

TRANSEATION

BLUE IS THE NEW GREY · NATURE-BASED SOLUTIONS

**Advancing Ecosystem-Based Management through Hybrid
Blue-Grey Infrastructures in Marine and Coastal Areas**

D.9.1 LAUNCH OF THE PROJECT'S CITIZEN SCIENCE APP TOOLKIT 1st VERSION



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Symbols, abbreviations and acronyms

D	Deliverable
EU	European Union
T	Task
P	Partner
WP	Work Package
ASO	App Store Optimization
App	Application, mostly used for a mobile application
JSON	JavaScript Object Notation, data exchange standard
API	Application programming interface

1 LAUNCHING AN OPEN PARTICIPATORY PLATFORM FOR MARINE CITIZEN SCIENCE

In the Deliverable 9.1, SPOTTERON (P3) has launched the first prototype version of the project’s interactive participatory toolkit for Citizen Science data submission, integrated public engagement functionalities, and project to user communication. The toolkit consists of mobile applications for Android and IOS (iPhone/iPad), an interactive web-application for contributing to the project in the browser on desktops and laptops, and a data administration interface, allowing the project team to access and manage the data, download data exports and work with the user community.

All parts have been launched on the 31st of May publicly via the App Stores as the project’s App “COSEA”, including the launch of the web-application and the data administration interface setup for data access and management.



Figure 1: COSEA App Image Teaser adaptation, extensions and future feature integration.

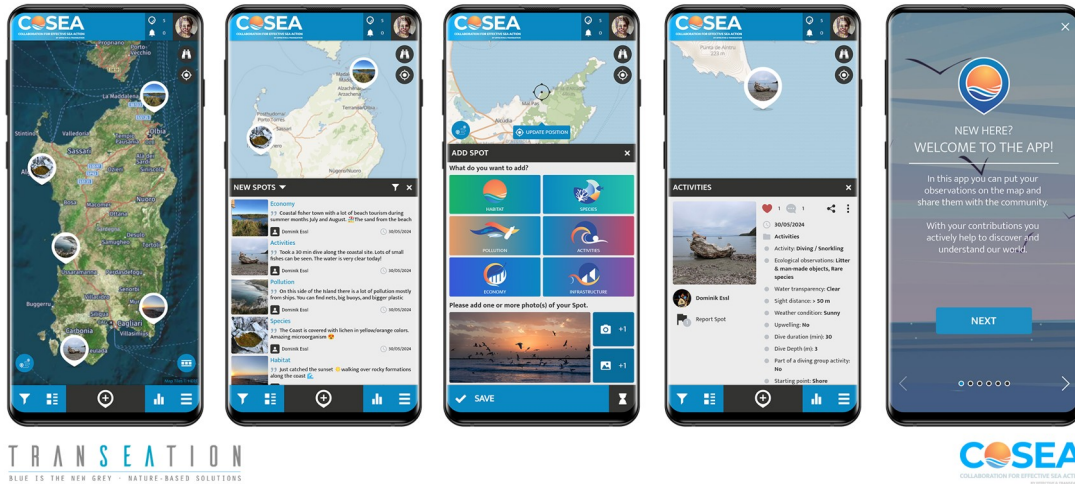


Figure 2: COSEA App Screenshots on a S10 Android Phone

The project’s web-application enables participation in the project’s app simply via browser on desktop and laptops. This offers an alternative for people not wanting to use a mobile app, or in certain use-cases like school class participation on PCs or professional photographers, uploading observations directly from their work laptop.

