

FUNDING AGREEMENT

between

THE UNIVERSITY OF STUTTGART

established in Keplerstr. 7, 70174 Stuttgart, Germany,
represented by its Chancellor Anna Steiger, (**"the University"**)

and

GEODETICCA VISION S.R.O.

established in Floriánska 19, 040 01 Košice, Slovak Republic,
represented by Marek Kožarík, (**"the Partner"**);

and

CENTRE OF OPERATIONS OF THE SLOVAK ACADEMY OF SCIENCES

established in Dúbravská cesta 9, 845 35 Bratislava 45, Slovak Republic,
represented by Nikola Kovaničová, (**"the Partner"**);

each a **"Party"** and together **"the Parties"**.

RECITALS:

- A. The University is the coordinator of a multi-partner project entitled **"FFplus – Fortissimo Plus"**, which project, pursuant to the Grant Agreement number 101163317 between the European High-Performance Computing Joint Undertaking (**"the JU"**) and the partners participating in the FFplus, (**"the FFplus Partners"**), has been funded under the European Community's Digital Europe Programme;
- B. Under, and as a project goal of FFplus, there is reserved an amount of grant funding to be distributed to eligible projects which have applied for and been awarded funding pursuant to open calls issued in the name, and pursuant to the project goals, of FFplus;
- C. The Partners (main participant – SMEs – and supporting participants) are part of a consortium of partners, (collectively **"the Consortium"**, and individually, each a **"Consortium Partner"**), which Consortium has submitted a proposal responding to the first open call, entitled **"First call for business experiments addressing the uptake of HPC by SMEs"**, identifier **"FFplus_Call-1-Type-1"** requesting funding for/towards the project entitled **"Foundation Model for Geospatial Analysis"**, (**"the Experiment"**), which Experiment, having been approved in accordance with the internal management process of FFplus, is now subject to receipt of an award of funding pursuant to this Funding Agreement, (**"the Award"**);

- D. It is a requirement of the Award that the Partners, as members of the Consortium, shall enter into this Funding Agreement in order to obtain Funding from FFplus for the purposes of conducting the Experiment.

ACCORDINGLY, THE PARTIES AGREE AS FOLLOWS:

1. DEFINITIONS

- 1.1 The terms already defined above shall be deemed to have been incorporated into this Funding Agreement. In addition, the terms below shall be interpreted as follows:

“Experiment” means the project described above, as more particularly detailed in the Proposal, (as defined hereunder), being a discrete, business-relevant sub-project activity designed to solve a business challenge, using advanced European HPC services and technologies to be undertaken by the Consortium.

“Main participant” is an SME (or a Start-up) that defines the business challenge being addressed in the Experiment.

“Supporting participants” are organisations supporting the main participant to complete activities foreseen for the Experiment.

“FFplus Consortium Agreement” means the agreement concluded in writing amongst the FFplus Partners, detailing their respective right and obligations regarding implementation of FFplus;

“Proposal” shall mean the proposal submitted by the Consortium (main and supporting participants) to FFplus Call-1-Type-1, seeking an award of funding, which Proposal is attached to this Funding Agreement as Part 1 of the Annex;

“Funding” shall mean the funding, as more particularly detailed in the Proposal, payable by the University to the Partners under and in accordance with this Funding Agreement;

“Annex” shall mean the Annex, in 3 Parts, annexed to, and which shall be deemed incorporated into, this Funding Agreement.

“Grant Agreement” means the Agreement between the European High-Performance Computing Joint Undertaking (“JU”) and the University for the project “Fortissimo Plus” (“FFplus”). The provisions necessary for the Funding are attached to this Agreement as Part 3 of the Annex.

2. THE EXPERIMENT

- 2.1 The Partners agree to undertake the Experiment as the same has been specified in the Proposal and in accordance with the requirements of this Funding Agreement. Any and all changes to proposed work or budget as described in the Proposal need a prior technical evaluation by the FFplus management and written consent of the University.
- 2.2 An excerpt from the FFplus Consortium Agreement is attached to this Funding Agreement as Part 2 of the Annex. The Partners shall comply with the terms of the Funding Agreement, as if the Project (as referred to in the FFplus Consortium Agreement), was the Experiment, and as if the Partners were the original signatories of the FFplus Consortium Agreement, so that the Consortium Partners shall, in relation to the Experiment be bound *mutatis mutandis* in the same terms as are the FFplus Partners

in relation to FFplus. In case of contradictions between the Funding Agreement and the FFplus Consortium Agreement excerpt, the Funding Agreement takes precedence over the FFplus Consortium Agreement excerpt.

Although the Consortium Partners shall have no direct contractual relationship with the JU, by virtue of this Funding Agreement and specifically this Clause 2.2, they shall be deemed bound to the University in the same way as the FFplus Partners are bound to the JU by virtue of their direct accession to the Grant Agreement, in order that there are equivalent and consistent provisions in place in relation to the expenditure of JU grant funding.

2.3 Publicly available results

2.3.1 The Partners agree that all results covered by section 2.3.2 will be made publicly available.

2.3.2 The Partners commit and agree to the provision of information and data required for the production of public success stories relating to the application experiment covered by this agreement. Such information and data include, but is not limited to, the following:

- a) Content of success stories written using dedicated document templates and guidelines provided by the FFplus Partners.
- b) Media content: At least four high-quality images of the experiment in high resolution (min 1200x800 px), .jpg or .png format, landscape position (team image, team at work, simulation/LLM model wireframe or screen, final product/service).
- c) At least 2 short videos/animations produced during the execution of the experiment in full-HD, min 1920x1080 px, .mp4 format, 30-60 fps, landscape position, introducing simulation/product development, LLMs visualization/graphic/model).
- d) Information about the organisations involved in the experiment, including: role of experiment partners (end-user, Software provider, domain or HPC expert, HPC provider), country of end-user, name of the software used, name of the industrial sector, suitable high-resolution logos, trademarks, short company description and names/functions of key persons.

The Partners consent to the use of all information and data for the purpose of project dissemination on a wider level, also beyond the project framework and lifetime, in different kinds of publications, newspapers, magazines and other print media, or electronic media (including the Internet), and/or in mailings for educational and awareness purposes.

2.4 The Partners allow the University to forward the Proposal to the members of FFplus Work Package 3 “Experiment and Innovation Studies Oversight” (being employees of the FFplus Partners, SCAPOS, ARCTUR, CINECA, CESGA, TERATEC, CYFRONET and USTUTT). The purpose is to facilitate the effective support and management of experiments and to ensure that the experiments proceed according to their objectives during the execution of the experiment’s work plan.

2.5 Experiment Reporting

- 2.5.1 Besides monthly reports updates for monitoring, the experiment partners will submit technical progress reports to the FFplus management at month 5, month 10 and a final report at the end of the experiment. An additional technical progress report by month 13 might be requested should the progress up to month 10 be assessed as unsatisfactory. A template will be provided, and the technical progress reports will cover results, challenges, risks and data management.
- 2.5.2 The Partners will duly submit their financial reports at month 6 and at the end of the experiment to the University, using the template provided. The financial report will cover all costs and must contain a breakdown of purchase and travel costs.
- 2.6 The Experiment will commence on January 1st, 2025 or once the Funding Agreement has come into effect (pursuant to clause 6.4), whichever point in time is later. The experiment will run for 15 months or until the end of the FFplus term, whichever point in time is earlier.
- 2.7 Consortium Partners acknowledge that the attendance to project meetings (e.g. initial Kick-Off) is mandatory.

3. THE FUNDING

- 3.1 It is a condition of the Award, and consequently any payment of Funding, that each Consortium Partner shall have signed this Funding Agreement. The University shall be under no obligation to the Partner or to the Consortium unless and until this Funding Agreement has been signed in accordance with the requirements stipulated by the University.
- 3.2 Experiment Partners should ideally use EuroHPC systems for the work. A decision not to apply for access to the EuroHPC systems should be duly justified. If approved, it is possible for access to HPC resources to be otherwise provided by the EuroHPC up to the amount specified in the estimated budget for the Experiment in the Proposal.
- 3.3 The budget for the Experiment has been included within the Proposal, along with the allocation amongst the Consortium Partners (main and supporting participants). The maximum amount of the Funding may not exceed EUR 150 000 for each Partner (in case of supporting participants, over all experiments in which they participate) and EUR 200 000 for the whole Consortium.
- 3.4 The payment of the Funding shall be deemed a grant and accordingly no VAT, unless it is non-deductible or non-refundable, or other purchase/sales or other tax shall be payable. The Funding is a maximum commitment and in no circumstances shall any further amount be payable, other than as expressly approved in advance, in writing, by the University. In case that it subsequently turns out that the Funding was subject to taxation, the Partners bear the tax liability.
- 3.5 The Partners shall be accountable to the University in relation to the Funding. The University shall be entitled to seek a breakdown of expenditure incurred and for which payment has been made by the Partners, to ascertain/ensure, (as the University shall determine in its sole discretion, although acting reasonably and in good faith), that the Partners has expended all Funding in accordance with the Proposal and the requirements of, or as are referred to in, this Funding Agreement.

