

EPOS SP – Grant Agreement n. 871121

D5.5 - Overview of the legal regulations for EPOS-Private Sector collaboration

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1. Introduction

The purpose of task 5.3. is to develop the legal and organisational setting for EPOS - private sector cooperation. In accordance with task 5.3. the development of the legal framework should take into account rights, responsibilities and limitations of both EPOS and industrial stakeholders. In particular it should address issues such as rules for providing EPOS data /service to private sector, integrating industrial infrastructures with EPOS, external funding rules, securing the researchers and private sector rights. The objectives of the task 5.3. include also establishing mechanisms for innovation implementation regarding both legal and organizational components as well as developing and testing mechanisms for effective monitoring of the EPOS - private sector cooperation and its performance.

The establishment of legal framework of any kind of cooperation cannot be made in isolation from identifying of the expectations and interests of the parties concerned. Due to the global pandemic of COVID-19 it was decided that all the actions aimed at getting of a preliminary picture of possible scenarios of EPOS-industry interactions should be limited to the ongoing pilot projects developed under Task 5.1, i.e.:

- 5.1.1 Private sector uptake and use of strong ground motion services from EPOS Seismology - SGM services;
- 5.1.2. Anthropogenic hazard: strengthening service provision for geo-resources - Deformation services;
- 5.1.3. Volcanic plume model application to design services for the aviation community (Navigation Companies) - VAACs services;
- 5.1.4. Physical Access to Research Infrastructures - common interest of Private Sector and EPOS - TNA services.

To obtain this knowledge, dedicated questionnaires were prepared to get more information about the pilots. Between 14 May 2021 and 28 May 2021 interviews were held with the leaders of the four pilots, which are investigating and developing possible areas of collaboration with private sector. Meeting summaries constitute appendices No 1 - 4 of this report.

The meetings with the coordinators revealed important issues concerning the role of EPOS and the members of the EPOS Thematic Core Service (TCS) in the collaboration with the private sector.

2. The role of EPOS ERIC and members of TCS

Preliminary analysis of ownership relations and arrangements with pilot coordinators show that EPOS ERIC - does not own the infrastructure created under EPOS. Rights to this infrastructure belong to the institutional members of individual TCS. The members also own the know-how, facilities and resources that may be of interest to the private sector, and necessary to offer services and cooperate. The specific role of EPOS, on the other hand, is to combine a diverse and extensive scientific infrastructure along with advanced tools, and to enable new ways of using the infrastructure, thus giving credibility and strengthening the position of the scientific entities operating within EPOS as important partners for the private sector.

In this respect, it should be noted that any cooperation in the provision of specific services will predominantly take place at the level of individual TCS members - private sector, rather than at the level of EPOS - private sector. The party to any contract for the provision of services with a private company will therefore be the

TCS member concerned, and the legal framework for such cooperation should therefore be developed taking into account in particular the interests and rights of TCS members. In this configuration, therefore, the role of EPOS is limited to being a brokering institution, disseminating and promoting services and tools in which the private sector may be interested and helping to frame and establish cooperation between TCS members and individual companies. From the perspective of EPOS ERIC, it is therefore possible to consider **two legal dimensions**. The first relates directly to EPOS. From EPOS point of view, it is important to ensure that there are clear disclaimers of liability in brokering and facilitating activities. Taking into account that, it is up to the parties to specific contracts, i.e. TCS members and companies, to lay down the rules of cooperation for specific contracts involving the provision of services or products to the private sector and the responsibility for their performance; in this second legal dimension the role of EPOS can only be to develop scenarios of cooperation with the private sector in order to identify the essential risks and areas of relevant regulation, which can serve as an aid to the scientific entities operating within EPOS, and at the same time can guide the legal standards for safeguarding and regulation.

3. Possible scenarios of cooperation with the private sector

Interviews with pilot coordinators allowed to distinguish the following scenarios of possible cooperation with the private sector:

- **Scenario I:** The private sector uses directly the infrastructure developed under EPOS, that is utilizing Data, Data products, Software and Services (DDSS) available as services provided by each TCS, for the purpose of developing its instruments, products, concepts, practices etc.
- **Scenario II:** A TCS member is commissioned to develop or implement a service/software/product tailored to the needs of the private sector partner
- **Scenario III:** Provision of consulting services by one or more TCS members
- **Scenario IV:** A private sector partner commissions research, testing, analysis to a TCS member
- **Scenario V:** A laboratory or infrastructure owned by a TCS member is rented to the private sector partner.
- **Scenario VI:** A TCS member provides training to the private sector partner on the use of the service/product already possessed by the private sector partner,
- **Scenario VII:** The private sector partner commissions the processing of data uploaded in the EPOS infrastructure, with the use of the software/services available within EPOS,
- **Scenario VIII:** The private sector partner shares the data owned and commissions its processing with the use of services within the EPOS infrastructure.

The list of the scenarios presented above and prepared based on the interviews held with the pilot leaders does not exhaust possible scenarios of collaboration with private sector partners. For instance, on the basis of the various documents and studies prepared within the frame of EPOS^{1,2} it is possible to name other scenarios for instance:

¹ Trans National Access (TNA) to Research Facilities of the European Plate Observing System (EPOS) Research Infrastructure, Version 12 October 2017

² EPOS SP_D5.8 Plan for sustainability of EPOS utilising the ICS, Main Author Keith Jeffery, Contributing authors Beata Orlecka-Sikora, Karolina Chodzińska, Version 3 23 January 2021

implementation of services (data, data products, software, services) developed within the private sector to services available within EPOS or

a number of different types of joint projects between TCS members and private sector partners, with or without participation of EPOS ERIC, the results of which will or will not be implemented in the structure of services available under EPOS.

