020. European Open science monitor. https://ec.europa.eu/info/research-and-innovation/strategy/goals-research-and-innovation-policy/open-science/open-science-monitor_en.

[5] European Commission. 2020b. Data management. https://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/open-access-data-management/data-management_en.htm.

[6] European Commission. 2017. IPR, Technology Transfer & Open Science. https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106998/kj1a28661enn.pdf.

[7] European Commission. 2020c. Responsible research and innovation. https://ec.europa.eu/programmes/horizon2020/en/h2020-section/responsible-research-innovation.

[8] Fecher, Benedikt, and Sascha Friesike. 2014. 'Open Science: One Term, Five Schools of Thought'. In *Opening Science: The Evolving Guide on How the Internet Is Changing Research, Collaboration and Scholarly Publishing*, edited by Sönke Bartling and Sascha Friesike, 17–47. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-00026-8_2.

[9] FIZ Karlsruhe – Leibniz-Institut für Informationsinfrastruktur. Defensivpublikationen – Angriff ist die beste Verteidigung. [June 06, 2018]; Available from: https://www.fiz-karlsruhe.de/de/benefiz/archiv/defensivpublikationen-angriff-ist-die-beste-verteidigung.html.

[10] FOSTER. 2020. https://www.fosteropenscience.eu/foster-taxonomy/open-science.

[11] Fraser, Nicholas. 2019. https://www.biorxiv.org/content/10.1101/673665v1.

[17] Gert, Bernard, and Joshua Gert. 2017. 'The Definition of Morality'. In *The Stanford Encyclopedia of Philosophy*, edited by Edward N. Zalta, Fall 2017. Metaphysics Research Lab, Stanford University. https://plato.stanford.edu/archives/fall2017/entries/morality-definition/.

[12] Heller MA. Can Patents Deter Innovation? The Anticommons in Biomedical Research. Science 1998;280(5364):698–701.

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[19] Koh, Benjamin, and Pat McConnell. 2018. 'Bank Codes of Conduct: Add Bars to the Window Dressing and Make Them Legally Binding'. The Conversation. 2018. http://theconversation.com/bank-codes-of-conduct-add-bars-to-the-window-dressing-and-make-them-legally-binding-105391.

[24] Laine, Heidi. 2018. 'Open Science and Codes of Conduct on Research Integrity'. *Informaatiotutkimus* 37 (4). https://doi.org/10.23978/inf.77414.

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[21] Whitton, Howard. 2009. 'Beyond the Code of Conduct: Building Ethical Competence in Public Officials'. *U4 Brief* 2009:19. https://www.cmi.no/publications/3455-beyond-the-code-of-conduct.

[14] Wikipedia. 2020a. 'Open Science'. In *Wikipedia*. https://en.wikipedia.org/w/index.php?title=Open_science&oldid=937016095.

[22] Wikipedia. 2020b. 'Code of conduct'. In *Wikipedia*. https://en.wikipedia.org/wiki/Code_of_conduct

[23] Wikipedia. 2020c. 'Governance, Risk Management, and Compliance'. In *Wikipedia*. https://en.wikipedia.org/w/index.php?title=Governance,_risk_management,_and_compliance&oldid=961669426.

Open ScienCe Aeronautic & Air Transport Research

Past and Future:
Some Ideas How to Tap the Potential of Open Science for AAT Research

10th EASN Virtual International Conference
2 – 4 September 2020

Martin Spieck, Diana Penzien, Sabine Spieck

Thelsys GmbH

"This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 824350"

Putting all cards open on the table?
Then you're one card short of a full deck…

„Open Science Principles" (willkürliche Zusamm

- Open …
- Open Models/Tools
- Open Methodology
- Open Infrastructure
- Open Peer Review
- Open Educ. Resources
- Open Notebook Sc.
- Citizen Science

Open …

Open …

What OSCAR‘s collegues are thinking…

What the heck…?

What is in for me?

Just more work to do!

Who pays for it?

Gives away the competitive edge!

Langue du pays, s‘il vous plaît!

1) Open Access: Recognition from the academic
most major publishers are not
2) Open Data: A
3)

Science is pushed by Europe without taking into account the **bad impact** of the unbalanced
ion worldwide. […] Open scien
ch because of the high level o
to European aerospace and defence

competition of
major aircraft manufacturer it‘s
im
ex

Open-source software is getting
and more important workflows,
on a limited number of contributors. How to
e contributions is a difficult question.

la **langue officielle du pays** !

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the sharing of data ta
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ibility, value, and

there…
mined very high APC costs

It is necessary to end the dominati
on the market of th
ors .

Confidentiality of proprietary
data is often

form to share

Today, the
The develop
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re and sure.
ion to make papers
re the paper is published.
access journal with a full, standard peer-review
ed. The very same situation could be applied to courses…

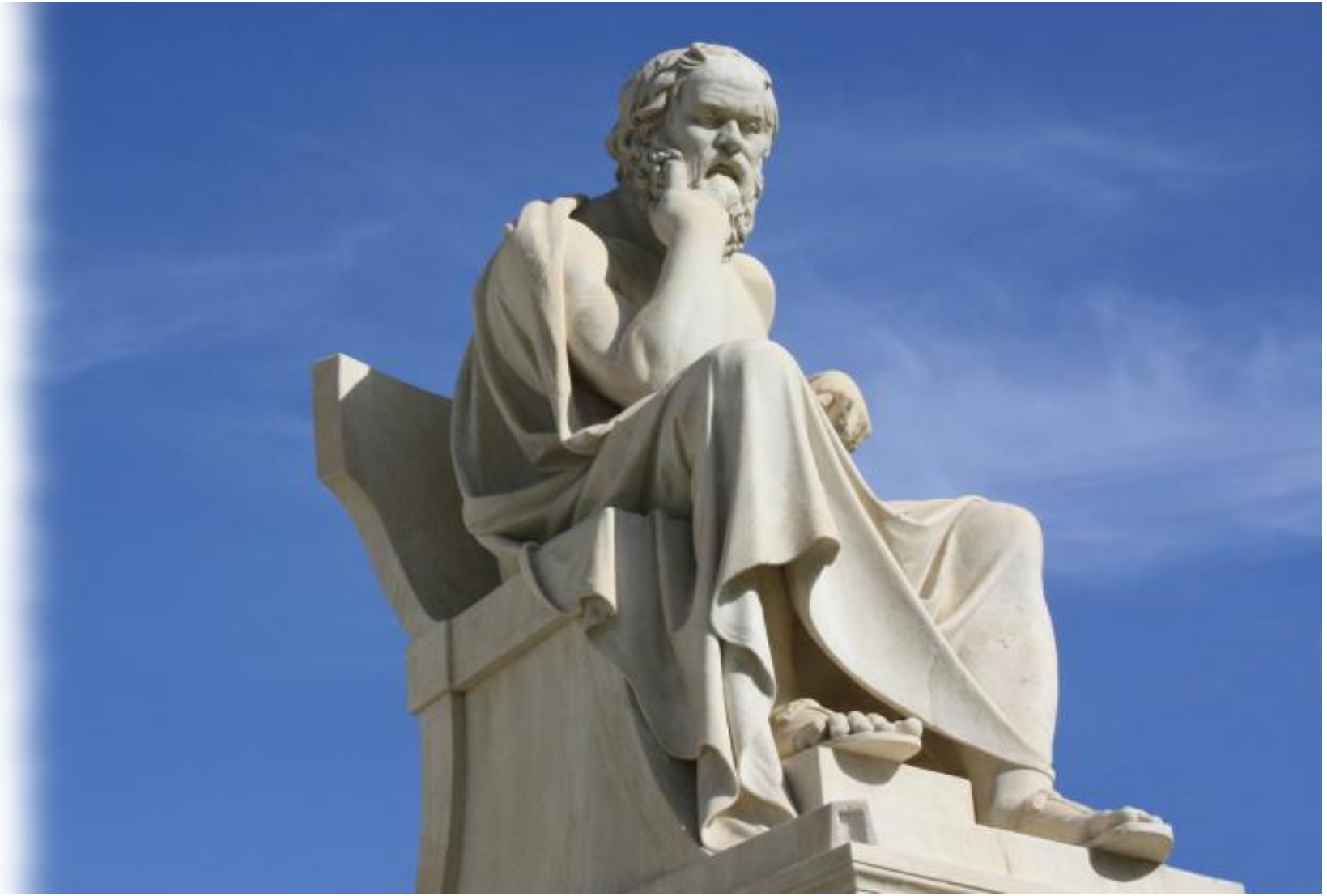
it is always difficult to
classified as Open Science