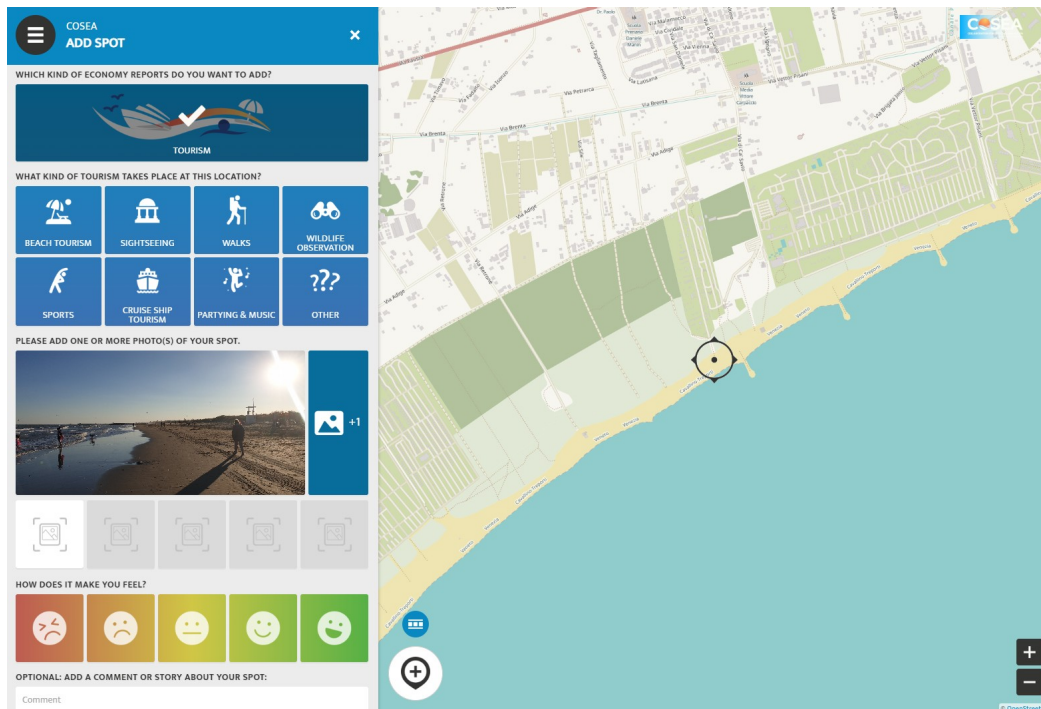


Figure 3: Contribution upload via web-application in a regular browser

2 CITIZEN SCIENCE APP PRODUCTION

Developing and designing the Citizen Science App prototype is a multistage process, ranging for defining the data model and input options together with the involved scientists to user interface design and app content creation and app development. Thanks to P3’s already existing software as a service platform “SPOTTERON”, a range of features and functionalities are already available in the Citizen Science App toolkit and implemented / set up during app production.

2.1 PREPARATIONS & DEFINITIONS

P3 has organized the TRANSEATION data model definitions for the citizen science app in the course of online meetings and workshops, leading the work package teams through the process.

During the data definition workshop, P3 also has introduced base concepts of Citizen Science and User Engagement to the project’s consortium and showcased options and possibilities for science communication and user community building to the whole project team.

For the definition phase, an online work document has been prepared in which inputs from the project team have been translated into a data input structure. This structure reflects the input options, users have in the app in a defined syntax, including content parts like data input field headlines, data input field labels and conditions under which the field is displayed in the app. The resulting branching data input tree forms the basis for taking over the app's data model definitions into an app setup on the system. Data categories defined in the TRANSEATION project include blue economy related questionnaires from infrastructure types and their conditions and use, to life realities of local stakeholders like fishers or the impact of tourism.

The data model can be further extended and fine-tuned in the future revisions of the project’s app toolkit. Via the online work document, new data categories can be added in collaboration with the work package teams. Testing the prototype app version in the field in pilot areas enables the consortium members to better understand potentials and to identify further needs and requirements in terms of data submission categories and types for their own scientific and data analysis work. With the fluid workflow via a centralized online living document, these emerging requirements can be defined, drafted and integrated in a defined process in future app updates and extensions.

IF INFRASTRUCTURE

What kind of Infrastructure is it?
Coastal | Off shore | Both
(CO or OS)

What is the infrastructure purpose?

Agriculture CO
Civic/Social CO
Educational CO
Tourism CO/OS
Aquaculture OS
Resource extraction
Energy CO/OS
Industry production CO
Water treatment plant CO
Desalination CO
Waste processing & disposal CO
Harbor CO
Pier/dock CO
Transportation CO/OS

Coastal/Flood protection CO
other_(buttons or list?) CO/OS

What is the condition of the infrastructure?

6 buttons
New constructed | Recently renovated | Well maintained | Signs of decay | Breaking down | Unsure

Is it currently in use by people/industry?
Buttons: Yes No Unsure

Figure 4: Screenshot of example section of the TRANSEATION/COSEA WorkDoc on Cryptpad.fr

2.2 BRANDING AND APP LOGO DESIGN

As a public participation platform, the Citizen Science App toolkit requires an engaging name branding, that reflects the project’s topic as well as generates appeal, interest and communicates the core of the app concept. Further aspects of app branding include App Store Optimization (ASO) with the direct use of a related keyword, app name length considerations for improved home screen display, and the possibility for people to remember the app name and communicate it verbally and in writing to other potential users in their peer group.

The resulting outcome of the brand design process by P3 is “COSEA”, reflecting the collaborative approach both on user to user as on project levels. The brand name has a witty wording, which helps with remembering and a clear marine definition.

P3 has produced a first logo version early on the app production process for internal presentation and revised it further in the design phase of the app. The revision implemented core visual styles coming out of the data submission dialog design process, and adds color to the logo for more visual appeal. Furthermore, the second version of the logo includes adaptive logo design concepts, allowing to use the app’s icons for the main observational categories to be used as the letter O. This enables to utilize the logo under different aspects and topics of the project, while keeping its visual identity.



Figure 5: First version of the COSEA logo



Figure 6: COSEA Logo Final Version, Marker and Adaptive Design Element

Further elements in the branding design process include the creation of the app icon, which serves as app entry point on both app stores and on the home screen/app drawer on a user’s device. The app icon utilizes the visual core element of the COSEA logo in a marker shape.