- 3.6 The Funding will be paid by the University to the Partners, (which will provide the University with appropriate banking details to enable electronic transfer), in three instalments. The first tranche – or the pre-financing – of 50% shall be paid within thirty (30) days of the Partners signature of this Funding Agreement, provided that, as aforesaid, all Consortium Partners shall have signed this Funding Agreement. The second payment will be done in the 7th Month after Experiment commencement, upon previous submission of the financial report, and last tranche shall be paid within thirty (30) days of the Partners having provided the financial report as well as appropriate evidence, (as the University shall determine in its sole discretion, although acting reasonably and in good faith), that the Consortium Partners have properly provided the deliverables required for the full completion of the Experiment as specified in the Proposal.
- 3.7 For supporting participants, only engineering activities are eligible for funding. Activities such as business consultancy, marketing initiatives, administrative tasks, and other non-engineering activities are not eligible for funding.
- 3.8 In case the Partners receives excess or undue payment, the Party has to return the relevant amount to the University without delay.

4. OBLIGATIONS UNDER THE GRANT AGREEMENT

- 4.1 The Partners have to comply with the rules regarding grant and eligible and ineligible costs according to Articles 5 and 6 of the Digital Europe Programme (DIGITAL) General Model Grant Agreement and according to the eligibility conditions set up under the section “Funding, Eligibility Criteria & Obligations” in the Call Announcement, identifier FFplus-CALL1-Type-2.
- 4.2 The Partners are subject to the audit rights of the JU, the European Commission/Agency, the European Court of Auditors (ECA) and the European Anti-Fraud Office (OLAF). They have the right to carry out checks, reviews, audits and investigations on the Partners according to Article 25 of the Grant Agreement.
- 4.3 The JU and the European Commission/Agency shall have the right to carry out interim and final evaluations of the impact of the action at the Partner`s according to Article 26 of the Grant Agreement.
- 4.4 As regulated in Article 12 of the Grant Agreement the Partners have the obligation to avoid conflict of interests.
- 4.5 The Partners are bound by the confidentiality provisions as mentioned in Article 13 of the Grant Agreement.
- 4.6 The liability provisions in Article 33 of the Grant Agreement also apply for the Partners.

- 4.7 The University is entitled to verify compliance with the provisions of this section 4 in conjunction with the relevant Articles of the Grant Agreement. In case of breach of these obligations, the University may take appropriate action to reduce the Funding or terminate the participation of the Partners.
- 4.8 In case of non-compliance with the rules of Articles 5 and 6 of Digital Europe Programme (DIGITAL) General Model Grant Agreement and FFplus Grant Agreement, the Partners will indemnify the University against any and all claims regarding their grant and their eligible and ineligible costs.
- 4.9 For supporting participants, only engineering activities are eligible for funding. Activities such as business consultancy, marketing initiatives, administrative tasks, and other non-engineering activities are not eligible for funding.

5. TERMINATION

- 5.1 This Funding Agreement or the participation of one or more Partners may be terminated:
- (i) with immediate effect by the University, by the provision of notice in writing to the affected Partner(s), in the event that the Funding shall not be used for the purposes of the Experiment, (as the University shall in its sole discretion determine, acting at all times reasonably and in good faith); or
 - (ii) at the expiry of any reasonable period of notice, (as the University shall in its sole discretion determine, acting at all times reasonably and in good faith), provided in writing by the University to the affected Partner(s), within which notice the University shall have required that the Partner rectify any deficiency in the provision of the Experiment and which deficiency shall not have been so rectified to the reasonable satisfaction of the University; or
 - (iii) at the expiry of period of notice of two weeks, provided in writing by the University to the affected Partner(s), within which notice the University shall have required that the Partner(s) rectify any violations of the provisions of sections 2.3.1 and 2.3.2 of this Funding Agreement and which violation shall not have been so rectified according to the provisions of this Funding Agreement.
- 5.2 For the avoidance of doubt, the Consortium Partners are jointly and severally liable for technical completion of the Experiment, and therefore the technical responsibilities of each Consortium Partner cannot be seen in isolation. Accordingly, (and again for the avoidance of doubt), where the University shall terminate the participation of any one Consortium Partner within the Experiment, although this Funding agreement remains in force and the other Consortium Partners shall be entitled to request that the Experiment continue on the basis that it can be completed in accordance with the Proposal and within funding budget, the University nevertheless reserves the right to voluntarily terminate this Funding Agreement where in the opinion of the University, (as the University shall in its sole discretion determine, acting at all times reasonably and in good faith), the continuance of the Experiment no longer remains feasible.

- 5.3 In the event of termination of this Funding Agreement or the participation of one or more Partners pursuant to Clause 5.1 or 5.2, the University shall be entitled to recover from the Partners any part of the Funding which has not been spent or which the University shall, acting reasonably and in good faith as aforesaid, deem to have been misspent by the Partners.

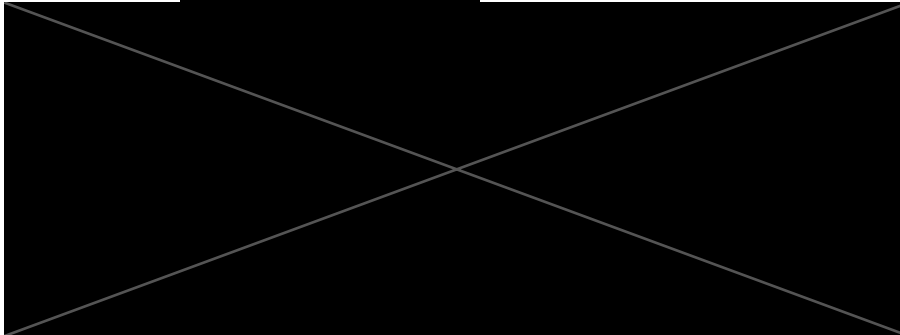
Further, where this Funding Agreement shall be terminated in any circumstance above listed, the University shall reimburse the Consortium Partners for any costs and/or expenses, properly incurred and which would have been reimbursable had this Funding Agreement not been so terminated.

6. MISCELLANEOUS

- 6.1 This Funding Agreement may be amended only by written agreement between the Parties.
- 6.2 Neither Party shall be entitled to assign any of its rights or obligations under this Funding Agreement without the prior written consent of the other.
- 6.3 Any reference in this Funding Agreement to the provision of a notice in writing shall include the provision of a hard copy notice and the provision of notice by electronic mail, (provided proof of despatch to an appropriate address), with, in either case, clear reference to this Funding Agreement and the Experiment.
- 6.4 This Funding Agreement becomes effective when signed by the University and the Partners. An electronic version of the signature is acceptable.
- 6.5 This Funding Agreement shall be interpreted in accordance with the law of Germany. The place of jurisdiction for any dispute arising out of or in connection with the Funding Agreement shall be Stuttgart, Germany.
- 6.6 This Funding Agreement prevents the participation of the main participants in the subsequent business experiment Fortissimo calls.

IN WITNESS WHEREOF this Funding Agreement has been executed by the Parties as follows:

On behalf of the University of Stuttgart

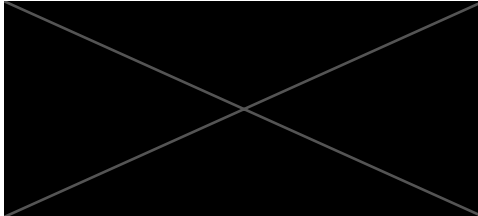


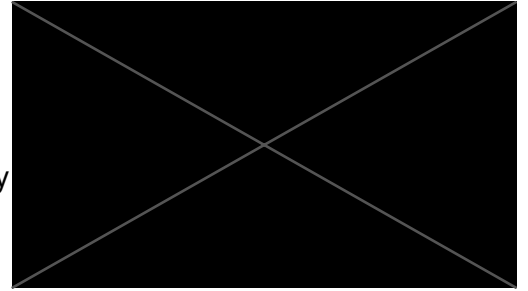
On behalf of GEODETICCA VISION s.r.o.