FUTURE
PAST

On the other hand

- In ancient Greece, philosophers, mathematicians and other thinkers discussed their ideas in open forums.

  This form of open discussion stimulated Science and laid the foundations to our European culture.



Ancient World | Middle Ages | Enlighten-ment | Modern Age

On the other hand

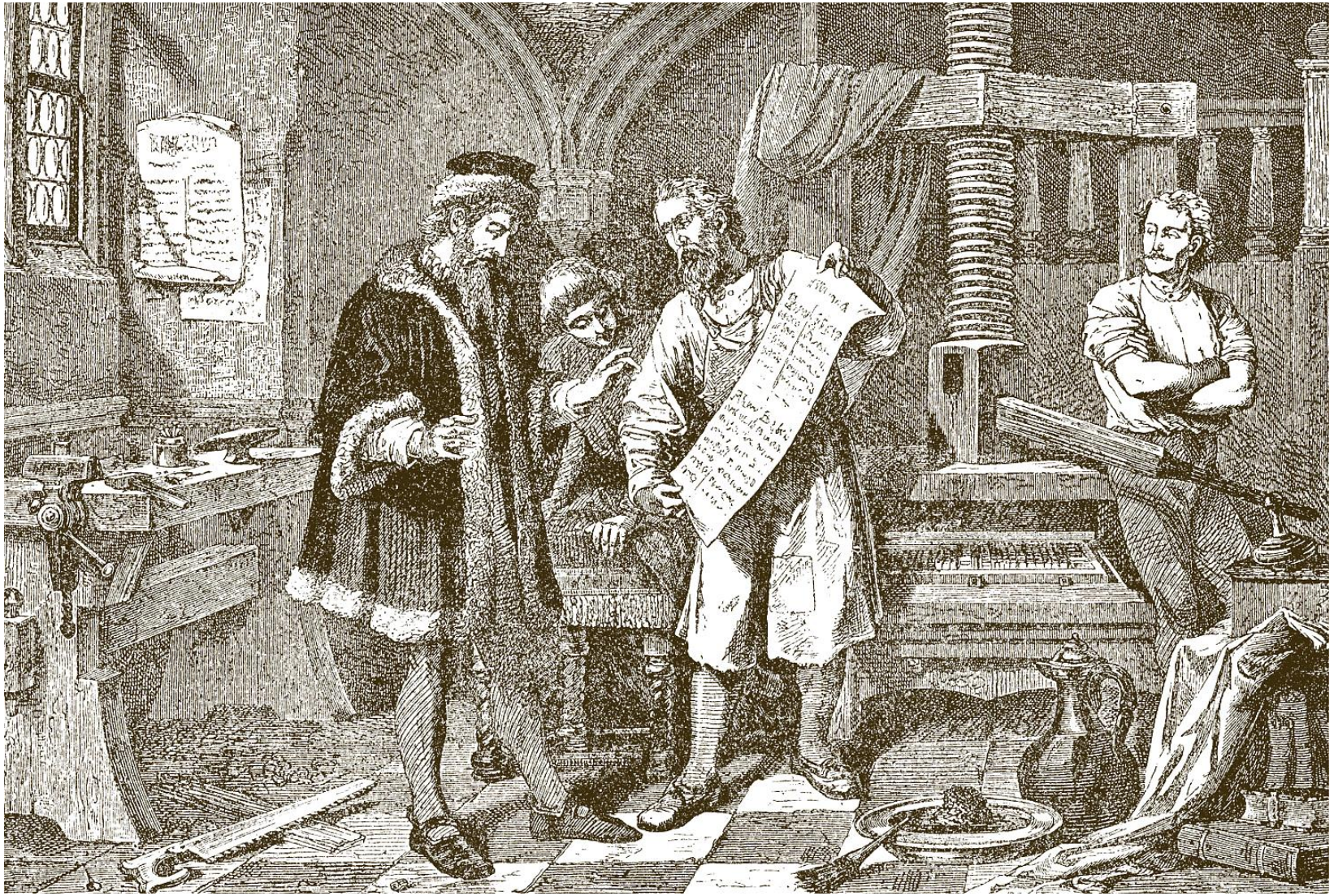
- The libraries of the venerable abbeys and monasteries of the Middle Ages „pooled“ the knowledge of those times.

  Access was possible for learned individuals, but was difficult and cumbersome to obtain.

On the other hand

- The invention of the printing press (innovation!) „democratised“ the access to knowledge.