2.3 SETUP AND DESIGNING THE DATA SUBMISSION DIALOG

With the TRANSEATION data model/data category definitions finalized for the project’s app prototype version in 2.1, P3 moved to the next stage of transforming the text-based outcome into a working user interface in the Citizen Science App. After a general cleanup, P3’s team has set up the data input field and their input options in system and data base of the project’s IT infrastructure, alongside with configuration conditions for a hierarchical display under the various categories. When submitting observational data in the Citizen Science App about sightings, locations, infrastructure status, economy factors or other categories, users can choose from a main category, from where the branching input options expand. The main categories are aiming to cover a wide range of potentials for observational data to enable ongoing participation and user activity while producing project-related data inputs for the science teams.

After the initial setup, P3 started the data submission design process and app content creation. This procedure’s outcome is a complete visual representation of all input options in the TRANSEATION app prototype in form of a vector-based source file. For all buttons, P3 has included icons to visually convey information and created a color scheme using a gradient coloring for each section.

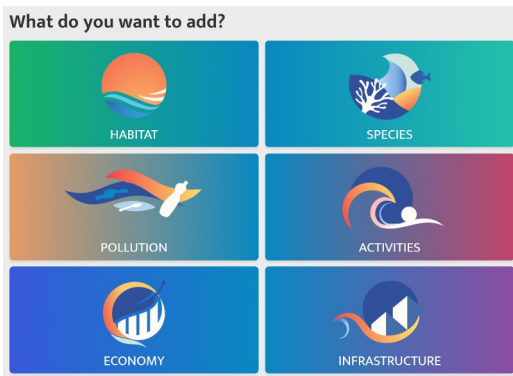


Figure 8: Main category button design

For the main categories, which are the first element the user sees and uses when imputing new data in the app, P3 has created a colorful and detailed visual look, which in the process has taken over into the 2nd version of the app’s branding and logo design (2.2).

With currently 99 data input fields being set up and configured in the system, P3 also produced the app’s language file in English. The language file includes all strings utilized in the projects app, from title to headlines and buttons. After the prototype phase, the language file will be translated with the help of the consortium partners to all project languages and implemented in upcoming app update releases.

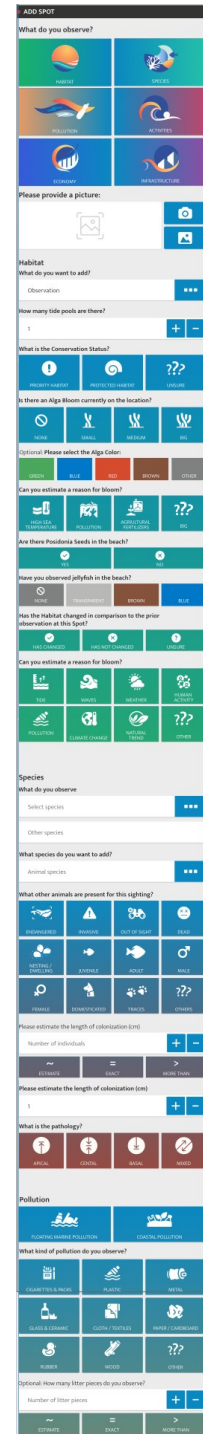


Figure 7: Small section of the Data Input Dialog Design Sheet

Each main category branch ends with the standardized question “How does it make you feel?”. This component will allow utilizing social science aspects in the future of the project and also creates a level of respecting a user’s view on a situation.

Particular questions, that involve a level of experience or knowledge, are tied to a specific user role. On account creations, users can choose a user role fitting best their background, like professions like “Fisher”, “Science communicator”, or “Field scientist”. For users of that user role, additional data input options are available in the app in the categories. For more details about the data protection of elements, which can in combination result in personal data classification, please refer to Appendix 1 of this document.

One additional data feature implemented in the app is the option for users, to provide information about their relation to the sea/ocean in the user profile. This will help the science team to better understand data submission relations to personal experience and background of users.

2.4 IMPLEMENTATION OF APP FEATURES

Inputting data can go beyond standard form elements like text field, buttons are number inputs. Resulting from P3’s software platform, a range of features, which have already been developed and released in other Citizen Science projects, are already extending the project in the first prototype. Implanted core features in the project’s app are:

- Routes recording: fishers can use GPS/Location Service to record routes of fishing tours
- Satellite maps: the map view of the app can be switched to satellite view
- Multiple Images for data submissions and background data upload: users can add multiple images to one submission; data for submissions is uploaded in a background worker