(Signature) _____ (Authorised signatory

(Name)

(Date)





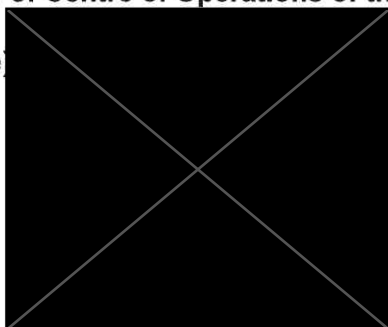
On behalf of Centre of Operations of the Slovak Academy of Sciences

(Signature)

(Authorised signatory)

(Name)

(Date)



ANNEX

This is the Annex, in 3 Parts, referred to in the foregoing Funding Agreement between the University of Stuttgart and GEODETICCA VISION s.r.o. and Centre of Operations of the Slovak Academy of Sciences.

Part 1 – The Proposal

Proposal to FFplus Project Call-1 – Type-2: *Innovation Studies for the Development of Generative AI Models* Part A

Call Information:

Identifier: FFplus_Call-1-Type-2

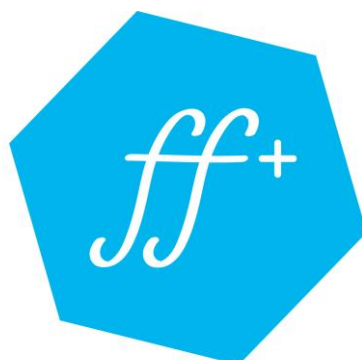
Call title: First call for innovation studies for the development of generative AI models

Project full name: Fortissimo Plus

Acronym: FFplus

EuroHPC Project 101163317

Deadline: September 4th, 2024, at 17:00 Brussels local time



FORTISSIMO

PLUS

Foundation Model for Geospatial Analysis

Name of the coordinating person:

Mr. Marek Kožarík, GEODETICCA VISION

E-mail: kozarik@geodeticca.sk

No.	Participant organisation name	Participant short name	Country
1	GEODETICCA VISION s.r.o.	GVIS	Slovakia
2	Centre of Operations of the Slovak Academy of Sciences	COO SAS	Slovakia

No.	Participant short name	SME (yes/no)	PIC ¹	Role in the Consortium (Main Participant, Application Expert, HPC Expert, Other)
1	GVIS	YES	895881428	Main Participant
2	COO SAS	NO	937100026	HPC Expert

Were similar or related activities (*) funded through other European Commission or national research project funding?

☐ Yes

☒ No

If yes: please provide details (project name and funding programme).

¹ Participant Identification Code (PIC): To obtain a PIC, register at <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/how-to-participate/participant-register>. Please note that having a PIC is not a requirement of the call.

Feedback to the project

In order to better support the general broadening of SME exploitation of HPC services and technologies, FFplus plans to organise a number of surveys to identify and collect SMEs needs. Please indicate if you would be willing to be approached and provide responses to such surveys:

☒ Yes

☐ No

It should be noted, that the response to this question has absolutely no influence on the evaluation of the proposal.

How did the Consortium participants become aware of the FFplus Open Call?

(Please tick all options that apply)

- ☐ FFplus Web-site
- ☐ Electronic Media
- ☐ Webinars and presentations
- ☐ Other media
- ☒ Personal Contacts
- ☐ Other

Please list:

Please list:

Please describe

Please describe: Via colleagues from COO SAS

Please describe

Statistical Information

1 Participant (Organisation name)	2 Country	3 Type (SME /MID /IND / AC / OTHER)	4 First EU project? (Y/N)	5 PIC	6 Funding requested	7 Total costs
GEODETICCA VISION	SK	SME	N	895881428	152 680 €	152 680 €
Centre of Operations of the Slovak Academy of Sciences	SK	OTHER	N	937100026	63 500 €	63 500 €
TOTAL					216 180 €	216 180 €

Call Information:

Identifier: FFplus_Call-1-Type-2

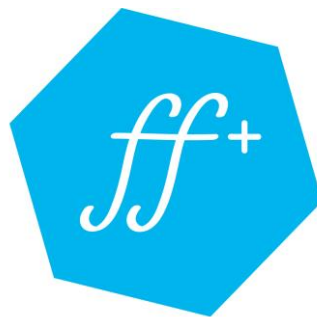
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FORTISSIMO
PLUS

Foundation Model for Geospatial Analysis

Name of the coordinating person:

Mr. Marek Kožarík, GEODETICCA VISION

E-mail: kozarik@geodeticca.sk

Summary

GEODETICCA VISION proposes to enhance its **CARTOGRAPHER** platform [<https://cartographer.ai/>] by developing a new foundation model for advanced geospatial data analysis. CARTOGRAPHER helps users like government agencies, environmental organizations, municipalities, and businesses manage and convert satellite/aerial imagery into topologically clean vector data, enabling data-driven decision-making. The platform already uses AI to extract and vectorize features such as buildings and roads.

This project will develop a **foundation model** pre-trained on high-resolution satellite and aerial imagery, using **generative AI** for tasks like **segmentation** and **vectorization**, with potential extensions to **improve image resolution** (super-resolution), create synthetic labeled datasets, and address data gaps.

While foundation models like the **Clay Foundation Model** [1] and **Prithvi** [2] have shown efficiency in **reducing the need for extensive labeled data**, they have primarily addressed lower-resolution geospatial data. Our project aims to fill this gap by leveraging large-scale **European HPC** resources to develop a model specifically for **high-resolution geospatial data**. This enhanced model will be integrated into CARTOGRAPHER, improving its performance with minimal labeled data.

By focusing on high-resolution geodata and incorporating generative AI, this project will make CARTOGRAPHER **faster, more cost-effective**, and **adaptable to diverse regions**, thereby expanding GEODETICCA VISION's reach in the geospatial analytics market.

Industrial relevance, potential impact and exploitation plans

BUSINESS PROBLEM AND THE ROLE OF THE FOUNDATION MODEL

The geospatial industry is increasingly using AI for automated data analysis but processing large and complex datasets from different regions is still a major challenge. **Current AI models need a lot of labeled data to work accurately**. This requirement raises costs and slows down the time required to deploy solutions. Additionally, these models often struggle to work well across different geographic regions, limiting their usefulness.

Foundation models offer a **solution** to this challenge by reducing the dependency on large volumes of labeled data through extensive pre-training on diverse datasets. Our foundation model, specifically designed for **high-resolution** geospatial data, provides several key advantages:

- **Reduced Training Costs:** The extensive pre-training reduces the amount of labeled data needed for later tasks, which lowers the costs of data labeling and training.
- **Scalability:** The model can be fine-tuned for any region, regardless of its geographic features, making it applicable across different environments.
- **Faster Deployment:** With less need for labeled data and pre-training on high-resolution imagery, the model can be deployed more quickly, allowing customers to see results sooner.

The development of this new model is crucial because existing models like Clay [1] and Prithvi [2] are not fully capable of handling the wide variety of high-resolution geospatial data and diverse geographic regions, particularly within Europe, that our customers require. Prithvi is optimized for low-resolution data, while Clay, though supporting high-resolution data, lacks

sufficient European regional coverage. This foundation model is designed to overcome these limitations by incorporating a rich dataset that includes comprehensive coverage of high-resolution European geospatial data. By addressing these specific challenges, this model becomes a necessary advancement for our platform, enhancing its ability to provide precise and adaptable solutions across diverse and high-demand regions.

BUSINESS MODEL AND HPC EXPERIENCE

IDENTIFICATION AND ANALYSIS OF COMPETITION

Market leader in automated vectorization is **Ecopia.AI** - ranking 5th on Deloitte's Technology Fast 50™, a ranking of the 50 fastest-growing technology companies in Canada. Vectorization is also offered by AIRBUS OneAtlas from analytic toolbox using Pleiades 50cm GSD imagery. On 04 March 2021 **Ecopia** and **AIRBUS** announced **partnership** and Ecopia Vector Maps are available within the Airbus **OneAtlas** Platform **upon request**. So, it is a **semiautomatic process** with **manual quality control** and **editing**. With ever-growing satellite imagery availability, we see business opportunity with different approach offering customers possibility to automatically extract vector objects and then **make post-processing** (manual quality control and editing) **by themselves** - which **brings the costs down significantly**. **Automated extraction** as well as **manual post-processing** will be done in **CARTOGRAPHER** by customer himself with possibility of **simultaneous multi-user collaborative work** multiple people on one project.