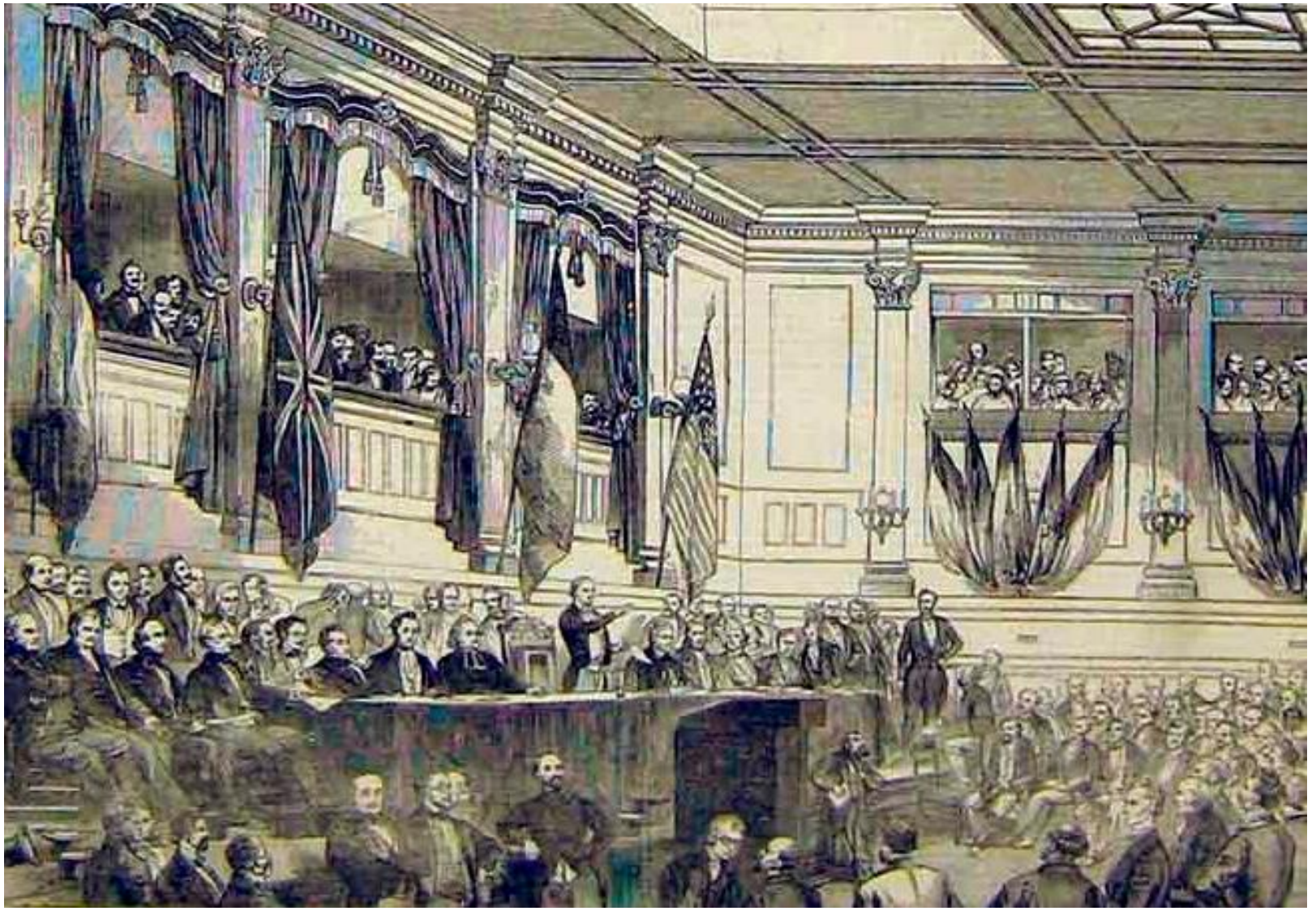
  With printed books, advanced and complex information became available for „everyone“.



Ancient World | Middle Ages | Enlighten-ment | Modern Age

On the other hand

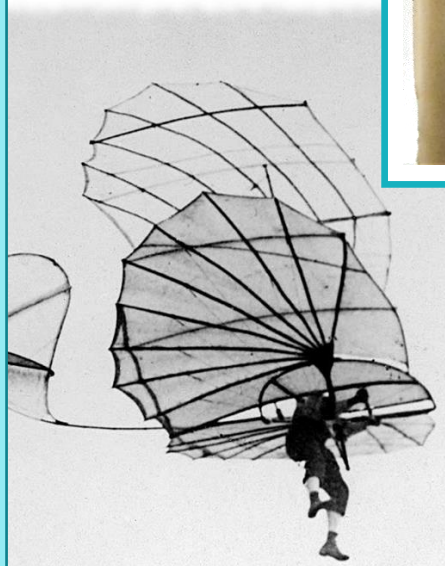
- The modern society (equality, mobility, education) allowed to share and discuss science openly and interactively:
  - congresses,
  - conferences,
  - exhibitions,
  - journals,
  - …

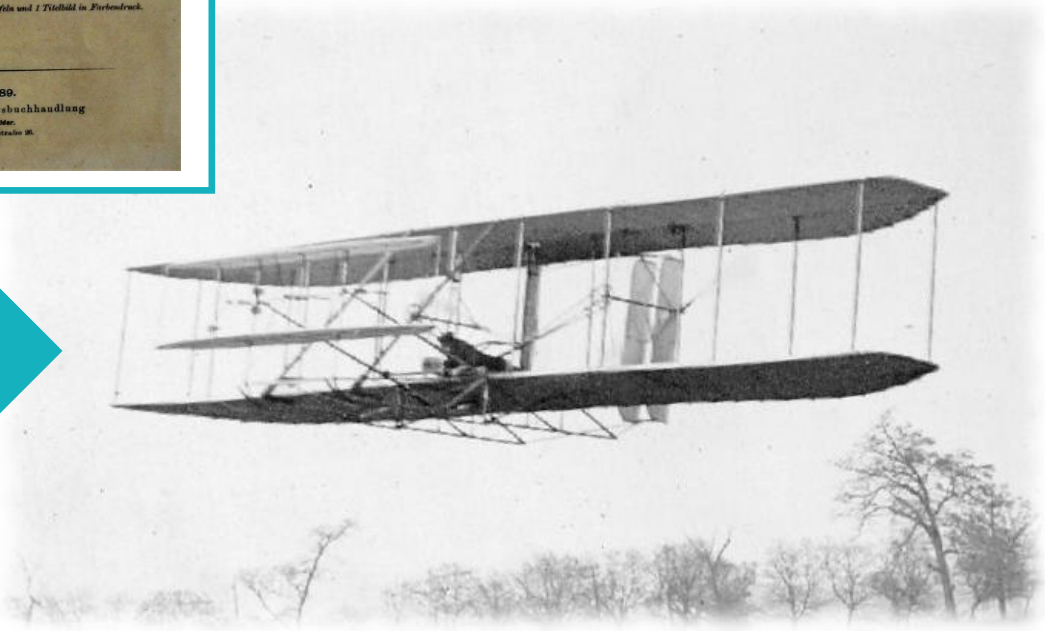


Ancient World → Middle Ages → Enlighten-ment → **Modern Age**

Open Science in aviation: Knowledge

- Otto Lilienthal diligently researched the flight of birds and discovered (some of) the fundamental principles of flight.
- After his fatal accident, the Wright brothers took up the torch and proceeded to create the first aeroplane.





Knowledge → Methods → Reference Data

Open Science in aviation: Methods

- In the 1960ies, the VTOL-doctrine required the collaboration of 8 companies (former competitors).
- The common repository of design methods was so successful that it is continued to this day

Content

The current LTH edition includes the 7 digitally processed LTH volumes in PDF format:

AD Aerodynamics
AT Propulsion Technology
BM Loads
FL Composite Design Criteria
FV Flight Test Engineering
MA Mass Analysis
SE Systems Engineering

Price

For subscribers not actively participating in working groups
€ 1000,-- for the joint LTH edition (7 volumes)
€ 250,-- for the update of the LTH edition
in Germany plus valid VAT in each case, shipping costs will not be charged.

Subscribers

As before, the number of subscribers is limited. It is determined by the working groups. Export restrictions must be observed. Previous subscribers can order the current LTH edition without prior request.