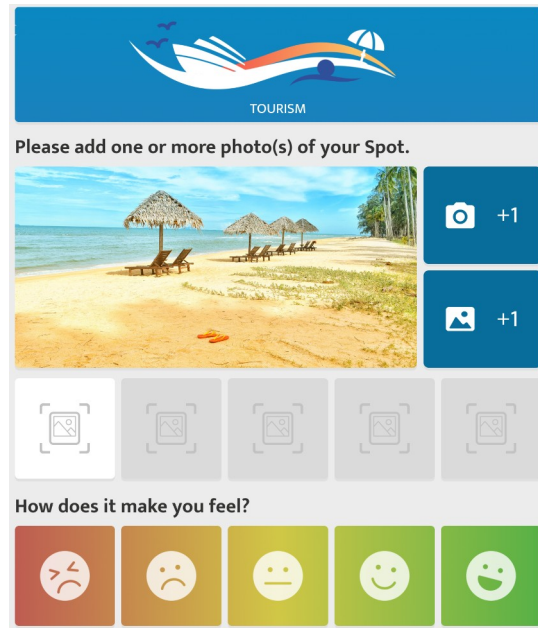


Figure 9: "How does it make you feel" buttons for qualitative feedback

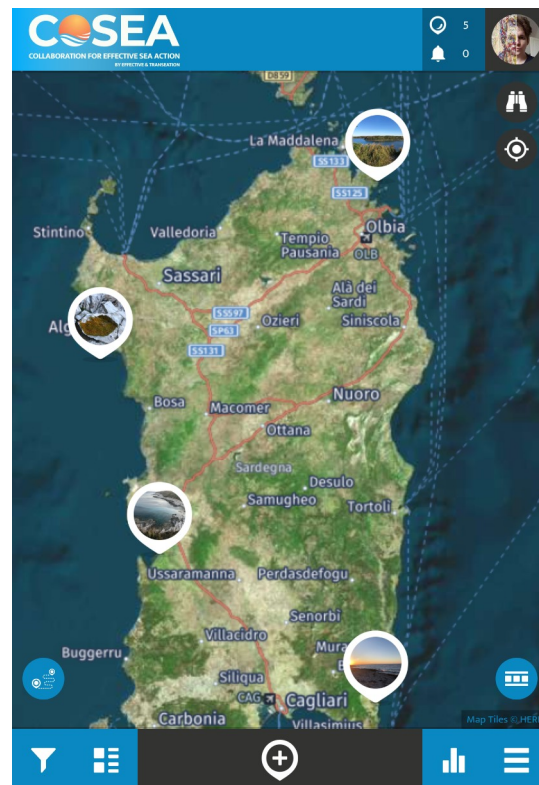


Figure 10: Satellite Map View in the project's App on an android tablet

process on the users device instead of blocking the app or breaking in low connectivity situations

- Data moderators: enables the set up of user accounts with data moderator permission level to change/edit submissions directly in the fronted of the app
- Spot privacy feature: enables users to choose between keeping a submission public, hide its map coordinates or only show a submission to administrators and moderators of the project
- Project-specific profile questions: users can provide optional feedback on their background in relation to marine aspects and experiences
- User roles: enables the display of selected data input options for only defined user roles in the project
- User Community: the app is enriched with a range of community options for user to user and project to user communication, form comments, user tagging including push notifications, to like buttons (heart) and user to user following
- Project-to-user communication tools: option to allow project administrators to send custom messages with media, link and titles to all users in the app, or to particular countries and/or user groups
- Data visualization panel: displaying a heat-map as map overlay about the submission distribution
- Data and user statistics: leader board with most active users, and data statistic panels for most contributed categories, including timeline diagram display
- Info panels: Informational/educational content display prototype for habitat types
- User badges: users earn badges for ongoing participation (basic level: amount of data submissions)
- User Profile panels: extend user profile with data submissions collection, message board and awarded badges (gamification)