BLUE OCEAN STRATEGY

We apply the BLUE OCEAN STRATEGY when analyzing the competition and designing our innovative value proposition and subsequent business model.

Our BLUE OCEAN STRATEGY eliminates the costly and time-consuming quality control and manual editing process, which is a major scaling bottleneck due to its reliance on extensive manpower. Instead of maintaining a fluctuating internal workforce, we offer a user-friendly interface that allows customers to perform quality control and editing themselves, parallelizing the process to reduce delivery time significantly. Customers can opt to self-manage (similar to IKEA) or use third-party services (like UBER or BOLT), leveraging shared economy principles. This **strategy eliminates major variable costs**, enabling us to **lower prices** and **reduce delivery times** from days/weeks to minutes/hours.

Customers can **easily generate vector maps** via the CARTOGRAPHER web app, with a simple registration process that includes time-limited credits to encourage use of automated vectorization. By **involving customers in creation**, we **gather valuable insights** into their needs through support channels and usage data. Our scalable cloud backend ensures **on-demand service in near real time**. Integration with [geoportal](#) allows customers not only to **buy but also sell data**, broadening market reach to architects, designers, cities, municipalities, and governments by consolidating relevant open and paid data sources.

VALUE PROPOSITION and BUSINESS MODEL CANVAS

Our value proposition is shaped by the **Blue Ocean Strategy Canvas** (Fig.1) and the Value Proposition Canvas, which aligns our offerings with customer needs. It consists of two key parts: the Customer Profile, identifying customer jobs, pains, and gains, and the Value Map, detailing products/services, pain relievers, and gain creators. By aligning these elements, we can design offerings that meet customer needs and stand out from competitors.

This approach feeds into the **Business Model Canvas** (Fig.2), where the Customer Profile defines our target segments, and the Value Map specifies our value proposition—forming the

core of our business strategy. The Business Model Canvas is then refined and tested to ensure a strong product-market fit.

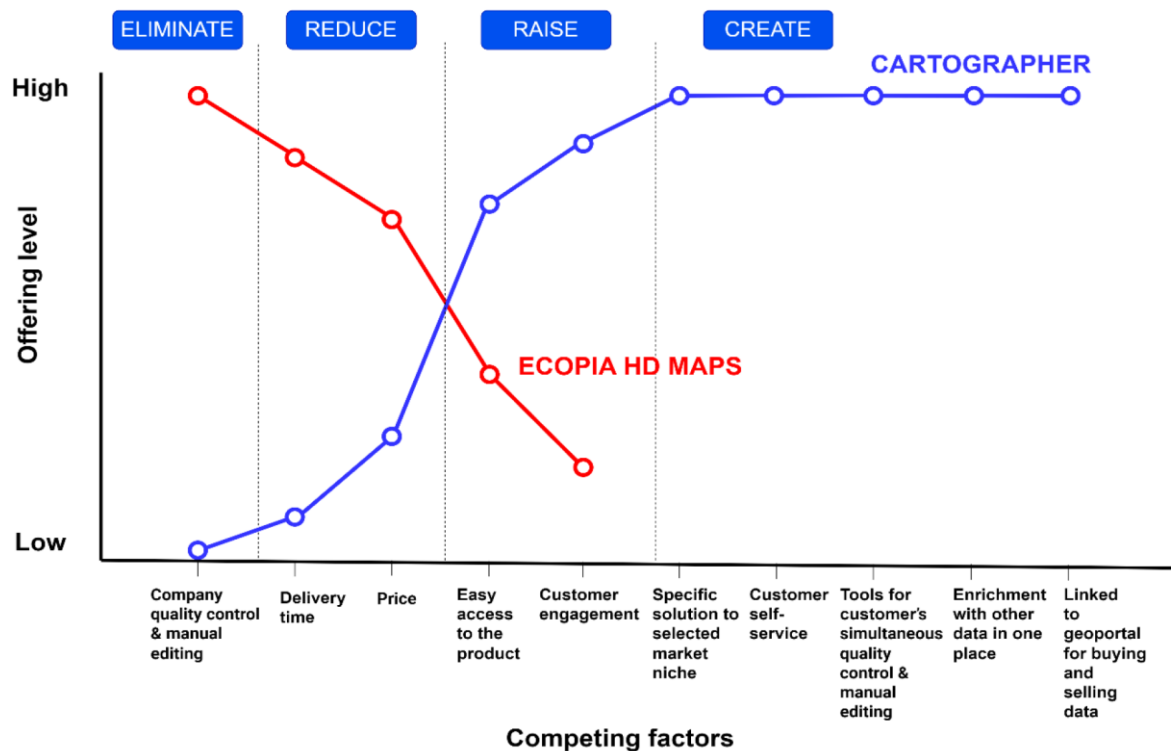


Fig.1 Blue Ocean Strategy Canvas

BUSINESS MODEL

KEY PARTNERS Satellite and Aerial Imagery Providers: Collaborating with leading data providers ensures access to the freshest and most detailed imagery available, crucial for delivering up-to-date maps and analyses. Academic Institutions: Forming partnerships with universities and research organizations for collaborative projects, access to cutting-edge research, and tapping into emerging talent in geospatial sciences. Industry Organizations and Professional Associations: Engaging with professional bodies keeps Cartographer aligned with industry standards, trends, and best practices, enhancing credibility and market reach.	KEY ACTIVITIES Marketing and Sales Efforts Community Engagement Continuous Improvement Creation of New Training Sets Creation of Models for Vectorization KEY RESOURCES Robust Cloud Infrastructure Advanced AI and Machine Learning Algorithms Skilled Development, GIS, Marketing and Sales Team Input Data (Orthophoto) Training Data for AI Models	VALUE PROPOSITION Cartographer offers an innovative cloud-based platform that transforms satellite/aerial imagery into actionable, vectorized topologically clean GIS data with speed, efficiency, and high accuracy . The platform enables real-time collaborative mapping and geospatial analysis, making it a powerful tool for a wide range of users from urban planners to environmental scientists. Up-to-date land cover data quickly and affordably in one place with all open source data along with import and export geodata in CAD and GIS formats for interoperability and easy integration into customer's pipelines .	CUSTOMER RELATIONSHIPS Dedicated support teams to assist customers with onboarding, training, and technical issues. Community forums and user groups to encourage feedback, share use cases, and foster a user community. Regular updates and feature releases based on user feedback and emerging market needs. CHANNELS Direct sales through the Cartographer.ai website Partnerships with satellite imagery providers to bundle Cartographer.ai as an added service. Collaboration with educational institutions for research and academic purposes. Engagement in trade shows, webinars, and industry conferences to showcase capabilities and network with potential clients.	CUSTOMER SEGMENTS Government Agencies and Municipalities: For urban planning, illegal buildings detection, real estate tax evasion, environmental monitoring and infrastructure development. Environmental Organizations: For tracking changes in land use, deforestation, and environmental conservation efforts. Architecture, Design, Construction and Real Estate: For site analysis, planning, and development. Agriculture: For crop monitoring, land use planning, and precision farming. Academia and Research Institutions: For geographical research, studies, and educational purposes.
COST STRUCTURE Software Development and Maintenance Cloud Hosting, Data Storage, and GPU Computing Creation and Enhancement of AI Models Marketing and Sales Activities Operational Expenses		REVENUE STREAMS Subscription Model: Monthly or annual subscriptions offering access to Cartographer's features, with tiered pricing based on usage levels, data storage, and the number of users. Pay-per-Use: For customers with sporadic needs, charging based on the amount of data processed or the specific features used. Enterprise Solutions: Customized offerings for large organizations, including dedicated servers, enhanced security features, and bespoke functionality. Training and Consultation: Providing training sessions, workshops, and consultation services.		

Fig.2 Business Model Canvas

VALUE PROPOSITION EXTENDED by FOUNDATION MODEL and EXPECTED BUSINESS IMPACT

To enhance CARTOGRAPHER, we aim to integrate a foundation model into its training pipeline. This model, pre-trained on high-resolution satellite and aerial imagery, will be fine-tuned for specific tasks like segmentation, vectorization, and super-resolution—enhancing lower-resolution images to meet applications requiring fine details. This integration will yield faster training, lower costs, and adaptable solutions, extending CARTOGRAPHER's capabilities.