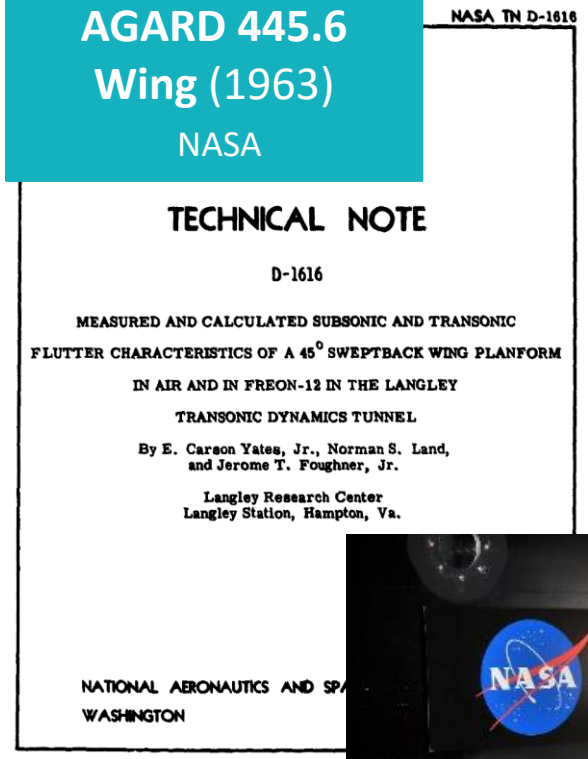
8 companies – three projects

Knowledge → Methods → Reference Data

Open Science in aviation: Reference data

- Generic models and open experimental data can be used for:
  - calibrating test equipment
  - verifying computational tools
  - comparing studies of new concepts
  - providing hands-on teaching material

AGARD 445.6 Wing (1963)
NASA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TECHNICAL NOTE

D-1616

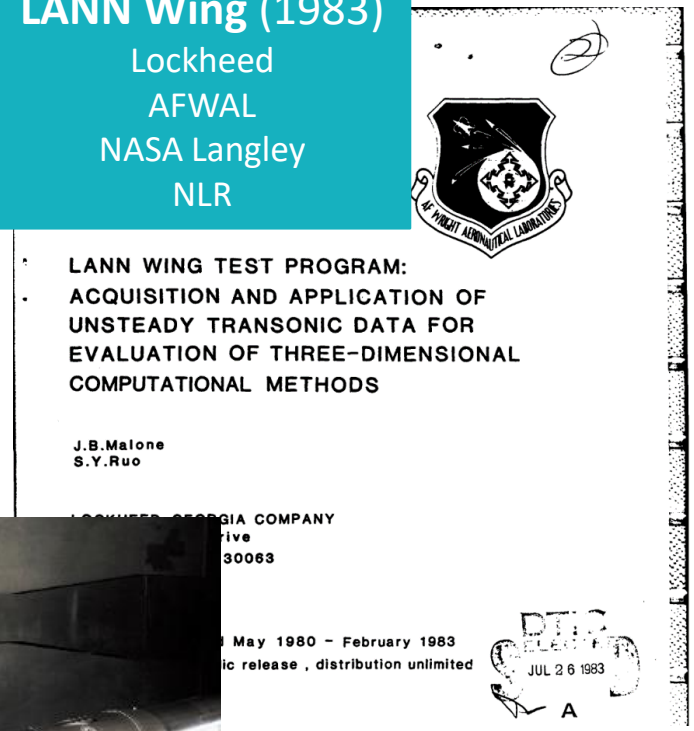
MEASURED AND CALCULATED SUBSONIC AND TRANSONIC FLUTTER CHARACTERISTICS OF A 45° SWEPTBACK WING PLANFORM IN AIR AND IN FREON-12 IN THE LANGLEY TRANSONIC DYNAMICS TUNNEL

By E. Carson Yates, Jr., Norman S. Land, and Jerome T. Foughner, Jr.

Langley Research Center
Langley Station, Hampton, Va.

NATIONAL AERONAUTICS AND SP
WASHINGTON

LANN Wing (1983)
Lockheed
AFWAL
NASA Langley
NLR


LANN WING TEST PROGRAM:
ACQUISITION AND APPLICATION OF UNSTEADY TRANSONIC DATA FOR EVALUATION OF THREE-DIMENSIONAL COMPUTATIONAL METHODS

J.B.Malone
S.Y.Ruo

GIA COMPANY
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May 1980 - February 1983
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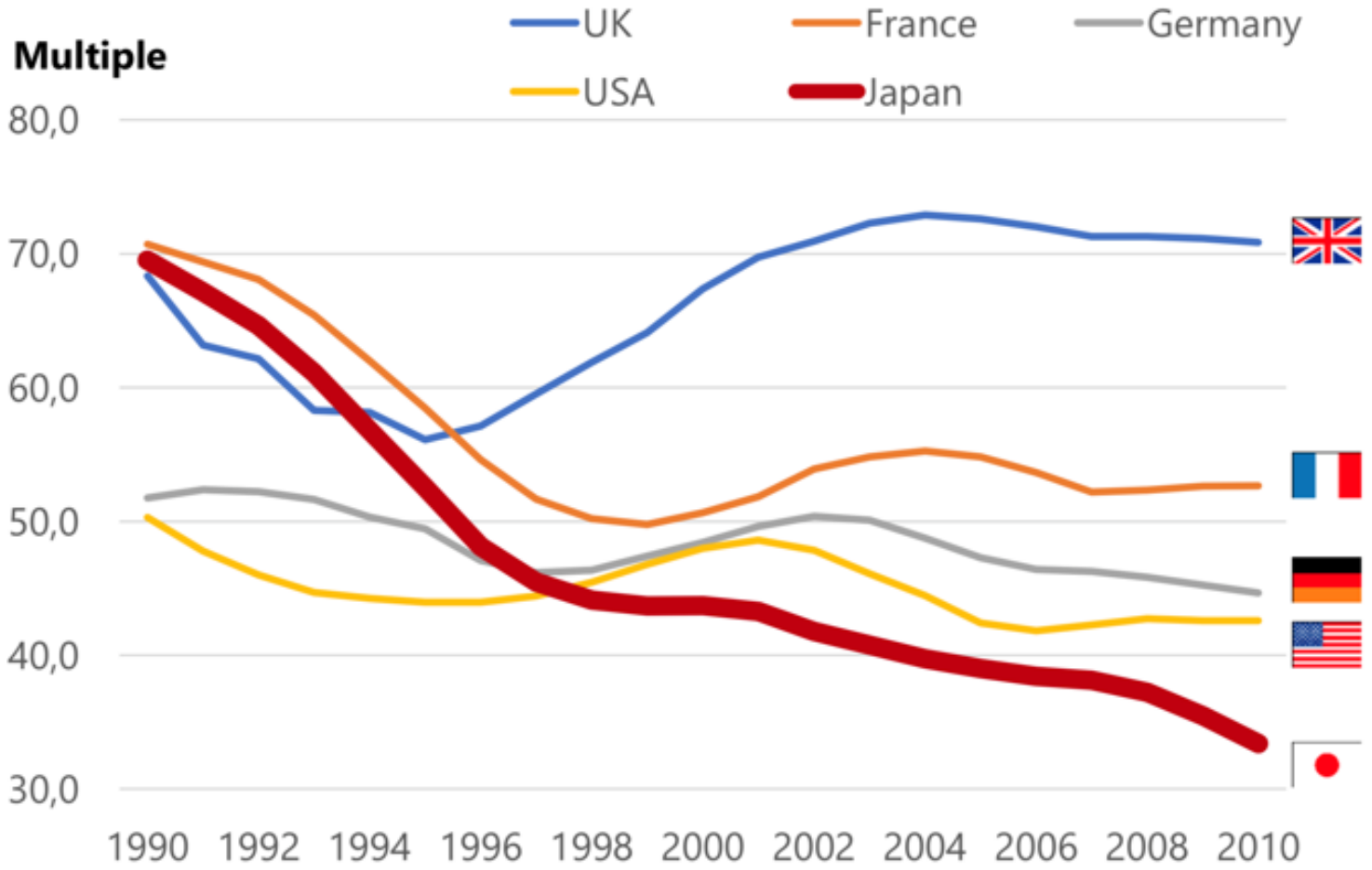
Common Research Model (2008)
NASA

Knowledge → Methods → Reference Data

Fact: Cooperation pays off!