It can be noted that in case of major part of the scenarios described above EPOS ERIC may not be involved in any way but it may choose to be involved in order to enhance possible innovation arising from the specific collaboration. The example of such approach was described in Trans National Access (TNA) to Research Facilities of the European Plate Observing System (EPOS) Research Infrastructure when EPOS foresees situation when certain projects (including collaboration with private sector partners) – within the excellence-driven approach – may be developed with the financial support of EPOS ERIC. The definition of the legal framework for EPOS ERIC's participation in projects will largely depend on the extent to which EPOS ERIC intends to engage in specific types of cooperation. In this respect, it would be helpful to define and describe the intended levels of collaboration in terms of access criteria and the degree of involvement of EPOS ERIC.

4. Legal framework for cooperation with the private sector

The scenarios identified above clearly show that direct cooperation with the private sector will be established by the TCS members. The scenarios also reveal that the services (tools, products) provided by TCS members may be developed on the basis of infrastructure established under EPOS and some of them – on the basis of their own results or resources. That is an important factor for the correct identification of the legal framework of cooperation with private sector, since the infrastructure established under EPOS projects have for the most part been prepared or funded under the Horizon 2020 - the Framework Programme for Research and Innovation (hereinafter referred to as “the Horizon 2020”). In such case cooperation with the private sector will be subject to additional conditions arising from EU law. What is more, the identification of a framework for cooperation at TCS members - private sector level shall also enable the establishment of a legal framework for the EPOS ERIC operations in this configuration (brokering institution). In this regard, there are three main areas that need to be analysed:

- general legal conditions for cooperation with the private sector,
- conditions relating to the use of infrastructure developed under EPOS,
- legal framework for the activities of EPOS ERIC as a brokering institution.

5. General legal conditions for cooperation with the private sector

Collaboration between TCS members and companies will take place within Europe and most likely also outside Europe. Therefore, the rights and obligations of the parties will vary depending on where the services will be provided and which country's law will apply. It is therefore impossible to enumerate in advance all the various pieces of legislation that will be applicable to the scenarios of cooperation with the private sector. Nor would the preparation of a list of such legislation provide any real help in developing rules for cooperation with private sector. Instead, it will be important for TCS members and companies to identify the key legal issues from the point of view of the cooperation to be undertaken. Identifying and presenting these

legal issues will be a milestone in establishing a legal and organisational framework for cooperation with the private sector.

The key legal areas that need to be addressed in the case of cooperation with the private sector are as follows:

- access to EPOS data, data products, software and services
- verification of intellectual property rights
- quality control
- protection of personal data
- intellectual property rights and ownership rights to the results of the projects
- liability of the parties during performance of the project
- liability for the accuracy and safety of use of the developed product/service
- OHS (Occupational safety and health) of the scientists involved in the project or other users or participants
- trade secrets.

6. Conditions relating to the use of infrastructure developed under EPOS ERIC

The infrastructure developed under EPOS ERIC has been created and integrated with the support of public means coming from many different founding bodies and under various funding programmes. It is therefore important to acknowledge that use of this infrastructure may be limited by the rules laid down for the specific programmes. It would be nearly impossible to analyse all the rules for all the programmes used to finance the entire large-scale infrastructure integrated within EPOS. However, in order to present the type of issues that may arise from such regulations, the rules provided in Horizon 2020 are presented below. Horizon 2020 is the programme that sets out the framework for the management of European Union support to research and innovation activities, thereby strengthening Europe's science and technology base and promoting benefits for society as well as better harnessing of the economic and industrial potential of policies of innovation, research and technological development. The general objective of the programme is to contribute to building a knowledge and innovation-based society and economy in the European Union by generating additional investment in research, development and innovation, thus contributing to the achievement of the research and development objectives. In particular, the programme provides regulations for a number of financial instruments to support research and innovation.

Horizon 2020 is regulated in particular by the following legal acts:

- Regulation (EU) no 1291/2013 of the European Parliament and of the Council of 11 December 2013 establishing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020) and repealing Decision No 1982/2006/EC (Official Journal of the EU L 347/104 of 20.12.2013, hereinafter referred to as “the Regulation 1291/2013”),
- Regulation (EU) no 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) No 1906/2006 (Official Journal of the EU L 347/81 of 20.12.2013, hereinafter referred to as “the Regulation 1290/2013”).

The following will outline the most relevant provisions and principles arising from the Regulation 1291/2013 and the Regulation 1290/2013, that need to be taken into account when using infrastructure of which the institution has received Union funding.

The Regulation 1291/2013

Research and innovation activities carried out under Horizon 2020 should comply in particular with the following conditions set out in the Regulation 1291/2013:

Gender equality

The objective of the Horizon 2020 is to ensure the effective promotion of gender equality and the gender dimension in research and innovation content. Particular attention shall be paid to ensuring gender balance, subject to the situation in the field of research and innovation concerned, in evaluation panels and in bodies such as advisory groups and expert groups. The gender dimension shall be adequately integrated in research and innovation content in strategies, programmes and projects and followed through at all stages of the research cycle (article 16 of the Regulation 1291/2013).

Researchers' careers

Activities under Horizon 2020 should contribute to reinforcement of a single market for researchers and attractiveness of researchers' careers across the Union in the context of the European Research Area, by taking into account the transnational character of the majority of the actions supported under it (article 17 of the Regulation 1291/2013).