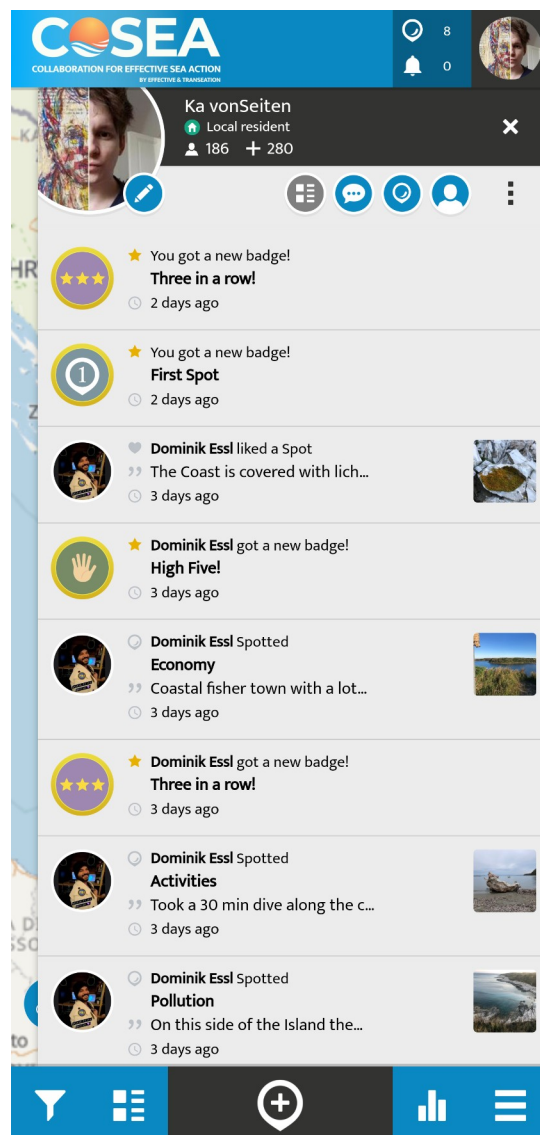


Figure 11: User Community News Feed and Notifications in Project App

- Offline Maps: download of map areas for offline availability
- Species Taxonomy: implementation of the P3's data taxonomy features for submissions about species presence via WikiData API connection

Other already present platform features support app quality, user experience, app stability, privacy and data quality. Thanks to the underlying software platform, a wide range of functionalities can be used in the project's app without extra development costs and efforts, benefiting both scientists and citizens alike, as well as the public reception of the project's Citizen Science toolkit.



3 NEXT STEPS

In the upcoming tryout phase by the consortium members, experiences with the app and with monitoring and Citizen Science will be made. P3 will invite the consortium members to start using the prototype in the pilot areas under live conditions and will collect the feedback for identifying further project requirements in terms of data categories and data input options.

The app will be translated to the pilot area languages in this process, and the consortium partners can invite first public users and stakeholders to download the app and submit observations/data.

P3's team will continue to work on the app technology development and on further fine-tuning and extending the data input options in collaboration with the project's consortium. P3 will also start working on project-specific features and in-project data flow integration for providing access to the data via JSON API to consortium partners for automated data transfer into repositories. For the pilot areas, national data access to data administration interface will be provided and a workshop held on how to access, manage, and export the data, and how to use the integrated communication and user community feature for user engagement, social community building and science communication/ project-to-user dissemination.

Furthermore, P3 will compile a Media Package, which will contain all produced App Store media from image teasers to marker icons, app store badges, links, and phone mockups and deliver the package to the leading party of the TRANSEATION dissemination work package for use in online distribution. Also, instructions how to embed the interactive web-application of the project directly via HTML iFrame code on the project's website will be provided alongside.

4 APPENDIX 1

DATA PROTECTION AND ETHICS REQUIREMENTS:

This subsection, on ‘Data protection and Ethics Requirements’, aims to answer some of the most frequently asked questions about data protection law and to clarify the basic principles underlying data protection. This subsection covers the different legal aspects that apply in a data protection context and when they apply. It also aims to explain the need for a ‘legal basis’ to justify the processing of personal data and to outline the rights that ‘data subjects’ have and how they can exercise them in the framework of the **COSEA** app.

1.1 Data Protection Main Concepts

The **TRANSEATION** project acknowledges that data protection is a fundamental right, implemented within the Treaties of the European Union: The Treaty on the Functioning of the European Union (TFEU) and the Charter of Fundamental Rights. The European law setting out the new protection of individuals’ rights and increasing data controller obligations in the digital era is the General Data Protection Regulation (GDPR). This is the main law that will apply to the **COSEA** App. The **TRANSEATION** Project and specifically, this activity, involves the collection and processing of personal data on a minimized level; and to correctly implement, the following definitions will be included within the project’s taxonomy as defined in GDPR:

- **Personal data:** “[...] any information relating to an identified or identifiable natural person (‘data subject’); and identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to physical, physiological, genetic, mental, economic, cultural or social identity of that natural person.”;
- **Data Processing:** “[...] any operation or set of operations which is performed on personal data or on sets of personal data, whether or not by automated means, such as collection, recording, organisation, structuring, storage, adaptation or alteration, retrieval, consultation, use, disclosure by transmission, dissemination or otherwise making available, alignment or combination, restriction, erasure or destruction.”;
- **Data Controller:** “[...] the natural or legal person, public authority, agency or other body which, alone or jointly with others, determines the purposes and means of the processing of personal data; [...]”;
- **Data Processor:** “[...] a natural or legal person, public authority, agency or other body which processes personal data on behalf of the controller; [...]”

1.2 Data protection principles

The GDPR establishes a risk-based approach to data processing and requires data controllers to bear full responsibility for the safety and security of personal data and the protection of individuals’ rights in relation to the processing of their personal data. The **TRANSEATION** project will fully endorse and adopt this approach. In particular, **TRANSEATION** will strictly adhere to the GDPR framework, which highlights the key principles for collecting and processing data:

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- **Lawfulness, fairness, and transparency:** COSEA will only process data for a specific purpose and remain transparent with the users.
- **Purpose Limitations:** COSEA will collect and process data for specified and legitimate purposes, following explicit consent from the users. In particular, the specific purposes for which personal data are processed should be explicit and legitimate and determined at the time of the collection of the personal data. However, further processing for archiving purposes in the public interest or scientific research purposes (in accordance with Article 89(1) GDPR) is not considered to be incompatible with the initial purposes.
- **Data Minimisation:** COSEA will limit the amount of data collected and retained where necessary; this requires, in particular, ensuring that the period for which the personal data are stored is limited to a strict minimum.
- **Data Accuracy:** COSEA enables the users to correct, update and keep the personal data stored accurate and does store it secured safely at industry standard level.
- **Storage Limitation:** Personal data will be kept for as short-term as possible with full control by the user on deletion/erasure; Users can freely choose pseudonyms to protect user identities; Using pseudonyms is officially recommended.
- **Integrity and Confidentiality:** The data processors of the COSEA app will protect user data against unlawful processing or loss, using encryption and privacy by design methods.
- **Accountability:** The COSEA consortium ensures that all activities comply with ethical principles. This applies both to the use of secondary data and the collection and use of field data.

In the process of technological design, COSEA will observe at the same time the principles of both data protection and e-governance. For that purpose, the tool should follow a clear concept with regards to the information required for the functioning of the COSEA tool and the compliance with the principles of data minimisation (Art. 5, para. 1, lit. c, GDPR) and purpose limitation (Art. 5, para. 1, lit. b, GDPR).

Privacy and data ethics in COSEA include a no-user-tracking and no-digital-surveillance approach by avoiding third-party listening scripts/analytics or implementation of privacy-unsafe elements from data-harvesting platform for user data monetization. As core principle of the SPOTTERON Citizen Science App Platform, this practice oriented and ethical approach to user data privacy ethics does go beyond the basic requirements of the EU General Data protection Regulation and adds an ethical layer to the COSEA App, that provides a digital safe space for citizen science and use engagement.

In order to do that, the COSEA app will take into account that:

- All data collection, processing, storage, sharing, preservation, and archiving will respect ethical research practices and national, EU and international law, including privacy law, and extend to not apply technologies and services, which are built for injecting user surveillance for service provision or data gathering.
- Among the relevant legal and ethical requirements, in the context of TRANSEATION those of privacy and data protection nature are of primordial importance. Every sophisticated information technology system that has the ambition to provide services to natural persons should consider in its very foundation the proper implementation of these notions, in order to guarantee that the quality of the service offered would not

compromise individuals' rights, especially in public funded programmes. It is of upmost importance that natural persons involved are provided with appropriate safeguards, data protection practises and empowered to exercise their respective rights.

- In order for the **COSEA** system to represent a trustworthy technological tool that is widely used by the target groups, it is of pivotal importance to provide an adequate level of personal data protection to its users and avoid user surveillance by third parties
- The legal definition of consent in its data protection sense is provided for in Art. 4, para. 11, GDPR. As a general rule, it should always be obtained before the processing activity is initiated. In order to be valid, consent must be given freely, be specific, informed and unambiguous.
- Freely given consent must be understood in the sense that the data subject is free to choose and to control the decision whether or not to express consent. If the data subject (or in our case any **COSEA** user) does not have the opportunity to choose whether to share or not their personal data or he/ she is obliged to give consent, then it is presumed that the consent is not freely given.
- Consent may cover more than one data processing operation if these operations are all executed to achieve the same purpose. When the controller must process personal data for different purpose, additional consent must be sought in order for the processing to be lawful.

Finally, the consent must be unambiguous. So that, the data subject must have taken a clear and affirmative action to consent to the particular processing. In terms of COSEA and the creation of a user account on the SPOTTERON Citizen Science App platform, this unambiguous and informed consent is taking place at the registration process via the provided Terms of Use of the Service (<https://www.spotteron.net/terms-of-use>) and a transparent listing of involved data processing directly in-app in the linked privacy section (<https://www.spotteron.net/privacy>).

Moreover, the security-oriented approach in designing the tool is a priority for the COSEA app and the underlying platform/Service. The tool will be developed in a way that ensures best possible the trust of all end-users in the security of their information in accordance to industry-standards.. Security (computer security, cybersecurity) is needed to protect the users' data from unauthorized access for viewing, misusing, or altering it. This applies both to data of users and individuals working for organizations as well as the data of the organizations themselves. In terms of roles, a clear separation between "project specific" and "platform specific" aspects for a reliable basis in COSEA. For all platform specific aspects including the processing of user accounts, SPOTTERON acts as "controller", while for "project specific" aspects, the coordinator in representation of the consortium acts as "controller" and have full decision power on data-set ownership of collected observations and recordings.

1.3 Data protection by Design and by Default

The GDPR provides for two crucial concepts for the project: Data Protection By Design and Data Protection By Default. While long recommended as good practice, both principles are enshrined in law under the GDPR (Article 25).

- **Data Protection by design** means embedding data privacy features and data privacy enhancing technologies directly into the design of projects at an early stage. This will help to ensure better and more cost-effective protection for individual data privacy.
- **Data Protection by default** means that the user service settings (e.g. no automatic opt-ins on customer account pages) must be automatically data protection friendly, and that only data which is necessary for each specific purpose of the processing should be gathered at all. It is linked to the principles of data minimization and purpose limitation.