Key Value Propositions:

- **Faster Training and Deployment:** Leveraging pre-trained high-resolution imagery reduces the need for extensive labeled data, cutting training costs and accelerating deployment.
- **Cost Efficiency:** Less reliance on labeled data allows us to offer affordable AI-driven solutions to a broader range of customers, from small municipalities to national governments.
- **Global Flexibility:** Pre-training across diverse geographic areas makes the model adaptable to different regions and tasks, enhancing market versatility.
- **Generative Capabilities:** The foundation model's location-encoded data can generate additional labeled datasets, particularly beneficial in regions with scarce labeled data.

This innovative solution, benefiting from access to large-scale computational European resources and from **successful past collaborations**, such as the one with **Slovak National Supercomputing Center** [3], will streamline vector data generation, reduce labeling needs, and enhance CARTOGRAPHER's adaptability.

EXPLOITATION PLANS

Our target market is showing extraordinarily strong growth [4]. It means there is very strong demand for solutions like our CARTOGRAPHER. Our strategy includes enhancing CARTOGRAPHER's features, expanding into new markets, and strengthening our subscription model. The foundation model will enable us to:

- **Broaden Offerings:** Develop new features serving diverse industries and regions.
- **Expand Market Reach:** Adapt to new geographic areas and sectors.
- **Enhance Subscription Services:** Provide continuous updates and improvements.
- **Strategic Partnerships:** Collaborate with satellite data providers for comprehensive geospatial solutions.

By integrating this model, we aim to reduce costs, speed up deployment, and expand our market presence, supporting GEODETICCA VISION's long-term growth.

Description of the work plan, technological/algorithmic approach and software development strategy

1. Project Objectives and Action Plan

This project **aims to develop a foundation model** that enhances the capabilities of our CARTOGRAPHER platform by addressing key challenges in geospatial data analysis.

- 1.1. Development of a Foundation Model:** A Vision Transformer (ViT) trained with a Masked Autoencoder (MAE) approach will serve as the foundation model. This will improve the accuracy and efficiency of geospatial data analysis by leveraging pretrained weights, minimizing the need for extensive labeled datasets, and surpassing traditional CNN-based approaches.

- 1.2. Fine-Tune for Downstream Tasks:** The model will focus on the segmentation and vectorization of roads and buildings, achieving high accuracy with shorter training times and less labeled data, compared to both training from scratch and traditional CNN approaches.
- 1.3. Utilize HPC Resources for Model Development:** Leveraging large-scale European HPC resources will ensure that the foundation model is trained and fine-tuned efficiently, enabling it to scale and perform well in advanced geospatial analysis tasks required by CARTOGRAPHER.

2. ML Lifecycle

The development of the foundation model follows a structured ML lifecycle:

- 2.1. Data Acquisition and Preprocessing:** We will utilize publicly available WMS/WCS services across Europe and high-resolution datasets from NAIP (USA) and LINZ (New Zealand). Preprocessing will involve normalization, mosaicking, and patch generation, with data versioned using DVC for secure storage.
- 2.2. Model Development and Pretraining:** The foundation model will be based on a ViT architecture with an MAE approach, trained on large-scale HPC resources. The model will focus on reconstructing missing data patches, capturing complex spatial, spectral, and temporal patterns.
- 2.3. Fine-Tuning for Downstream Tasks:** Privately labeled datasets, specifically curated for building and road segmentation and vectorization, will be used for fine-tuning the pretrained model. This approach ensures high accuracy and significantly reduces training time by leveraging data that is tailored to our specific application needs.
- 2.4. Ethical Considerations and Compliance:** Diverse sampling strategies will mitigate geographic or demographic biases. Transparency will be ensured through comprehensive documentation and model cards. The project will also adhere to GDPR and other relevant regulations.

3. Training Dataset Description and Availability

3.1. Data Sources:

- **LINZ (New Zealand):** High-resolution aerial imagery, publicly accessible.
- **NAIP (USA):** Nationwide high-resolution imagery from Data.gov.
- **European Geoservices (INSPIRE EU Project):** High-resolution orthoimagery from multiple European countries, available via WMS/WCS interfaces.

- 3.2. Data Preprocessing:** Raw tiles will be divided into 224x224 patches and organized by region. Preprocessing, including normalization and mosaicking, will utilize HPC resources for faster processing. The final dataset will include around 200 million patches, totaling 80TB of data.
- 3.3. Sampling Strategy:** Sampling will leverage ESA WorldCover for diverse land cover types, capture varied landscapes in NAIP and LINZ datasets, and include additional samples from regions with high land cover diversity to ensure comprehensive coverage.
- 3.4. Demonstration of Availability:** All data sources are publicly accessible with clear licensing, ensuring comprehensive geographic coverage for effective model generalization across regions and tasks.

4. Model Characteristics and Repercussions to Training and Exploitation

4.1. Model Architecture:

- **Vision Transformer (ViT) with MAE:** Designed for high-resolution geospatial data, capturing spatial, temporal, and spectral relationships through dynamic embedding blocks and encoding.

4.2. Input and Output Specifications:

- **Input Size:** 224x224 pixel patches with RGB and NIR channels.
- **Output:** Reconstructed patches during pretraining; embeddings or predictions during fine-tuning.

4.3. Training Strategy:

- **Loss Functions:** Reconstruction loss and representation loss during pretraining, with task-specific loss functions (e.g., cross-entropy, IoU) during fine-tuning.
- **Optimization:** AdamW optimizer with a Cosine Annealing schedule and regularization techniques to prevent overfitting.

4.4. Model Size and Complexity:

- **200 Million Parameters:** Balances expressiveness and efficiency, optimized by HPC resources.

4.5. Training and Scalability:

- **Training Efficiency:** Initial training time increases, but fine-tuning is faster, supporting scalable model development for large-scale geospatial data.

4.6. Exploitation and Deployment:

The model is designed to achieve the same performance as those trained from scratch or on ImageNet weights, but with shorter training time and less labeled data, and is expected to outperform CNN models trained solely on ImageNet weights.

4.7. Ethical and Trustworthiness Considerations:

Ethical considerations will be addressed by mitigating biases through diverse data sampling and ensuring transparency with comprehensive documentation and model cards, in line with EU guidelines for trustworthy AI.

5. Performance Metrics, Benchmarks, and Reproducibility

5.1. Performance Metrics:

- **Pretraining Metrics:** Reconstruction loss and visual quality.
- **Downstream Task Metrics:** IoU for segmentation; accuracy, precision, recall, F1-score for classification

5.2. Benchmarks and Baselines:

- **Baseline 1:** Comparison against ViT models pretrained on ImageNet.
- **Baseline 2:** Comparison against randomly initialized models to quantify the benefits of pretraining.
- **Baseline 3:** Comparison against traditional CNN models (e.g., ResNet, UNet) for segmentation.

5.3. Reproducibility:

Reproducibility will be ensured through version control with Git, data management via DVC [5], experiment tracking with tools like Weights & Biases (WandB), consistent environments using Docker, and cross-validation for robust, generalizable results.

6. Risk Identification and Mitigation Strategies

Geospatial bias will be mitigated through diverse sampling, ensuring balanced representation. Transparency risks from the complexity of the ViT architecture will be addressed with detailed documentation and model cards. To manage data quality risks, rigorous preprocessing and quality checks will standardize inputs. Ethical considerations will be handled by establishing clear guidelines and engaging stakeholders to ensure responsible use in sensitive applications.