Open access

Open access to scientific publications resulting from publicly funded research under Horizon 2020 shall be ensured as well as open access to research data resulting from publicly funded research under Horizon 2020 shall be promoted - as set out in the Regulation 1290/2013 - more below (article 19 of the Regulation 1291/2013).

Ethical principles

All the research and innovation activities carried out under Horizon 2020 shall comply with ethical principles and relevant national, Union and international legislation, including the Charter of Fundamental Rights of the European Union and the European Convention on Human Rights and its Supplementary Protocols.

In terms of ethical principles, it is emphasized in particular that:

- Particular attention shall be paid to the principle of proportionality, the right to privacy, the right to the protection of personal data, the right to the physical and mental integrity of a person, the right to non-discrimination and the need to ensure high levels of human health protection;

- Research and innovation activities carried out under Horizon 2020 shall have an exclusive focus on civil applications;
- The following fields of research shall not be financed:
 - a) research activity aiming at human cloning for reproductive purposes;
 - b) research activity intended to modify the genetic heritage of human beings which could make such changes heritable;
 - c) research activities intended to create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer;
- Research on human stem cells, both adult and embryonic, may be financed, depending both on the contents of the scientific proposal and the legal framework of the Member States involved. No funding shall be granted for research activities that are prohibited in all the Member States. No activity shall be funded in a Member State where such activity is forbidden (article 18 of the Regulation 1291/2013).

The Regulation 1290/2013

The Regulation 1290/2013 provides for more detailed rules on confidentiality and rules governing the exploitation and dissemination of results. The main provisions are as follows:

Confidentiality

Any data, knowledge and information communicated as confidential in the framework of an action shall be kept confidential, taking due account of Union law regarding the protection of and access to classified information, subject to the conditions established in the implementing agreements, decisions or contracts (article 3 of the Regulation 1290/2013).

Ownership of results

Results shall be owned by the institution generating them. Where institutions in an action have jointly generated results, and where their respective contribution to the joint results cannot be ascertained, or where it is not possible to separate such joint results for the purpose of applying for, obtaining or maintaining the relevant intellectual property rights protection, they shall have joint ownership of those results. The joint owners shall establish an agreement regarding the allocation and terms of exercise of that joint ownership in accordance with their obligations under the grant agreement. The joint owners may agree not to continue with joint ownership but decide on an alternative regime, inter alia by transferring their ownership shares to a single owner with access rights for the other institutions, once the results have been generated.

Unless otherwise agreed in the joint ownership agreement, each joint owner shall be entitled to grant non-exclusive licences to third parties to exploit the jointly owned results, without any right to sub-license, subject to the following conditions:

- prior notice shall be given to the other joint owners;
- fair and reasonable compensation shall be provided to the other joint owners.

If employees or any party working for an institution are entitled to claim rights to the results generated, the institution concerned shall ensure that it is possible for those rights to be exercised in a manner compatible with its obligations under the grant agreement (article 41 of the Regulation 1290/2013).

Protection of results

Where results are capable of or may reasonably be expected to be capable of commercial or industrial exploitation, the institution owning those results shall examine the possibility of protecting them. The institution shall, if possible, reasonable and justified given the circumstances, adequately protect them for an appropriate period of time and with an appropriate territorial coverage, having due regard to its legitimate interests, and the legitimate interests, particularly the commercial interests, of the other institutions in the action.

In case an institution that has received Union funding intends not to protect results generated by it, intends to abandon the protection of results or intends not to seek the extension of such protection, that institution, in principle, shall inform the Commission or the relevant funding body, which may, with the consent of the institution concerned, assume ownership of those results and take the necessary steps for their adequate protection, or continue or extend protection by assuming ownership thereof (article 42 of the Regulation 1290/2013).

Exploitation and dissemination of results

Each institution that has received Union funding shall use its best efforts to exploit the results it owns, or to have them exploited by another legal entity, in particular through the transfer and licensing of results. Any additional exploitation obligations shall be laid down in the grant agreement. In the case of research with the potential to address major societal challenges, additional exploitation obligations may include licensing on non-exclusive terms. Any such additional obligations shall be indicated in the work programme or work plan.

The rules for dissemination of results and research data shall be, in particular, as follows:

Subject to any restrictions due to the protection of intellectual property, security rules or legitimate interests, each institution shall through appropriate means disseminate the results it owns as soon as possible. The grant agreement may lay down time-limits in this respect. Any additional dissemination obligations shall be laid down in the grant agreement and indicated in the work programme or work plan. With regard to the dissemination of results through scientific publications, open access shall apply under the terms and conditions laid down in the grant agreement.

With regard to the dissemination of research data, the grant agreement may, in the context of the open access to and the preservation of research data, lay down terms and conditions under which open access to such results shall be provided, in particular in European Research Area frontier research and Future and Emerging Technologies research or in other appropriate areas, and taking into consideration the legitimate interests of the institutions and any constraints pertaining to data protection rules, security rules or intellectual property rights. In such cases, the work programme or work plan shall indicate if the dissemination of research data through open access is required.

Prior notice of any dissemination activity shall be given to the other institutions. Following notification, an institution may object if it demonstrates that its legitimate interests in relation to its results or background would suffer significant harm by the intended dissemination. In such cases, the dissemination may not take place unless appropriate steps are taken to safeguard those legitimate interests. The grant agreement shall lay down time-limits in this respect (article 43 of the Regulation 1290/2013).

Transfer and licensing of results

Where an institution transfers ownership of results, it shall pass on its obligations under the grant agreement regarding those results to the transferee, including the obligation to pass them on in any subsequent transfer.