Calculation based on Science Technology and Industry Scoreboard, OECD
By Mizuho Research Institute Ltd.

FUTURE
PAST

An avalanche no-one can stop…

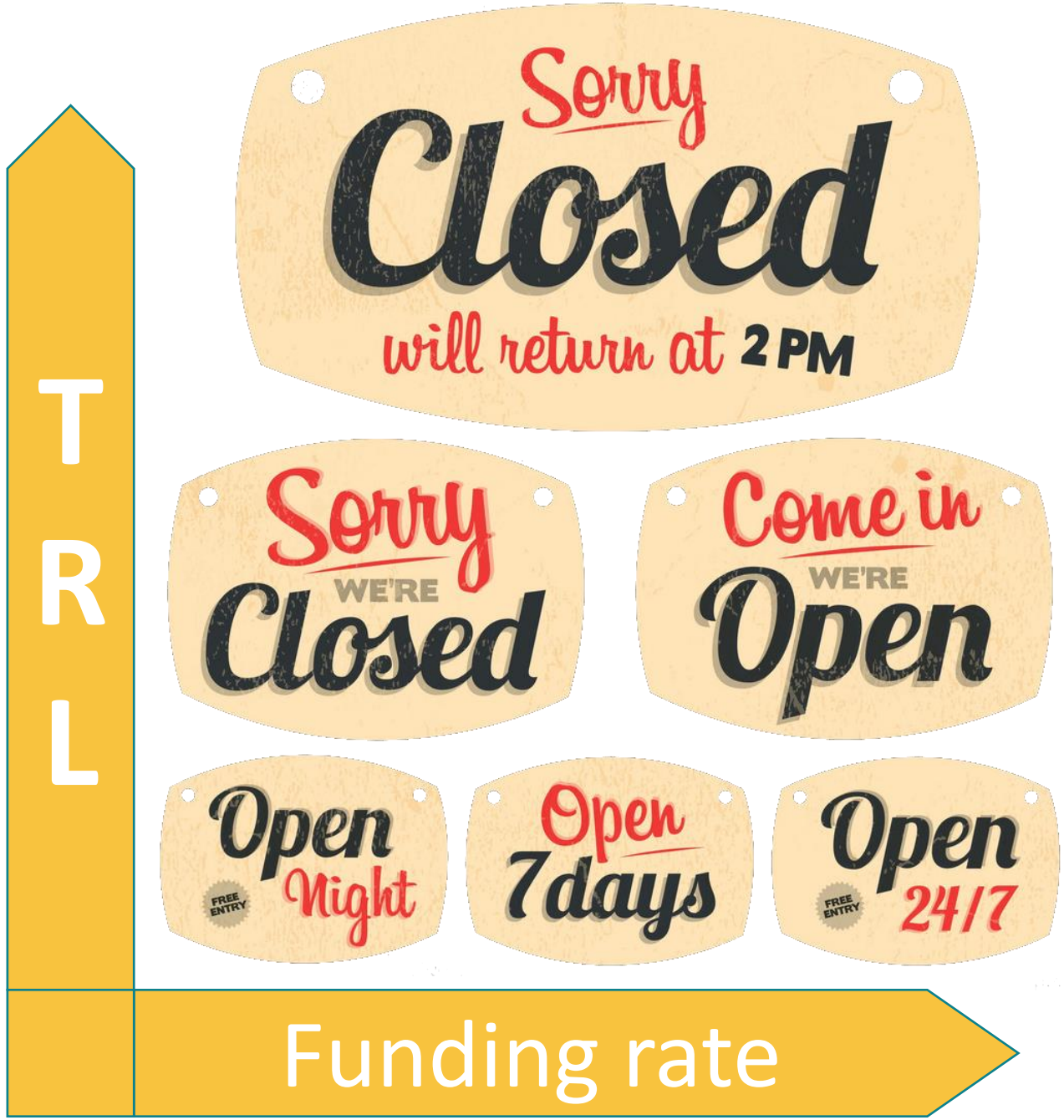
…but maybe it can be steered clear of sensitive places?

The future of Open Science

- **Fairplay**
  Open Science means to „Give & Take“.
  Balanced and fair cooperation is essential.
- **Level playingfield**
  Every participant of (and contributor to) Open Science should be able to reap his advantages.
  No „bonus“ for large and influencal players, agressive parasites or protective countries.