7. Development of a Foundation Model for Geospatial Analysis

PERSONAL MATRIX							
Main participant (GEODETICCA VISION)							
Name	Marek Kožarík	Patrik Sabol	Juraj Malega	Martin Lazarik	Jozef Filep	Marek Jasaň	Michal Nemčík
Role	Project manager	ML Engineer	Geospatial Analyst	Data Management Expert	Labeling and Validation Specialist	Backend Software Engineer	Frontend Software Engineer
Supporting partner (Computing centre of Slovak Academy of Sciences)							
Name	Michal Pitoňák	Bibiána Lajčinová					
Role	HPC expert	AI Developer					
DESCRIPTION							
<ul style="list-style-type: none"> ▪ Purpose: Develop a foundation model using a Vision Transformer (ViT) trained as a Masked Autoencoder (MAE) to enhance geospatial data analysis capabilities within the Cartographer platform. ▪ Scope: The project covers data acquisition, preprocessing, model development, pretraining, fine-tuning for downstream tasks, and compliance with EU guidelines for trustworthy AI. ▪ Key Objectives: <ul style="list-style-type: none"> ○ Efficiently train and fine-tune the model using European HPC resources. ○ Achieve higher accuracy in downstream tasks compared to models trained from scratch or using ImageNet weights. ○ Ensure model scalability, transparency, and ethical compliance. ▪ Expected Outcomes: <ul style="list-style-type: none"> ○ A pretrained, scalable foundation model, along with fine-tuned models integrated into the Cartographer platform, ready for various geospatial analysis tasks. ○ Concrete deliverables including preprocessed datasets, pretrained models, and performance reports. ○ A pre-final results and impact report by Month 7, guiding the potential extension of the study. 							
WORKPLAN							
<p>Task 1: Project Management and Oversight [Start: T0; End: T0 +10 Months]</p> <p>Task Description: The Project Manager will oversee project progress, ensure alignment with goals and timelines, address blockers, and maintain communication across roles, adjusting plans as necessary.</p> <p>Deliverable: Regular progress reports, updated project plan as needed, and ensuring alignment with project goals throughout the project duration.</p> <p>Associated roles:</p> <ul style="list-style-type: none"> ▪ Project manager [2 PM overall] <p>Task 2: Data Acquisition and Preprocessing [Start: T0; End: T0 +2 Months]</p> <p>Task Description: Collect and preprocess geospatial data from publicly available sources. Implement parallel processing techniques using HPC resources for tasks like normalization, mosaicking, and</p>							

patch generation to enhance efficiency. Optimizing data format for efficient loading during training.

Deliverable:

Preprocessed and structured dataset ready for model training (Month 2).

Associated Roles:

- **Geospatial Analyst [2 PM]:** Acquire datasets and coordinate preprocessing.
- **ML Engineer [1 PM]:** Optimize data format for dataset.
- **AI Developer [1 PM]:** Assist with optimizing preprocessing algorithms and data handling pipelines for AI model training.
- **Data Management Expert [2 PM]:** Ensure secure data storage and versioning.
- **HPC Expert [1 PM]:** Optimize and parallelize preprocessing tasks using HPC.

Task 3: Model Development and Pretraining [Start: T0; End: T0 + 4 Months]

Task Description:

Develop and pretrain the foundation model using a Vision Transformer (ViT) architecture with a Masked Autoencoder (MAE) approach. This will involve leveraging large-scale European HPC resources to handle the computational complexity.

Deliverable:

Pretrained foundation model with initial performance metrics (Month 4).

Associated Roles:

- **ML Engineer [3 PM]:** Leads the design and implementation of the model architecture
- **AI Developer [3 PM]:** Develop, validate and test the pretraining algorithms
- **HPC Expert [2 PM]:** Manages HPC resource allocation and optimization.

Task 4: Fine-Tuning for Downstream Tasks [Start: T0 + 4 Months; End: T0 + 6 Months]

Task Description:

Fine-tune the pretrained foundation model for specific tasks of segmentation and vectorization, using smaller labeled datasets. Cross-validation and performance testing will be conducted to ensure the model's robustness.

Deliverable:

Fine-tuned models for key geospatial tasks, along with performance evaluation reports (Month 6).

Associated Roles:

- **ML Engineer [2 PM]:** Lead the adaptation and modification of the pretrained model
- **AI Developer [2 PM]:** Debug and optimize the model performance for specific tasks.
- **Labeling and Validation Specialist [2 PM]:** Provides labeled data and interprets results.

Task 5: Pre-Final Results and Impact Report [Start: T0 + 6 Months; End: T0 + 7 Months]

Task Description:

Compile an intermediate report summarizing the results achieved, expected outcomes, and potential impact on the SME's business model and third-party users. This report will determine eligibility for extending the innovation study.

Deliverable:

Pre-final results and Impact Report (Month 7).

Associated Roles:

- **ML Engineer [1 PM]:** Report on model development and optimization
- **AI Developer [1 PM]:** Cover debugging and performance evaluation
- **Geospatial analyst [1 PM]:** Summarize data acquisition and preprocessing
- **Data Management Expert [1 PM]:** Outline data storage and versioning
- **HPC Expert [1 PM]:** Provide HPC resource usage details.
- **Labeling and Validation Specialist [1 PM]:** Report on labeled data and model validation

Task 6: Integration of Fine-Tuned Model into Cartographer [Start: T0 + 7 Months; End: T0 + 10 Months]

Task Description:

Integrate the fine-tuned model into the Cartographer platform, ensuring seamless functionality and optimization for geospatial analysis tasks, including developing interface that allows communication between the model's output and backend infrastructure.

Deliverable:

Fully integrated fine-tuned model within the Cartographer platform (Month 10).

Associated Roles:

- **Frontend Software Engineer [1.5 PM]:** Implements the user interface components for the integrated model.
- **Backend Software Engineer [2.5 PM]:** Develops and optimizes the backend infrastructure to support model integration.
- **ML Engineer [2 PM]:** Ensures the model's fine-tuning and integration meet performance and accuracy standards.
- **AI Developer [2 PM]:** Develop an interface between model and backend infrastructure.

Task 7: Finalization and Data Management Plan [Start: T0 + 9 Months; End: T0 + 10 Months]

Task Description:

Finalize the project by ensuring all tasks are completed and the data management plan is fully implemented. The plan will cover:

- **Data Access and Usage:** Establish role-based access controls and usage guidelines.
- **Data Sharing:** Implement secure sharing protocols with open access where possible.
- **Data Retention and Disposal:** Define retention periods and secure disposal methods.
- **FAIR Principles:** Ensure data is Findable through rich metadata and unique identifiers, Accessible under clear access conditions, Interoperable using standardized formats, and Reusable with detailed metadata and licensing.

Deliverable:

Final project deliverables, including the data management plan and final model versions (Innovation Study Month 10).

Associated Roles:

- **Data Management Expert [1 PM]:** Leads the finalization of the data management plan.
- **ML Engineer [1 PM]:** Ensures all model-related tasks are completed and documented
- **AI Developer [1PM]:** Assists in finalizing model output
- **Geospatial Analyst [1 PM]:** Verifies data accuracy and completeness for final datasets
- **Labeling and Validation Specialist [1 PM]:** Ensures validation processed and results are documented
- **HPC Expert [1 PM]:** Provides a summary of HPC usage and optimization for the final report
- **Frontend Software Engineer [0.5 PM]:** Finalizes and documents UI components related to model integration
- **Backend Software Engineer [0.5 PM]:** Finalizes and documents backend infrastructure

IMPACT AND OUTPUTS

The OUTPUT of the innovation study will be:

- **Preprocessed Geospatial Dataset:** A ready-to-use, high-resolution dataset for machine learning.
- **Pretrained Foundation Model:** A Vision Transformer-based model pre-trained using a Masked Autoencoder approach, optimized for geospatial data.
- **Fine-Tuned Models:** Models fine-tuned for segmentation tasks within the CARTOGRAPHER platform.

- **Pre-Final Results Report:** A progress report by Month 7, detailing results and projected impacts.
- **Data Management Plan:** A plan ensuring compliance with FAIR principles and EU data guidelines.

The RESULTS of the innovation study will be:

- **Enhanced Platform Capabilities:** Improved geospatial analysis features, boosting Cartographer's market competitiveness.
- **Efficiency Gains and Scalable Solutions:** Faster, resource-efficient model development, with models that generalize well across various geospatial tasks.

Main participant (GEODETICCA VISION)								
Name	Marek Kožarík	Patrik Sabol	Juraj Malega	Martin Lazorik	Jozef Filep	Marek Jasaň	Michal Nemčík	TOTAL
Effort (PM)	2	10	4	4	4	3	2	29
Supporting partner (Centre of Operations of the Slovak Academy of Sciences)								
Name	Michal Pitoňák	Bibiána Lajčinová						TOTAL
Effort (PM)	5	10						15
TOTAL								44

PM = Person Months

QUALITY OF THE CONSORTIUM AS A WHOLE AND OF THE INDIVIDUAL PROPOSERS

The **consortium has proven its effectiveness** through a successful collaboration on a previous project, where we implemented an advanced semi-supervised learning method for building extraction from aerial images [3]. This project utilized high-performance computing (HPC) to significantly enhance the accuracy and efficiency of geospatial data processing. The work, originally conducted in partnership with the Slovak National Supercomputing Center, was carried out by individuals who are now affiliated with the Centre of Operations of the Slovak Academy of Sciences.