Without prejudice to confidentiality obligations arising from laws or regulations in the case of mergers and acquisitions, where other institutions still enjoy access rights or may still request the granting of access rights to the results to be transferred, an institution which intends to transfer the results shall give prior notice to the other institutions, together with sufficient information concerning the intended new owner of the results, to permit the other institutions to analyse the effect of the intended transfer on the possible exercise of their access rights. Following notification, an institution may object to the transfer of ownership if it demonstrates that the intended transfer would adversely affect the exercise of its access rights. In such a case, the transfer may not take place until agreement has been reached between the institutions concerned. The grant agreement shall lay down time-limits in this respect. The other institutions may by prior written agreement waive their right to prior notice and to object to transfers of ownership from one institution to a specifically identified third party.

Provided that access rights to the results can be exercised, and that any additional exploitation obligations are complied with by the institution which owns the results, the latter may grant licences or otherwise grant the right to exploit them to any legal entity, including on an exclusive basis. Exclusive licences for results may be granted subject to consent by all the other institutions concerned that they will waive their access rights thereto.

With regard to results which are generated by intuitions that have received Union funding, the grant agreement may provide that the Commission or the relevant funding body may object to transfers of ownership or to grants of an exclusive licence to third parties established in a third country not associated with Horizon 2020, if it considers that the grant or transfer is not in accordance with the interests of developing the competitiveness of the Union economy, or is inconsistent with ethical principles or security considerations (article 44 of the Regulation 1290/2013).

Background

Institutions shall identify the background for their action in any manner in a written agreement (article 44 of the Regulation 1290/2013).

Access rights principles

Any request to exercise access rights or any waiving of access rights shall be made in writing. Unless otherwise agreed by the owner of the results or background to which access is requested, access rights shall not include the right to sub-license. Institutions in the same action shall inform each other before their accession to the

grant agreement of any legal restriction or limit to granting access to their background. Any agreement concluded thereafter by a participant regarding background shall ensure that any access rights may be exercised. The termination of the participation in an action shall not affect the obligation of such an institution to grant access under the terms and conditions established in the grant agreement. The consortium agreement may stipulate that where a participant defaults on its obligations and such default is not remedied, such a defaulting participant shall no longer enjoy access rights (article 46 of the Regulation 1290/2013).

Access rights for implementation

An institution shall enjoy access rights to the results of another institution in the same action if those results are needed by the former to carry out its work under the action. Such access shall be granted on a royalty-free basis.

A institution shall enjoy access rights to background of another institution in the same action if this background is needed by the former to carry out its work under the action, and subject to any restrictions or limits of which it has been informed. Such access shall be granted on a royalty-free basis, unless otherwise agreed by the institutions before their accession to the grant agreement (article 47 of the Regulation 1290/2013).

Access rights for exploitation

An institution shall enjoy access rights to the results of another institution in the same action if those results are needed by the former to exploit its own results. Subject to agreement, such access shall be granted under fair and reasonable conditions.

An institution shall enjoy access rights to background of another institution in the same action if this background is needed by the former to exploit its own results, and subject to any restrictions or limits of which it has been informed. Subject to agreement, such access shall be granted under fair and reasonable conditions.

An affiliated entity established in a Member State or associated country shall, unless otherwise provided for in the consortium agreement, also have access rights to results and, subject to any restrictions or limits of which it has been informed, to background under fair and reasonable conditions if those results and background are needed to exploit the results generated by the institution to which it is affiliated. Such access rights shall be requested and obtained directly from the institution owning the results or background unless otherwise agreed.

A request for above-mentioned access may be made up to one year after the end of the action, unless the institutions agree on a different time-limit (article 48 of the Regulation 1290/2013).

7. Licences

In view of the abovementioned provisions of Horizon 2020, in particular, rules for dissemination of results and research data as well as the obligation incumbent on the institution owning the results to ensure adequate protection of those results, it becomes necessary to secure these results and data with appropriate licences. These licences should enable the implementation of the principle of open access adopted in the Regulation 1291/2013, according to which open access to scientific publications resulting from publicly funded research under Horizon 2020 shall be ensured and open access to research data resulting from publicly funded research under Horizon 2020 shall be promoted.

It is intended within the next actions within Task 5.3 to review and analyse all the types of the licences applicable for DDSSs. For the sake of this document the two licences used for the DDSSs within TCS AH (CC BY and GNU GPL) are analysed.

The use of CC (Creative Commons) licenses is recommended. Creative Commons licenses offer a diverse set of licensing terms. This allows the author to define the rules under which the author wants to share its work with others. The author retains its copyright, while allowing others to copy and distribute, and it can specify whether the use is non-commercial or restricts the creation of derivative works. The use of a licence allows to explicitly define additional rights for users (the licensee). The licensee must always comply with the terms of the licence, otherwise the licence automatically expires. This means that the author and its rights must be correctly indicated on each copy of the work and that the use of measures restricting access to these works is prohibited.

The basic type of licence that can be used in this regard is the CC BY licence. This license allows reusers to distribute, remix, adapt, and build upon the material in any medium or format, so long as attribution is given to the creator. The license allows for commercial use. It is the licence that guarantees the widest freedom to the licensee.

Similar licensing principles are also defined by the GNU General Public License (GPL), which is used by many Open Source projects. Open source licensing is characterized by free access to a given software and the possibility of modifying the code. The GPL licence is a form of licensing where the creator of a given software solution can use the code and modify it. At a further stage of creating a given functionality, it is necessary to maintain the original model based on the GPL. In order to create new functionalities, code fragments or entire modules can be created using other software, which are separate forms of licensing.

The proposed licences should be sufficient to ensure that the Horizon 2020 conditions set out above are met. In this respect, further detailed analysis of the types of research data and results and the licences currently in use will be required.