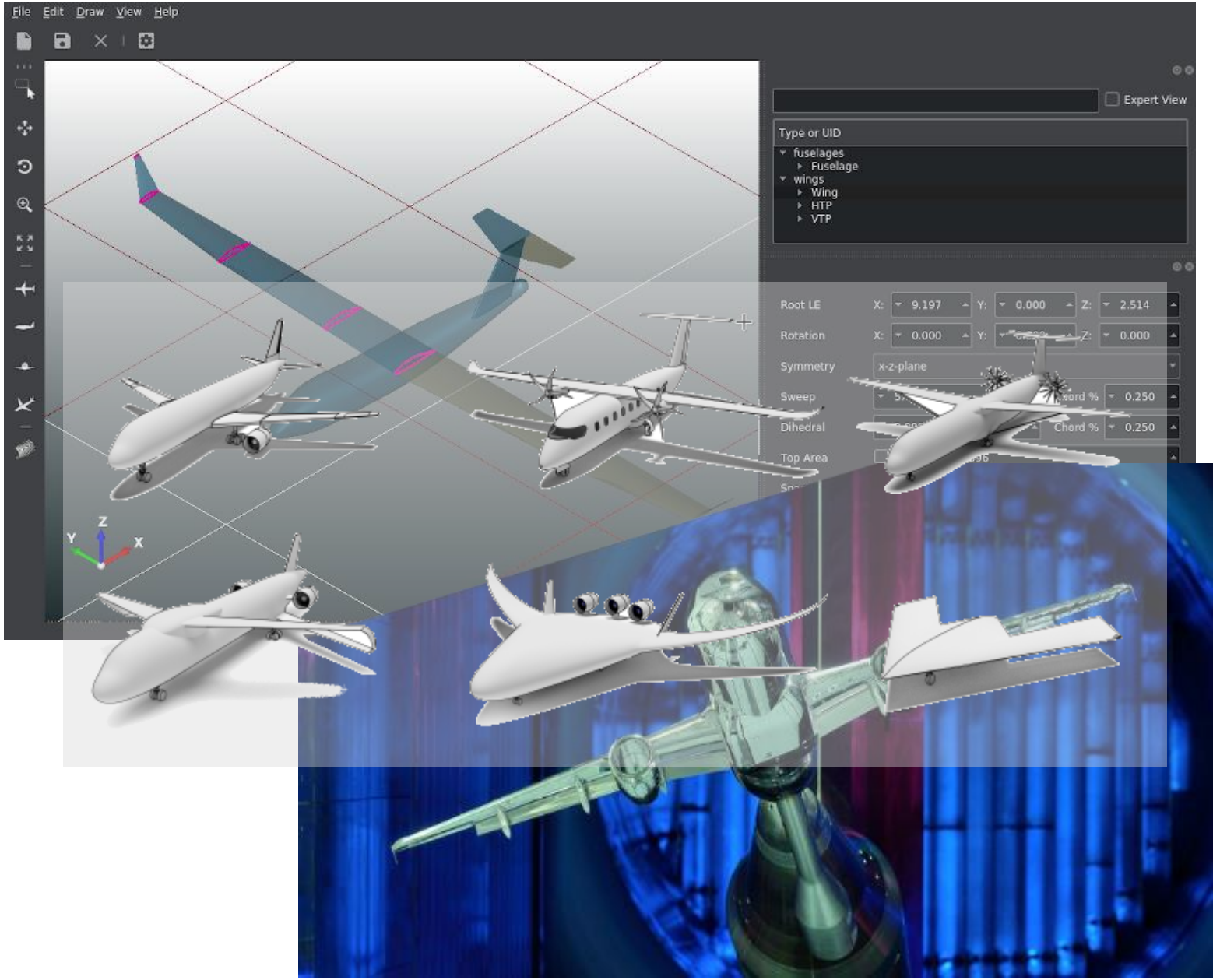
The future of Open Science

- **Differenciated levels of Open Science**
  The level of „openness“ (and consequently the approach and content) has to be adjusted to the scientific/technological application.
  The higher the TRL and the lower the public funding, the less open Open Science can be.



The future of Open Science

- **Easy access to „Open AAT Science“**
  Open Science content for aviation & air transport should have a central access point and a logical structure – e.g. via an overarching meta-tool. Open Science contributions from EC-funded projects could lay the foundation for this.



The future of Open Science

- **The perceived dilemma of „speed“ vs. „power“**
  The advantage of Open Science is ist dynamics. Quality can only be supported by „evolutionary maturing “: Good content survives, bad content vanishes.
  Open Science cannot replace the current scientific system – it shall complement it with a more dynamic, rapidly moving dimension.

The future of Open Science

- **Supporting the “right topics” for Open Science**
  - Basic research:
    new concepts, general methods & principles, …
  - Reference data & models:
    comparation, calibration
  - Common standards:
    everyone is more efficient (suitable even for fierce competitors)
  - Teaching material:
    higher education and professional training

The future of Open Science
Addressing the big challenges of aviation

Reconciling mobility & climate change:

Requires a truly cross-cutting approach across disciplines: aviation, fundamental physics & chemistry, chemical engineering, social sciences, cybernetics (biological & engineering), etc.

And to do so in a better (more dynamic, integrative, holistic) processes of research

- Enforce fairplay & create a level playingfield
- Apply differenciated levels of Open Science
- Provide easy access to „Open AAT Science“…
  …and especially to results of EU projects
- Concentrate on the strengths of Open Science
  (in particular in the „agility versus quality“ dilemma)
- Use Open Science for the “right topics”
  (i.e. those where OS is advantageous and has real impact)
- Use Open Science to address the big challenges of aviation which need disruptive change and cross-cutting activity

Thank you!

The research leading to these results has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 824350.

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Open ScienCe Aeronautic & Air Transport Research

Open Science in Aeronautics Research – Why? How?

Virtual AITS event 2021-02-23 to -25

Gerhard Pauly / Fraunhofer IFAM

gerhard.pauly@ifam.fraunhofer.de

Fraunhofer IFAM

"This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 824350"

Large challenges - examples

- Computers & operation systems → Berkeley Software Distribution Unix, ARM
  - Commercial relevance: mac OS, Android
  - Commercial relevance: Apple switches to ARM CPUs
- Decarbonization
  - Automotive: Battery mobility? Hydrogen mobility? Infrastructure? Acceptance?
  - Automotive: Autonomous driving? What's needed?
  - Aeronautics: Climate crisis + corona … where to go? Which way to go? How to overcome the current economic disaster?
- Future aviation
  - How to address innovative technologies?
  - How to include all stakeholders to get things done?
  - How to deal with challenging competitors?

Can collaboration, transfer of technologies, trust and Open Science help to cope with the challenges?

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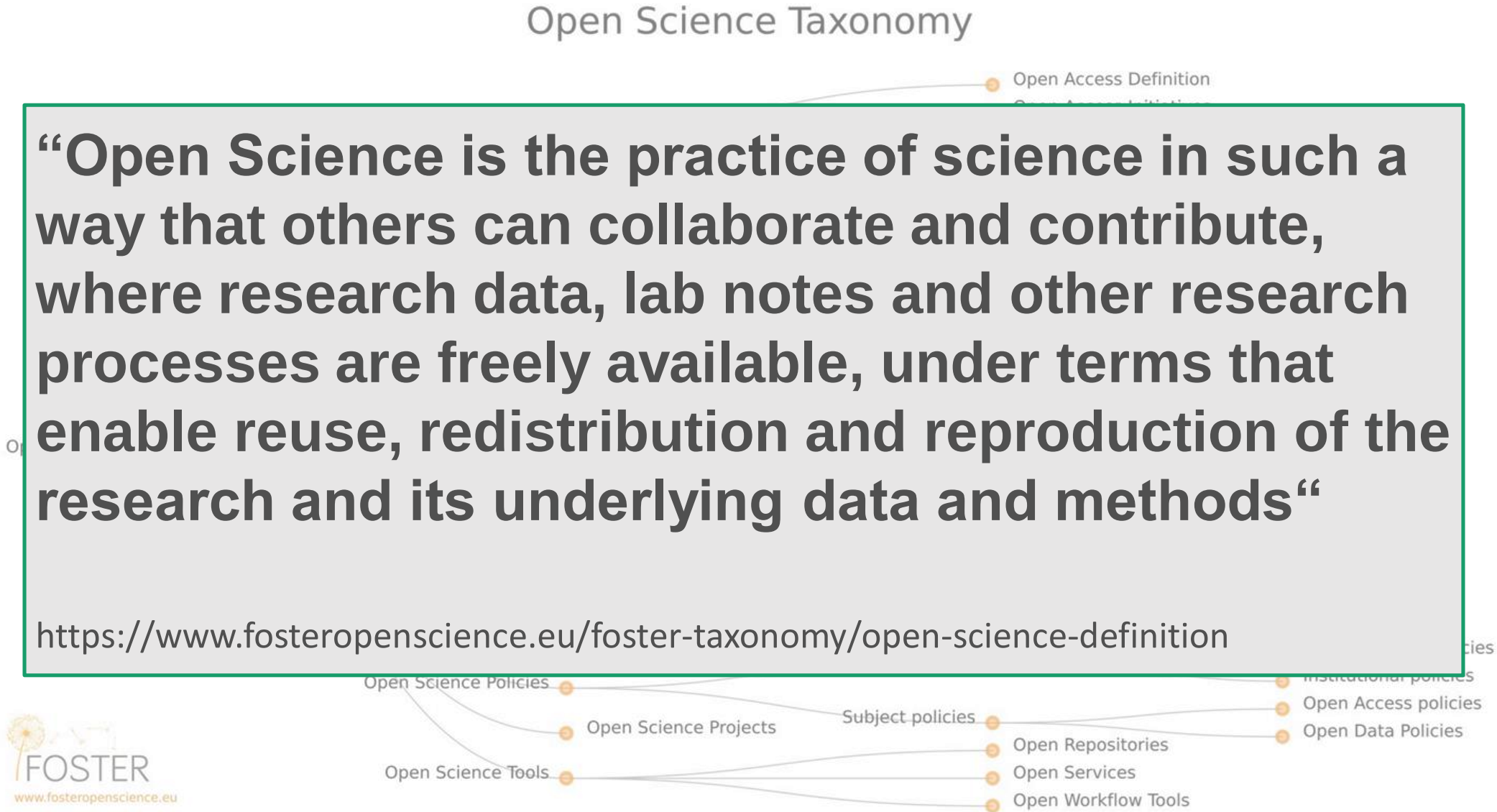
OSCAR @ AITS 2021 – What Is Open Science? 1/5