MAIN PARTICIPANT: GEODETICCA VISION s.r.o.

- **Role:** GEODETICCA VISION, a leading SME in geospatial solutions, will oversee the entire project, coordinating with supporting participants, managing resources, and ensuring timely delivery of milestones. The company will lead the development and integration of the foundation model into the CARTOGRAPHER platform.
- **Capabilities:** With over 15 years of experience in geospatial technologies, GEODETICCA VISION specializes in geospatial data, software development, GIS, machine learning, and large-scale data processing. Their flagship platform, CARTOGRAPHER which has been developed with ESA support, already demonstrates their expertise in AI-driven geospatial data processing.
- **Key Staff**
 - **Marek Kožarík (Project Manager)**
Oversees the entire project, manages timelines, resources, and ensures successful delivery of milestones. Marek holds a master's degree in Geodesy & Cartography from STU Bratislava and PhD in Geodesy and Mining Surveying from TU Košice and he's leading 3 ESA projects as a Prime contractor and as Subcontractor he's leading his team in 2 ESA project. Marek is a Certified PRINCE2 project manager and Chartered Geodesist

and Cartographer. As CTO and CEO of Geodeticca Vision he has led many development projects regarding technology and its transformation to the business products.

- **Patrik Sabol (Machine Learning Engineer)**
Leads the development and integration of the foundation model, specializing in AI applications for geospatial data. Patrik holds a PhD in Artificial Intelligence from TUKE Kosice and focuses on automating geospatial data analysis. He is responsible for multiple projects within the company, including leading a collaboration with the Slovakia HPC Center, where he worked on scaling up training to high-performance computing devices. His work includes applying AI techniques to enhance geospatial processes.
- **Other staff and their roles**
 - **Juraj Malega (Geospatial Analyst):** Ensures data accuracy and prepares geospatial data for AI model training and validation.
 - **Martin Lazorik (Data Management Expert):** Manages data organization, storage, and pipeline integrity throughout the project.
 - **Jozef Filep (Labeling and Validation Specialist):** Oversees data labeling and validates AI model outputs against ground truth data.
 - **Michal Nemčík (Frontend Software Engineer):** Designs and integrates user interfaces for CARTOGRAPHER to ensure a seamless user experience.
 - **Maroš Jasaň (Backend Software Engineer):** Develops and optimizes backend services and APIs for integrating the model into CARTOGRAPHER.

SUPPORTING PARTNER: Centre of Operations of the Slovak Academy of Sciences (COO SAS), organizational unit Computing centre of the Slovak Academy of Sciences (CC SAS)

- **Role:** COO SAS is the only provider of high-performance computing (HPC) resources on a national level in Slovakia. It has high level of maturity in HPC+ and HPC services, experience in international projects (EuroCC 1, EDIHs) and organizations (PRACE, EuroHPC JU) as well as in supporting users from non-academic sectors. COO SAS is a supporting partner in this project, with its primary role being to help develop the foundation model with a focus on HPC capabilities, parallelism, and deployment on large-scale HPC resources.
- **Capabilities:** In the position of a national HPC centre, COO SAS and its relevant unit – CC SAS specializes in not only on development of HPC services but also has a research unit, focusing on HPC+ applications, especially in the AI/ML field. CC SAS has expertise in development of parallel applications, big data and AI/ML, as well as in effective use of large HPC resources.
- **Key Staff**
 - **Michal Pitoňák (HPC Expert)**
Responsible for porting and optimization data (pre)processing and AI flows on HPC system. Michal Pitoňák is a senior HPC application developer, expert on code optimization, parallelization of new and legacy computer codes, and porting to GPU. His current responsibilities in EuroCC2 project include HPC application support in the fields of AI/ML and HPDA. Holds a PhD degree in Chemical Physics from the Comenius University in Bratislava (2006). Works for CC SAS since 10/2024.
- **Other staff and their roles**
 - **Bibiána Lajčinová (AI developer):** participates in the development and integration of the foundation model, specializing in AI applications for geospatial data, with focus on parallelization and scalability. Works for CC SAS since 10/2024.

JUSTIFICATION OF COSTS AND RESOURCES

HPC Resources (Hardware, Software, Frameworks, and Compute Volumes)

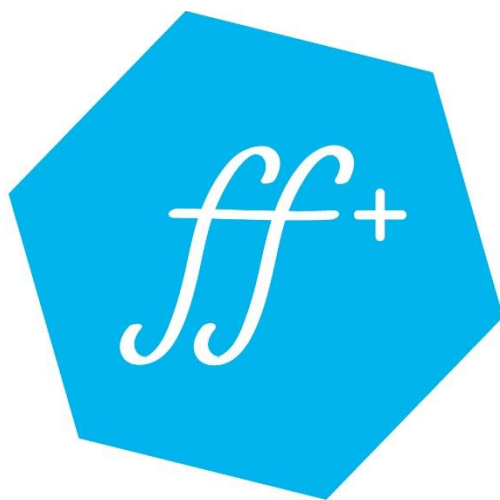
- **GPU Resources:**
 - **MareNostrum-5 Access:** 64 NVIDIA H100 GPUs from the Accelerated Partition.
 - **Compute Hours:** At least 150k hours for model development, training and fine-tuning.
 - **Justification:** The NVIDIA H100 GPUs represent state-of-the-art hardware, ideal for deep learning tasks, especially large-scale Transformer models. Based on our past experience with training and fine-tuning AI models on Slovakia HPC Devana handling geospatial data, we estimate our computational requirements as follows:
 - **model development:** 15k hours
 - **model training:** 120k hours (our dataset is estimated to have 200 million of training samples)
 - **models fine-tuning:** 15k hours
- **CPU Resources:**
 - **Configuration:** 2x Intel Sapphire Rapids 8480+ at 2Ghz and 56c each (112 cores per node)
 - **Compute Hours:** 400k CPU hours for preprocessing.
 - **Justification:** These CPU-only nodes will be dedicated to dataset preprocessing tasks, such as normalization, mosaicking, and patch generation. This extensive preprocessing phase ensures that the data is prepared and optimized for efficient model training on the accelerated nodes. We estimate that 340k georeferenced orthophotogrammetry tiles will need to be proceed.
- **Frameworks and Software:**
 - **Primary Framework:** PyTorch.
 - **Distributed Training:** PyTorch Lightning, enabling scalable training across multiple GPUs and nodes on MareNostrum-5.
 - **Environment Setup:** Conda environment with essential geospatial libraries, ensuring consistency and reproducibility across HPC nodes.
- **Data Storage:**
 - **HPC Storage:** 80TB on MareNostrum-5 for storing and processing large national orthophotos and other geospatial datasets.
 - **Private Cloud Storage:** Self-hosted for secure data management, ensuring data sovereignty and efficient transfer to MareNostrum-5.

Participant Number	Participant short name	Requested Funding rate	Estimated eligible costs					Requested Funding (€)
			Effort (PM)	Personnel Costs (€)	Subcontracting (€)	Other Direct costs (€)	Total costs	
1	Geodeticca Vision s.r.o	100%	29	152 680	-	-	152 680	152 680
2	COO SAS	100%	15	63 500		-	63 500	63 500
Total			44	216 180	-	-	216 180	216 180

References

- [1] "Clay Foundation Model: An Open Source AI Model for Earth," Available: <https://clay-foundation.github.io/model/>.
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- [3] *"Implementation of the UniMatch Semi-Supervised Learning Method into the Frame-Field Learning Method for the Task of Building Extraction from Aerial Images,"* EuroCC Slovakia. Available: <https://eurocc.nsc.sk/en/implementacia-metody-ciastocne-riadeneho-ucenia-uni-match-do-metody-frame-field-learning-pre-ulohu-extrakcie-budov-z-leteckych-snimok/>.
- [4] <https://www.fortunebusinessinsights.com/geospatial-imagery-analytics-market-108685>
- [5] Iterative, "Data Version Control (DVC)," DVC, [Online]. Available: <https://dvc.org/>. [Accessed: 03-Sep-2024].