8. Legal framework for the activities of EPOS ERIC as a brokering institution

Given the complex nature of the issue related to the varying possible degree of involvement of EPOS ERIC in participating in specific cooperation projects with the private sector (see section 3 above), legal framework for the activities of EPOS ERIC as a brokering institution may be addressed in different ways.

In any event, it will be important to secure the exclusion of liability of EPOS ERIC for particular risks arising during the course of the cooperation. An appropriately drafted disclaimer of EPOS ERIC's liability should be a permanent element of the communication concerning the services available under the ICS.

Among other issues whose relevance may depend on the choice of EPOS ERIC as to the degree of involvement in specific types of cooperation or specific projects, the following areas can be mentioned:

- introduction of service quality control standards,
- enforcing open access rules,
- securing intellectual rights to the results,
- regulations concerning founding,
- OHS rules.

9. Further activities planned within the Task 5.3

Further activities within Task 5.3 shall be strictly correlated with the development plan drawn in EPOS SP_D5.8 Plan for sustainability of EPOS utilising the ICS. Participation in all the interaction with existing and potential partners from the private sector may help to shape this specific projects by providing legal evaluation and may provide material to further develop material for the general legal framework for cooperation with private sector partners. It is also intended to support pilot leaders in defining of the legal conditions in the pilot projects.

Appendices:

- **Appendix No 1** – Summary of the meeting with the leader of the pilot 5.1.1
- **Appendix No 2** – Summary of the meeting with the leader of the pilot 5.1.2
- **Appendix No 3** – Summary of the meeting with the leader of the pilot 5.1.3
- **Appendix No 4** – Summary of the meeting with the leader of the pilot 5.1.4

Appendix 1.

Summary of the meeting of 21 may 2021

Pilot 5.1.1 Private sector uptake and use of strong ground motion services from EPOS Seismology

Information about the service:

- similar service is already offered but is in a process of update
- it may be used for product development for example by using the data that is available for calibrating sensors
- the private sector (PS) may use it to develop instruments, concepts, practices etc.
- there is no intention in making a specific commercial service package that is different from the scientific package that is already available

Idea of the pilot:

- to get in touch with the PS and show what TCS can offer – in principle the service should be open, including use for commercial purposes
- to interact with the PS to see potential developments in the service, which would make it more feasible to be used by the PS
- the interaction with the PS may only provide input to improve the service
- the objective of the pilot is to facilitate, to ease the use of seismological data, especially in the strong motion domain by the PS
- to make some steps towards opening the data for commercial use

The data:

- The data are licensed with:
 - very wide CC BY
 - without license
 - bilateral agreements with various institutions, that are often based on non-commercial purposes
- before opening this data to the PS the licenses should be unified – TCS is undertaking that process now
- only when TCS has clear open licenses on data, for example at least Share Alike licenses, TCS can seriously approach the PS, and ask them to tell what they can do with the data and how could they profit from it.
- TCS doesn't own the data, so TCS has to talk to operators across Europe to agree to share this data with the PS – TCS is in the process of obtaining consents
- the problem is to define legal framework to access the data. Reaching the goal of opening the data also for commercial purposes would be a great result

In the pilot leaflet as a challenge was mentioned lack of industry user targeted interface or service configuration. Is TCS planning to develop such tool?

- There is no need of developing any special interface for the PS.

- TCS has its own consolidated interfaces that are already used by researchers and most probably the PS is already using it without informing TCS (because of licenses issue). TCS needs only to make order in the database, that also the PS could profit from this data without violating licenses.
- the PS is welcomed to give response / feedback, which may be used as an input to improve the service, but there won't be a special service designated to the PS.

The payment for the services:

- access to the service will be free of charge for the PS
- there might be request from the PS to develop very specific product, that is tailored to their needs – then they will have to pay. But in principle our purpose is to use already existing interface/service free of charge
- even if TCS takes the PS money to do a specific product, all the results that come out of this collaboration will have to be open. Within TCS community the results must be open
- particular scientific institution might sign a bilateral contract with the PS, to offer consulting or services, in connection with which it may use services or data that are open to use on the TCS site - such cooperation has happened in the past already
- but as a community, TCS won't make a product for use only by the paying company. TCS wants to do the opposite – TCS mainly develops services for the scientists and if the same services and products can also work for the PS, then it is an added value

Were there any opportunity to discuss the open result policy with PS? Might it discourage them?

- In the sector of strong motion data there are not many direct interactions
- In other sectors, in principle, the policy is accepted

How do manufacturers of instruments may be interested in use of the service?

They may access the data to get records to calibrate their instruments

How may insurance companies be interested in the use of the service?

- They are interested in developing shake-based response systems for protecting of critical infrastructure
- They may use it to assess the vulnerability of structures
- There might not be much space for cooperation here, but the idea was to interact with them and see if any scope of cooperation is possible

How is the data available, how can it be accessed?

- If the subject is the strong motion data of TCS, they are accessed through web interfaces and web services that do already exist
- Institution that is typically in charge of coordinating is ORFEUS on behalf of TCS and all the founders. The access to the services will be through ORFEUS

Who owns the data?

Data providers own the data. TCS collects data from different providers and puts them together

Where is the data stored?

- The raw data are stored in individual data centres. They are made available using standardised web services, so the user doesn't really has to know where the data is physically

- The processed data are stored in different databases across Europe
- The unified database is in Milano – it is a product of ORFEUS, but it is hosted by INGV
- The European strong motion database (ORFEUS) contains also the Italian strong motion database (ITAKA)

Who is the service provider?