“Open Science is the practice of science in such a way that others can collaborate and contribute, where research data, lab notes and other research processes are freely available, under terms that enable reuse, redistribution and reproduction of the research and its underlying data and methods“

https://www.fosteropenscience.eu/foster-taxonomy/open-science-definition

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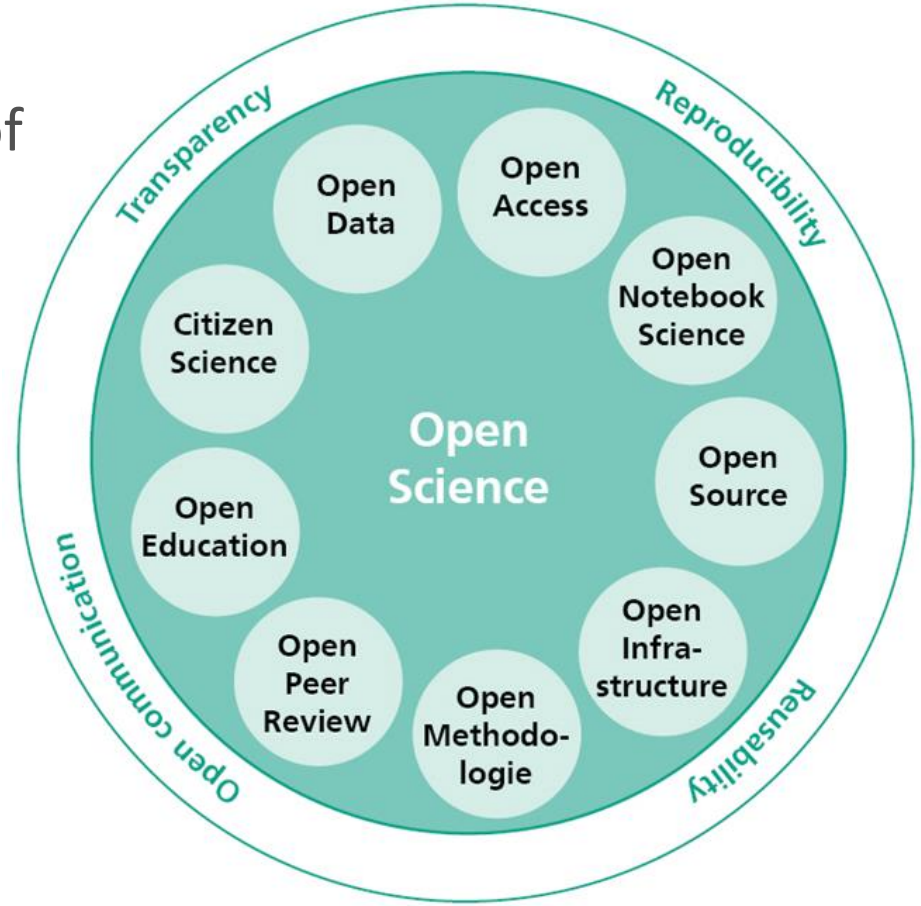
Definitions

- Open Science covers strategies and procedures that aim to use the possibilities of digitization along every step of the research process

- The intention is to open up research and create transparency to foster the knowledge transfer to society, economy and politics

- The results of scientific research is made accessible, understandable and reusable



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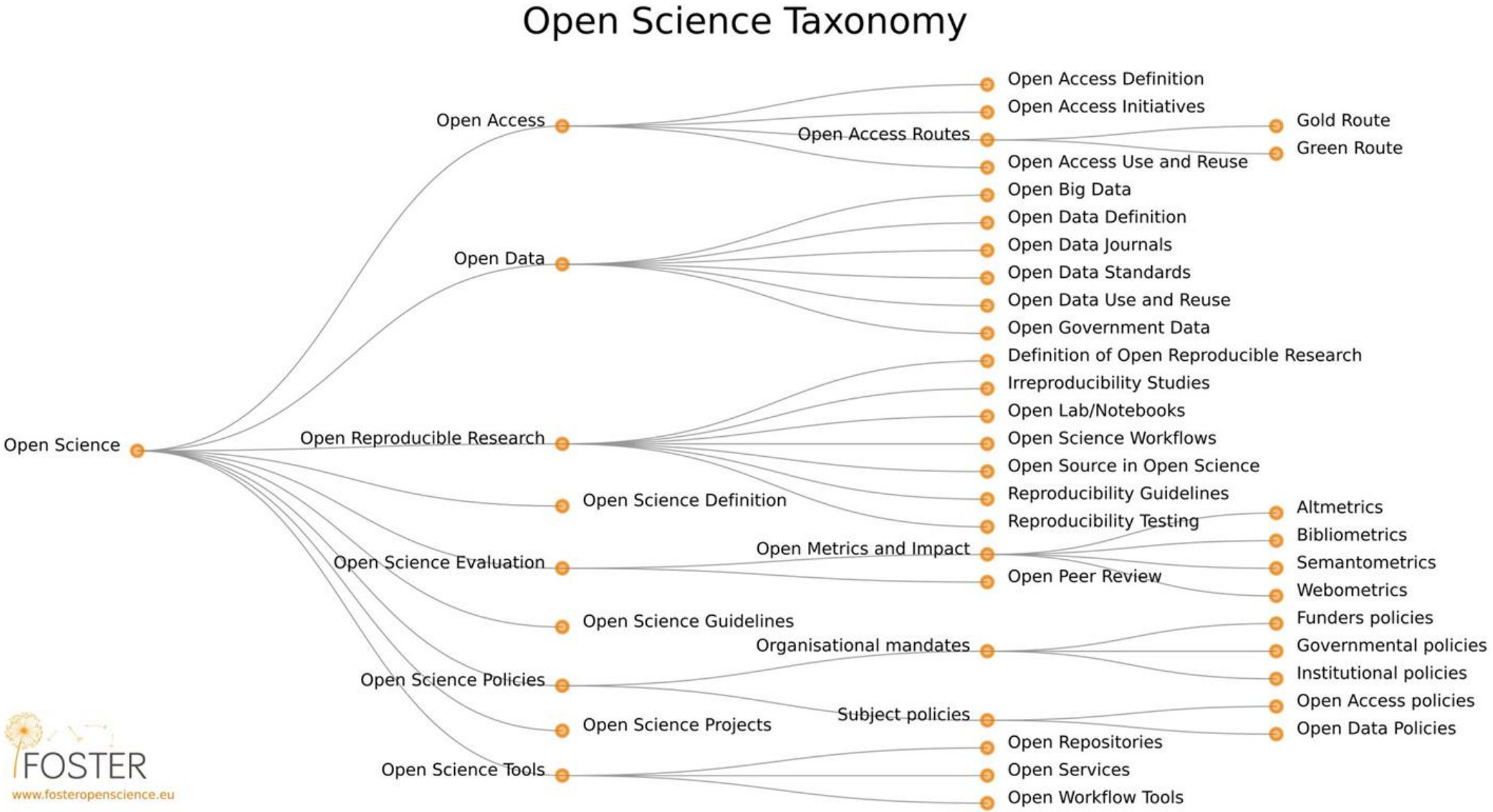

FOSTER
www.fosteropenscience.eu

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Dimensions

Process

- How are research results created, what are the research methods, which tasks are involved?
- Which part of the research process can be opened?