In the COSEA app, all transfer of sensitive data is protected by state-of-the-art data encryption (SSL/TLS) by default.

Additional technical organizational measures (TOMs) on the platform include:

- Deletion concepts for project-specific personal data:
On request, we delete the entire project-specific data-set in the live system within 14 days.
- Deletions are logged in the system with date/time (flag).
- Individual or bulk deletions of data points in the live system can be carried out by the admins/coordinator in the Data Administration Interface. Note: Data in backups are excluded from the immediate deletion procedure according to Art. 5 DSGVO and 32 para. 1 lit. c GDPR.

Measures of implementation of access control:

- Strong password protection with multi-factor authentication incl. app authorization at access on system relevant infrastructure.
- Deployments are located exclusively in the cloud environments with security measures according to industry standards of the cloud hosters and it is ensured that only the necessary services are exposed to the outside.
- All clients with access to relevant systems are protected by hard-drive encryption and firewalls.
- Physical access controls happen on the basis and measures of the cloud hosting providers' data centers.
- Logins to the ICT infrastructure are logged by the system.
- Password policies for project admins: Project-specific access takes place exclusively via provided user accounts for the admin area and are equipped with corresponding passwords. Admin accounts can also change the password independently or upon request after an identity check. Changes to the project-specific data set by admins or users are logged with an extension for this purpose.

Measures of implementation of transfer control of data:

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- The transfer of project-specific data (CSV export) is encrypted via SSL/TLS and is only available to the project partner/coordinator after login as admin user. For public open data, an fully anonymized version is optionally possible.
- It is prohibited to send personal data within the company. Any employee who is authorized to view this data must do so with the appropriate security mechanisms and authentication at the platform's cloud provider.

Implementation of the input control:

- Project-specific personal data can only be entered by registered users. There is a role concept with a distinction between privileged users per project (in-app moderator users with rights to change project-specific data) and project admins (access to the data management interface). For this purpose, there is a clear and strict separation from the system admins, who have access to relevant areas of the infrastructure. Changes to the data set by admins or users are logged with an extension for this purpose. On the infrastructure side, there is an audit log with the cloud provider.

Measures to implement availability control:

- Technical measures are taken on the basis of the data centers of the cloud providers.
- On the system side, there are internal real-time warning systems that warn of failures or irregularities.

Measures to implement the separation requirement:

- The project-specific data can only be viewed in the administration interface by the project admins after logging in and are strictly separated from access by other projects.

Audit of processors with regard to compliance with the data protection principles:

- The platform has standard contractual clauses (SCC) in place with all external project-specific processors. More information and EU legislation on SCC: https://ec.europa.eu/info/law/law-topic/data-protection/international-dimension-data-protection/standard-contractual-clauses-scc_en

Procedures for restoring the availability of project-specific personal data after a physical or technical incident:

- Backups: complete database backups are made daily to provide the ability to quickly restore availability and access to personal data.
- Incident Response Management: Incidents are logged and documented in an internal ticket system. Actions are taken in an appropriate timeframe depending on the severity of the incident.

Substitution arrangements for the IT officers:

.....

- The IT team is well prepared to manage and maintenance the app tool-kit's IT infrastructure and to ensure adequate data protection levels, IT security and availability. If the IT manager is absent, the deputy IT manager can take over his or her duties.
- Those responsible for IT security are adequately trained and integrated into all company structures that deal with personal data.

Resilience of the systems:

- The cloud provider guarantees the resilience of the systems and services through the infrastructure. Stress tests of the project are carried out exclusively within the framework of the development process on own environments in order not to jeopardize the smooth running at the production level.

Other

- All employees who deal with personal data have been committed to data secrecy and have been trained in the handling of data.

The technical and organizational measures correspond to the current state of technical progress and are appropriate according to the defined protection goals and risk profile.

1.4. Anonymisation

Data will generally be anonymous if they cannot be used to identify a person by all means likely reasonably to be used (Article 29 Working Party on Data Protection, 2007, 2014, 2015). Assessment of all the means reasonably likely to be used must consider not only the data on its own but also the possibility of combination with other accessible data, including by third parties.

For the purposes of the **COSEA** app:

* User-control and full ownership of personal data by user: App users can independently from the project's team delete all personal information stored and anonymize the user account in the app's settings panel. This process is instant and allows full control and ownership by the user over personal data.

* Pseudonymization in user account creation: th COSEA app clearly supports and recommends pseudonyms at account creation for user input of usernames.

* Data export/Open data: when observational data records are provided as open data under the OpenDatabase License OdbL 1.0 as data exports, all user account related data fields are removed.

Anonymized data refers to data where direct and indirect personal identifiers have been removed. Anonymized data poses only a minimal risk of individual re-identification, in considering the context of the data's use and the means reasonably likely to be used to perform re-identification.