- There are two scenarios:
 1. In case of using data through web interface or web services – the service provider is ORFEUS, while INGV hosts the service and is responsible as a representative of ORFEUS to provide the service and to provide operational resources for doing that
 2. In case that the PS asks for an additional service, there must be an agreement and cooperation with ORFEUS or a particular scientific institution which can develop the service. In this case the provider is that institution. This scenario is possible, but it is bilateral cooperation with the PS, which is not the subject of the pilot
- ORFEUS has a legal entity, so it might act as direct contractor for the PS, for example representing the TCS members, but again such way of cooperation is not the subject of the pilot

Main legal issues:

- Get proper licenses from data providers, that would allow TCS to open that for commercial use
- Establish a proper licenses with proper limitations of risks on the side of service providers and data providers

Appendix 2.

Summary of the meeting on 20 May 2021

Pilot 5.1.2. Anthropogenic hazard

Information about the pilot:

- The purpose of the pilot is not to create an actual service for the PS, but a demo that demonstrates the potential of the platform. It will be a simple solution based on algorithms and applications that are already available on the Platform - it will not be a final product for the private sector (PS)
- The IS EPOS Platform will be used with this demo application – it will be a chain of existing applications on the Platform and some new applications. There also will be prepared software that will link applications on the Platform

The data:

- The application will be linked directly to the data collected in the NODEs
- The data will be uploaded from the Polish and French NODEs and it will be possible to upload data by the user

Will the demo application be then turned into the service?

- The demo application will be already a working service that can be used by scientists or PS, but past experience shows that the PS will not use its potential because they will not upload their own data (they don't want to share the data or upload their data to the external platform)
- Instead, the PS may ask to create a similar application but in their internal environment
- The demo application only presents the potential of the Platform and promotes possible services

The possible cooperation with the PS

- The application will be open, so anyone from the PS may use it. The company may use its own data or data already stored in the Platform (NODEs)
- Usually the PS don't want to use any free access platform – often they are obliged by the inner regulations that don't allow to use such services
- The PS has the possibility to upload data or to order processing data using the platform, but they probably will not want to use it
- They may be willing to pay for making an internal product / service similar to the product / service provided on the Platform
- Depending on the contract with PS, the product may be self-supported or additional support service may be provided
- It is possible that the service may be developed without public funding, but with the money coming from the PS. The PS may be interested to pay for such cooperation
- The demo application is to show the PS the possibilities of the Platform. This may encourage them to use the Platform, or they may decide to order the copy of such internal service
- For example insurers or consulting companies may use the platform directly, but these are exceptions

- It is possible to make and sell directly to the PS a copy of a selected part of the services provided by the Platform
- Such service will not be sold by EPOS, but by individual TCS members
- Most probably the PS will want something similar to what is on the Platform, not an identical application, so it will be necessary to prepare the application from a scratch. Therefore, it will not be necessary to extend the licenses for the applications on the platform, as they will not be used

Who are the potential parties to the service agreement?

- The services that are implemented on the Platform will not be directly transferred outside as a standalone solutions for the PS, this is not possible as we do not have licenses to do so
- TCS is only a consortium, so the actual parties will be the members of TCS
- Within the pilots there are only two possible providers of services: IG PAS and INGV.
- The pilot is divided into two components:
 - “A” component – a basic service, simple solutions – IG PAS
 - “B” component – an additional more advanced service - INGV
- If it's not possible to fully demonstrate the pilot, only “A” component will be prepared
- A and B may be implemented and operate separately and may be sold separately
- Implementing of the product to the PS will consist of selling of the application and license concerning usage of this application and implementation covering adjusting to the processing of the data format used by the company
- The service will not be prepared with the participation of AGH or Cyfronet
- The service will have completely different software tailored for the PS. The company will be interested in more advanced solutions than available on the platform, so it will be designed anew
- Only the know-how and mathematical formulas will be transferred from the platform

Know-how concerning the preparation of the data: collecting of data and using of data

- Probably the PS company will have its own system of data collection, so the service provider will have to adjust to the company solutions
- There is also a possibility to convert this PS data into a format suitable for the Platform

What will the service implementation process look like?

- The platform will not be used to develop specific products, only to show what IG PAS can do for the PS. The products for the PS will be developed separately from solutions on the Platform
- Mathematical formulas already exist and based on them an application can be created that allows this formula to function
- The service provider will employ graphic designers, give them codes and they will prepare application software
- The company should be able to use the application without an extensive support from TCS scientists

Other possibilities for cooperation with PS:

- It is possible to make a service when the PS comes with the data, the scientist takes it, selects the appropriate application from the Platform and calculates on its basis. In this case, the question arises about the possibility of using the applications - not all of them allow the commercial use

- If we allow such activity the application licenses must be extended
- Many of scientists who developed EPOS do not want to allow such use of the Platform
- DOI (Digital Object Identifier) also does not allow to see how someone used the data. There is no way to see if the data was later used for commercial purposes
- A solution could be to use these applications by asking the software owners to agree on commercial use for a fee
- Generally there is no point in working on this scenario, because, there may be cases that there is a need for such collaboration, but applications on the platform are rather simple, so it won't happen often.
- DRIVE project would be a service worth developing and implementing, but it requires much more funding.