Output

- How can research results be reused and made available for economy, society and science?
- What kind of research results can be made open and how?

Strategy / Culture

- Which persons are involved? Who is responsible?
- Cultural shift to opening up research results (different to the behaviour of the past)

Infrastructure

- Establish technical basis for Open Science
- Develop services for scientists

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Example: Open Data in research projects

- Data Management Pla…tion
- Generation of data
- Analysis of data
- Selection of data for pu…
- Preparation of data for…priate formats, describing with metad…
- Selection of publicatio…entre / Data Repository / Data Platform
- Publication of data: Metadata, Indexing, Persistent Identification
- Tracking of publication by statistics
- Reuse of data

FAIR Data Principles

- Findable
- Accessible
- Interoperable
- Re-usable

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“For example, if we had not invested in the Framework programmes over the last twenty years how much lower would GDP have been now? If this investment had been allocated for example to roads instead of knowledge, what difference would this have made for today’s economic growth rate?“

RISE High-level Expert Group 2016: Europe’s Future: Open Innovation, Open Science, Open to the World. Reflections of the RISE Group.

Luxembourg: EU Publications Office, 2017; PDF ISBN 978-92-79-65566-; doi:10.2777/79895

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Current situation

- Participation rules (RfP) of Horizon 2020 respectively of Horizon Europe
  - Provide legal framework to projects
  - Open access to scientific publication obligatory (H2020 MGA article 29.2)
  - Broader open science approach not explicitly mentioned
- Consortium agreement models
  - CAMs are fully independent from EC
  - CAMs translate legal framework to project specific internal agreements
  - Current CAMs address open science implicitly
  - Current CAMs do not address digitization as base element to make open science happen

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Current situation in AAT

- Open science is changing constantly and dynamically
- The AAT community is shaped by competitive thinking and / or a restrictive mindset;
- Awareness and understanding of open science is limited (only open access is well known); There are many misconceptions of the actual relation between open science and intellectual property;
- The AAT community is fearful of losing IP to competitors;
- The AAT community is concerned with additional expeditures when doing open science; The AAT community is concerned that open science leads to a loss in quality. of the complexity problem by all stakeholders

… as derived from projects, scientists, researchers, and managers from IND, HES, REC

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OSCAR OS Code of Conduct

2 Principles of open science

2.1 Principle 1: 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.

2.2 Principle 2: 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.

2.3 Principle 3: 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 inclusiv6Syn420Fe as possible and make our research as reusable as possible.

2.4 Principle 4: 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 pertubations 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.

2.5 Principle 5: 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.

FAIR Data Principles

- Findable
- Accessible
- Interoperable
- Re-usable

But … how to implement???

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Next steps

- Finalization of the guidance for implementation
- Finalization of the open science code of conduct
- Provision of experiences and results gained to the European Commission

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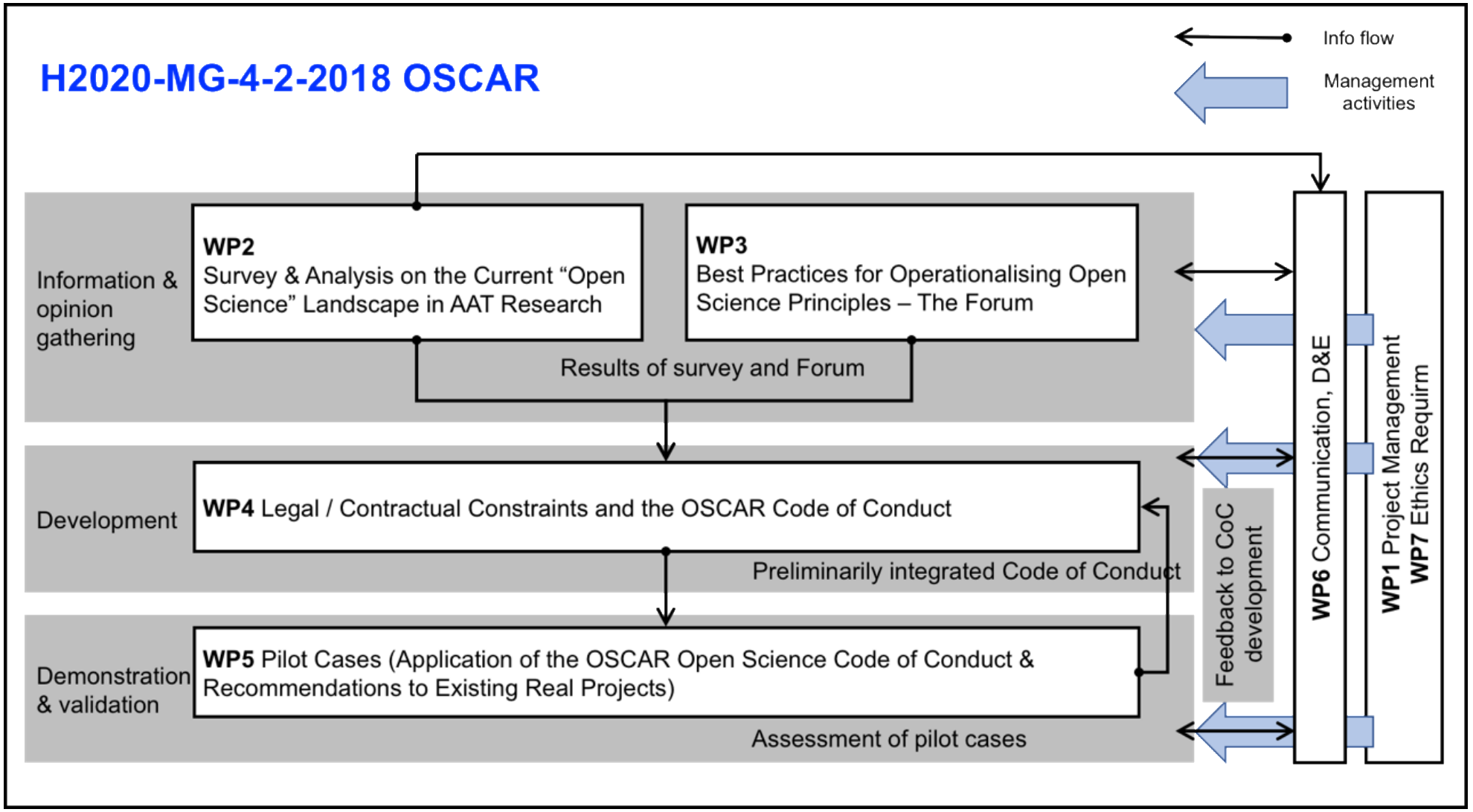

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