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1.5. Participants Consent

Consent as a legal basis would be applicable in the scope of the **COSEA** system, in particular when a user would like to use one of the data or services available. It is especially relevant when processing special categories of data. The procedures for valid consent collection will be integrated in the system itself, where the provision of each specific services requires a separate consent by the respective user. The platform's system is designed in a way that allows the users to easily withdraw their consent including the instant deletion of the user account and personal data. The informed consent for user account creation and services provision is provided at account registration. Terms of Use and a detailed privacy policy are in place to enabling informed capacity. Terms of Use of the Service: <https://www.spotteron.net/terms-of-use> - Privacy policy: <https://www.spotteron.net/privacy>

The **COSEA** tool is developed in a way that enables the users to input their data only once for account creation with editing capabilities and to permit its use by the different groups identified during the implementation of the project. Furthermore, the **COSEA** tool should be developed in a transparent way; it should permit persons to know how their information is used and to whom it is disclosed. CTN and SPOTTERON work together with the consortium to update this information in the course of the project and include it in the app's information section if changed/updated.

Additionally, the app allows users to get easy access to their processed data in the app's settings panel with instant export functionalities for a machine-readable copy of all data stored and processed in the COSEA project.

1.6. Ethical aspects in software

Design and usability are intrinsically linked. For example, in relation to the design of a user interface; poor design will render a system, application or device difficult and complicated to use, thereby hindering a successful deployment and uptake of the product. The SPOTTERON Citizen Science App platform provides a reliable and already-in-broad-use framework for quality design and usability, and data processing ethics. The first step in ethical computing is to not sell user data indirectly for the exchange for services, that are provided in form of a surveillance business model. Examples include analytic services or integrated social media buttons, that all are designed completely track user's behavior on the internet. The COSEA app and the SPOTTERON platform is consciously avoiding such harm to visitors and users of the software. Furthermore a defined approach for quality, performance and app safety results in a stable environment for user-driven and community-oriented participatory app platform. For the digital-social platform aspects included in the app, it is crucial to build infrastructure with an European (EU) hosting and service provision focus. SPOTTERON's ICT (Internet & Communication Tech.) infrastructure provides a stable & reliable environment for running interactive, community-driven Citizen Science applications & tools with transparent and strong digital privacy ethics, SSL/TLS encryption, and a focus on EU-based service providers. Service ethics also include not utilize indirect slavery e.g. if AI training tasks are included in projects. An integrated offline mode for both data submissions and map area download enables the use of the app independent from current connectivity in slow internet or no internet situations.

For data moderation and community content moderation, a data administration interface stands ready for the consortium with live data management, including also in-app options for

users to report comments and data spots to the admins. In the app's frontend user interface, users can freely decide to block/unblock content and other users to have an instant option for personal preference to have a safe and positive community experience in case of an abuse of the Service by another user. Incidents can be reported additionally via the support channels of the platform.

In terms of design, the COSEA app has a clear icon-supported navigation to best-possible be inclusive for all users. In the upcoming phased of the project, the app will be translated to all pilot area languages with the support of the native-speaking consortium members to enable language accessibility. Accessibility functions on smartphones built into the operating system (Android/IOS) can be used to support app usage, readability and more. In the future additional feature development can further support accessibility if additional needs emerge during the project. The apps are openly available on the app stores without cost barriers. For users without mobile devices, the web-application of COSEA allows participation even without smartphone or tablet simply via a browser. This multilevel participation availability reduces entry barriers. For participation, users can choose a user account type, which includes also options for not specified user types and also group accounts. These group accounts enable the use of COSEA on various devices simultaneously without direct identifiable personal data processed of single users. For age-group diversity in the project, the SPOTTERON platform already support parental/guardian consent functionalities with dynamic country-based age level configuration.

SPOTTERON utilizes a modular approach, which enables extending the platform's feature set with new functionalities, developed in projects. New features and functionalities are shared with all other projects on the platform without any extra development costs and can be used by new projects. By that principle, each project's needs and requirements extend the power of digital Citizen Science further, and by sharing developed functionalities, interactive mobile digital Citizen Science is strengthened both for participants and researchers. This digital collaborative "project ecosystem" enables all projects to use advanced features right from the start and empowers the Citizen Science Apps to build on each other to a level which one single project could never reach alone.

With the platforms established and practice-oriented approach on personal data protection and data ethics, the COSEA app is able to run on a user-respecting system with enhanced data privacy and ethics beyond basic requirements by GDPR. Without user tracking/user surveillance. The platform enables users to have full control about their personal data while offering state-of-the-art software as a service (SaaS) for interactive Citizen Science and user engagement with a defined focus on EU based solutions, extended functionality and design quality. Users on the platform are not treated as "products" or their data and their online behavior as payment alternatives for the "free" use of external software tools. With a clear policy for no-user-tracking/no-user-surveillance, COSEA provides a safe digital online space with integrated communication and community tools, that are built without user data monetization or tracking for both scientists, stakeholders and participants alike.