Funding:

- SHAPE project is an implementation of IG PAS codes, codes developed with money that came from IG PAS
- The final service that will be sold to the PS, also will not be publicly funded
- What is produced under the pilot is only a demo that will not be sold, so there is no need to consider whether it is possible to sell services subsidised with public money
- Instead, it should be considered how the individual elements on which the final service is to be based were financed and whether there are any limitations in this regard

Summary:

1. The purpose of the Time-Dependent Seismic Hazard Assessment pilot is to create a demo of an application. The purpose of the demo is to demonstrate the potential of the platform and to attract partners from the PS
2. The potential service will be developed from the scratch at the request of the PS by TCS AH member institutions (IG PAS, INGV):
 - the transfer will include an application and know-how
 - EPOS will not be a party to a possible agreement
 - our comment: an IT partner will be needed to implement the service
3. The IS Platform could be used directly for commercial purposes, but this would require changes to the licences granted by data providers and software providers

Appendix 3.

Summary of the meeting on 14 may 2021

Pilot 5.1.3. Volcanic plume

Information on the service:

- The pilot will use a numerical model of the volcanic plume that can help to investigate the potential impact to aviation in case of the turbulence induced by the eruption
- The service will be useful only when the eruption occurs. However based on this tool it is possible to make hazard assessment studies, i.e. preparing scenarios of the potential impact if an eruption occurs. Such kind of information may be provided to the end-users. This is likely to be a one time information.
- It will not be volcano eruption warning – there are other channels for that. This will be additional type of information

The background of the service:

- The management of the response to an eruption as far as aviation is concerned is vested in International Airways Volcano Watch (IAVW) - it is a framework of different institutions that work in the field of the aviation, and include volcano observatories, meteorological offices, volcanic ash advisory centres, air service navigation providers, airline companies etc.
- IAVW has been defining procedures that concern what to do when there is an eruption, what may be a threat to airplanes. It is established and designed by the International Civil Aviation Organisation.
- The service that will be result of the pilot will be implemented in the already existing service provided by IAVW
- Within IAVW:
 - the volcano observatories are supposed to provide information through official channel which volcano is erupting, how high is the column, where the plume is going etc.
 - at the same time meteorological offices are supposed to issue SIGMET – it is an official way of communicating to the aviation for variety of phenomenon that are happening in the atmosphere (e.g. SIGMET for turbulences). It identifies area that could be dangerous for the aircrafts. There are similar SIGMETs for eruptions. Entities responsible for issuing SIGMET are financed from public funds.
- The service will be relying on what already exists and will provide new information through the existing channels.
- The service will be provided to government entities and the PS will use the information obtained by it.

Details of the service

- The service will consist of providing the data, a tool to process the data and there will always be a specialist looking into the data that will be provided
- There is a tool and a method, which will be then taught within the organisation responsible for alerts
- So there will be provided two products: a tool that can be used and also a result of using that tool (because the volcano observatory coexist with meteorological office). The tool will be provided to other observatories including one In Catania

Possible cooperations

- The service will be provided to governmental institutions, although actual beneficiaries are the private companies. Airlines will be the most interested in introducing the service
- In Iceland there are established contacts with airlines so there is some potential for direct cooperation. In October 2021 a workshop with airlines will be held. The aim is to raise awareness about a hazard. There might be some feedback from the airlines to improve the service or add some features. It may even be possible to carve out parts of the service that airlines might be interested in purchasing. Maybe the insurers would also be interested in some services. During the workshop, there could be presented a list of products that might be of interest to the PS
- Perhaps it would be a good idea to make contact with the airlines before the workshop to see if there are any services they would be interested in buying or developing
- There are many ways in which the service can be implemented, so it would be good to establish with the airlines what they expect
- A pre-meeting could be organised to show what the services might involve, what data might be needed, and to find out what the PS would expect. We can work together to organize such a meeting
- The idea of the workshop is to invite all interested parties on European level and the companies
- Rolls Royce (aircraft engines) – they suggested to investigate the volcano-induced turbulence issue, so they may be interested in services. They are the first entity to be approached to develop the product

Details of the pilot

- Within the pilot there are two things that are planned to be made
- First, a service connected with the hazard that is hardly quantified associated with initial shockwave
- Second, to come with a better parametrisation for eruption source parameters – they are essential for informing the VAAC and coming with a mapped area where the flights would be discouraged because of potential high contamination due to ash
- The information is given through EVONA, which is the format agreed with IAVW, and EVONA is issued every time there is any change in the activity of volcano (more powerful, less powerful etc.), informing the VAACs about the change. VAACs always wants to get numbers to get quantitative information about ongoing eruption to be capable to produce a better and more reliable forecast of contaminated area
- A new tool will be used for operational application. The tool already exist - numerical model ASHEE. Some well-known test cases involving observing and quantifying the plume must be used. So first step is more a research step, that allows to tune the code to be capable to reproduce well what happened in the past so this will provide more empirical relationship that could be used in real time when a new eruption happens
- The tool is already prepared and new ways of using it are developed
- The tool and service will be related only to the source of the ashes, not to the dispersion and how they move later
- It is the responsibility of the VAAC that sits at the meteorological offices to run a dispersal forecast, but in order to do that they need input information provided from volcano observatories
- The owner of the ASHEE is INGV and now together with IMO they are working in developing it
- After implementing ASHEE the other observatories also will have to validate their models with the eruptions that happened in the past - this will be a necessary step in any new place

Summary of the additional meeting on 29 may 2021

Information after the meeting with the group preparing the workshop

- the workshop has been postponed until the first week of November - the workshop will be attended by members of EPOS SP and interested parties from Italy, France and Great Britain
- the working group discussed holding an initial meeting with potential service users – it is agreed to hold such a meeting, which is planned for early September
- the meeting would be attended by representatives of Isavia, VAAC, airports and interested entrepreneurs (Rolls Royce)
- the research is currently being conducted on Etna and Hekla (as these volcanoes are close to the airways)
- the research must be completed before the initial meeting
- it may be beneficial to stay in touch with PS while the research is being carried out, as this may help to define PS needs and the direction of work on potential services
- it was agreed to liaise with a Rolls Royce representative during the research - we can assist with contacts and interviews if required

Appendix 4.

Summary of the meeting on 20 May 2021

Pilot 5.1.4. TNA services

What kind of laboratories are meant for physical access? Are there already specified laboratories for this kind of services?

- All the laboratories are meant to be, eventually, available for this service
- There are number of laboratories that are almost ready for this service in TCS Multi-Scale Laboratories, TCS Seismology
- There are experimental programme possibilities in the Geoenergy Test Beds (underground labs, underground facilities)
- We have different volcano laboratories, falling into TNA
- TNA may have different facilities in almost all of the TCSs

Are the owners of the laboratories prepared to enter this kind of cooperation with the PS and let them use these laboratories physically?

- The owners generally opened the laboratories for scientific use or for the private sector (PS) use
- Not all have been contacted yet and not all facilities are already quite open, but TNA is still working on policies in EPOS to enable a procedure how to get access to add TNA facilities and open these facilities for some external users

Is there a list of those laboratories, which could be used?

- Yes, there is a list
- There are number of labs, which already started two years ago to open for TNA. These are mainly the TCS multi-scale laboratories and we have two volcano activities in Iceland (they have already tried to open one or two volcanos)
- There are number of labs, but it is not yet fully elaborated, it would take the next years to complete the work

What will be the model of use of these laboratories (letting the use of the laboratories for the PS directly, some kind of cooperation with the PS or the situation that the PS asks for some tests to be made)?

- A cooperation like this will not be within EPOS
- The main idea of TNA is sort of brokering service by EPOS, so EPOS brings the information to the customers, to the scientist, to the PS, to the industry and after that they get some information by EPOS through the ICS platform or through some TCS platforms
- The idea is that those people directly apply for some measurements or use of the facilities

Will the owners of the laboratories let the people from the PS to use the laboratories totally independently, for example, to take over of the laboratory for their own purposes for the period of time?

- It depends on the laboratory

- EPOS offer only the opportunities for the cooperation with the PS, so there is no need to go deep in the process of how the laboratories will be used. This will be arranged between the owners and the PS
- EPOS is intended just to share the information and maybe there will be some kind of quality control by EPOS. EPOS will not participate in the process of how the labs operate.

Relations between the owners of the laboratories and the private sector beneficiaries:

- It depends on how they organise it. They may have contracts or insurances for using these facilities
- There will be different types of access: remote access (people may send samples to the laboratory to do experiments), the PS may go to a laboratory and do the experiments by themselves, they may have assistance by the laboratory staff or training by the laboratory staff
- There are many different possibilities and the cooperation in that matter should be left to the PS and the operator of the labs and organisers. EPOS should keep out of this business

Is there a possibility that EPOS may help these laboratories in developing collaboration with the PS?

- EPOS can give information on the platform for the PS, how the PS can apply for laboratories, what are the requirements to do so, and what they have to bring. EPOS is unlikely to have any more involvement in this regard

Are there any ongoing collaboration between the laboratories listed for this service? Have any of these laboratories already worked with the PS?

- Until now, EPOS facilitated only the cooperation between researchers and laboratories not yet with the PS
- Individual institutions may establish cooperation with the PS (testing some equipment, using laboratories or experimental facilities for the experiments, testing and doing analyses, measurements in the field)
- But it has to be always organised between the PS and the laboratory itself, because every laboratory has own prerequisites - trying to standardize them would be difficult

What type of interactions between the parties that are working through EPOS and the PS can exist, what kind of agreements / legal documents would be necessary, what kind of conditions should be met in this kind of agreements? What are different scenarios of cooperation?

- Every lab, every university and every facility has its own conditions and its own contract
- There are different procedures that could be possible in TNA. Some documents are already prepared - they will be sent
- The most of the laboratories and the most of facilities which offer any TNA probably already have developed models of cooperation with the PS and related documents
- These facilitates, which are open for external use, must have figured this by themselves. There are different aspects to secure: radiation security, security for chemicals, toxic chemicals, risk of any mechanic errors, so it's an important issue and every lab should have already made some procedure in this regard
- While brokering laboratories, for EPOS may be important to check if laboratories have such documents and procedures developed. That could be a necessary requirement and only facilities and labs with such policies would be offered to the PS

- There is a working group in EPOS, led by the University of Utrecht, which is already working on such policies. There are many points discussed that may be simply taken and adapted for the PS cooperation - the draft of this documents will be sent
- The volcano people (Sara Barsotti) could be contacted, because they have some experience on how TNA works and how external usage of volcanos might be organised

Which of the laboratories are the most likely to attract the PS to use the labs?

- A number of rock-physical laboratories
- The boreholes as testbeds which are interesting for service industry for testing new instruments
- The specific chemical labs, high-pressure labs - for chemical industry
- It is not yet very much developed, but EPOS can also offer opportunities for scientists to visit the laboratories that are servicing the PS. There may be some PS, which will open their labs for EPOS members
- The PS interest of such cooperation is that they can obtain new ideas, young scientists who have new ideas and they may come with new possibilities
- Also private labs can be very advanced and their equipment can be very expensive, so sometimes institutions cannot afford to buy this equipment and they can use only the PS labs
- In this case EPOS should check what procedures are in the PS labs and which can be offered later by EPOS platform to researchers. Also in this case the insurances should be checked and if the risks are covered
- For this very general procedure it is very useful to have some handbook or some guidelines.