Part 2 – Excerpt of the FFplus Consortium Agreement



FORTISSIMO

PLUS

Consortium Agreement

[FFplus]

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CONSORTIUM AGREEMENT

THIS CONSORTIUM AGREEMENT is based upon Regulation (EU) No 2021/695 of the European Parliament and of the Council of 28 April 2021 establishing Horizon Europe – the Framework Programme for Research and Innovation (2021-2027), laying down its rules for participation and dissemination (hereinafter referred to as “Horizon Europe Regulation”), and on the European Commission’s General Model Grant Agreement and its Annexes, and is made on 1st of April 2024, hereinafter referred to as the Effective Date

BETWEEN:

UNIVERSITAET STUTTGART, established in Keplerstr. 7, 70174 Stuttgart, Germany, VAT-Number: DE 1477 94 196, represented for the purposes of signing the Agreement by its Chancellor Anna Steiger,
the Coordinator

and

SCAPOS AG, a commercial enterprise registered in Germany, registration number Siegburg HRB 10327, VAT-ID DE262601556, having its principal administrative offices at Schloss Birlinghoven, 53754 Sankt Augustin, Germany, represented by Dr. Guy Lonsdale, Vorstandsvorsitzender/CEO,

and

CINECA CONSORZIO INTERUNIVERSITARIO, established in VIA MAGNANELLI 6/3, 40033 CASALECCHIO DI RENO BO, Italy

and

ARCTUR RACUNALNISKI INZENIRING DOO, established in INDUSTRIJSKA CESTA 1A, 5000 NOVA GORICA, Slovenia, VAT-Number: SI 76530566, represented by Tomi Ilijaš, CEO, and

TERATEC, established in CAMPUS TERATEC 2 RUE DE LA PIQUETTERIE, 91680 BRUYERES-LE-CHATEL, France, VAT n°FR05507429728
Person who will sign this Agreement : Hervé MOUREN, Director of Teratec

and

FUNDACION PUBLICA GALLEGA CENTRO TECNOLOGICO DE SUPERCOMPUTACION DE GALICIA, VAT-ID G-15852981, registered as Public Foundation and established in AVENIDA DE VIGO, 15705 SANTIAGO DE COMPOSTELA, Spain, represented by Lois Orosa Nogueira as Managing Director.

and

AKADEMIA GORNICZO-HUTNICZA IM. STANISLAWA STASZICA W KRAKOWIE, VAT-ID PL6750001923, legal address: AL ADAMA MICKIEWICZA 30 30-059 , KRAKOW Poland

hereinafter, jointly or individually, referred to as “Parties” or “Party”

relating to the Action entitled

FFplus – Fortissimo Plus

in short

FFplus

hereinafter referred to as “Project”

WHEREAS:

The Parties, having considerable experience in the field concerned, have submitted a proposal for the Project to the Granting Authority as part of DEP – the Digital Europe Programme (2021-2027).

The Parties wish to specify or supplement binding commitments among themselves in addition to the provisions of the specific Grant Agreement to be signed by the Parties and the Granting Authority (hereinafter “Grant Agreement”).

The Parties are aware that this Consortium Agreement is based upon the [DESCA model consortium agreement](#).

NOW, THEREFORE, IT IS HEREBY AGREED AS FOLLOWS:

1 Definitions

1.1 Definitions

Words beginning with a capital letter shall have the meaning defined either herein or in the Horizon Europe Regulation or in the Grant Agreement including its Annexes.

1.2 Additional Definitions

“Consortium Body”

Consortium Body means any management body described in Section 6 (Governance Structure) of this Consortium Agreement.

“Consortium Plan”

Consortium Plan means the description of the Action and the related agreed budget as first defined in the Grant Agreement and which may be updated by the General Assembly.

“Granting Authority”

means the body awarding the grant for the Project.

“Defaulting Party”

Defaulting Party means a Party which the General Assembly has declared to be in breach of this Consortium Agreement and/or the Grant Agreement as specified in Section 4.2 of this Consortium Agreement.

“Needed”

means:

For the implementation of the Project:

Access Rights are Needed if, without the grant of such Access Rights, carrying out the tasks assigned to the recipient Party would be technically or legally impossible, significantly delayed, or require significant additional financial or human resources.

For Exploitation of own Results:

Access Rights are Needed if, without the grant of such Access Rights, the Exploitation of own Results would be technically or legally impossible.

“Software”

Software means sequences of instructions to carry out a process in, or convertible into, a form executable by a computer and fixed in any tangible medium of expression.

2 Purpose

The purpose of this Consortium Agreement is to specify with respect to the Project the relationship among the Parties, in particular concerning the organisation of the work between the Parties, the management of the Project and the rights and obligations of the Parties concerning inter alia liability, Access Rights and dispute resolution.

3 Entry into force, duration and termination

3.1 Entry into force

An entity becomes a Party to this Consortium Agreement upon signature of this Consortium Agreement by a duly authorised representative.

This Consortium Agreement shall have effect from the Effective Date identified at the beginning of this Consortium Agreement.

An entity becomes a new Party to the Consortium Agreement upon signature of the accession document (Attachment 2) by the new Party and the Coordinator. Such accession shall have effect from the date identified in the accession document.

3.2 Duration and termination

This Consortium Agreement shall continue in full force and effect until complete fulfilment of all obligations undertaken by the Parties under the Grant Agreement and under this Consortium Agreement.

However, this Consortium Agreement or the participation of one or more Parties to it may be terminated in accordance with the terms of this Consortium Agreement.

If

- the Grant Agreement is not signed by the Granting Authority or a Party, or
- the Grant Agreement is terminated, or
- a Party's participation in the Grant Agreement is terminated,

this Consortium Agreement shall automatically terminate in respect of the affected Party/ies, subject to the provisions surviving the expiration or termination under Section 3.3 of this Consortium Agreement.

3.3 Survival of rights and obligations

The provisions relating to Access Rights, Dissemination and confidentiality, for the time period mentioned therein, as well as for liability, applicable law and settlement of disputes shall survive the expiration or termination of this Consortium Agreement.

Termination shall not affect any rights or obligations of a Party leaving the Project incurred prior to the date of termination, unless otherwise agreed between the General Assembly and the leaving Party. This includes the obligation to provide all necessary input, deliverables and documents for the period of its participation.

4 Responsibilities of Parties

4.1 General principles

Each Party undertakes to take part in the efficient implementation of the Project, and to cooperate, perform and fulfil, promptly and on time, all of its obligations under the Grant Agreement and this Consortium Agreement as may be reasonably required from it and in a manner of good faith as prescribed by Belgian law.

Each Party undertakes to notify promptly the Granting Authority and the other Parties, in accordance with the governance structure of the Project, of any significant information, fact, problem or delay likely to affect the Project.

Each Party shall promptly provide all information reasonably required by a Consortium Body or by the Coordinator to carry out its tasks and shall responsibly manage the access of its employees to the EU Funding & Tenders Portal.

Each Party shall take reasonable measures to ensure the accuracy of any information or materials it supplies to the other Parties.

4.2 Breach

In the event that the General Assembly identifies a breach by a Party of its obligations under this Consortium Agreement or the Grant Agreement (e.g. improper implementation of the Project), the Coordinator or, if the Coordinator is in breach of its obligations, the Party appointed by the General Assembly, will give formal notice to such Party requiring that such breach will be remedied within 30 calendar days from the date of receipt of the written notice by the Party.

If such breach is substantial and is not remedied within that period or is not capable of remedy, the General Assembly may decide to declare the Party to be a Defaulting Party and to decide on the consequences thereof which may include termination of its participation.

4.3 Involvement of third parties

A Party that enters into a subcontract or otherwise involves third parties (including but not limited to Affiliated Entities or other Participants) in the Project remains responsible for carrying out its relevant part of the Project and for such third party's compliance with the provisions of this Consortium Agreement and of the Grant Agreement. Such Party has to ensure that the involvement of third parties does not affect the rights and obligations of the other Parties under this Consortium Agreement and the Grant Agreement.

4.4 Specific responsibilities regarding data protection

Where necessary, the Parties shall cooperate in order to enable one another to fulfil legal obligations arising under applicable data protection laws (the *Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data* and relevant national data protection law applicable to said Party) within the scope of the performance and administration of the Project and of this Consortium Agreement.

In particular, the Parties shall, where necessary, conclude a separate data processing, data sharing and/or joint controller agreement before any data processing or data sharing takes place.

5 Liability towards each other

5.1 No warranties

In respect of any information or materials (incl. Results and Background) supplied by one Party to another under the Project, no warranty or representation of any kind is made, given or implied as to the sufficiency or fitness for purpose nor as to the absence of any infringement of any proprietary rights of third parties.

Therefore,

- the recipient Party shall in all cases be entirely and solely liable for the use to which it puts such information and materials, and
- no Party granting Access Rights shall be liable in case of infringement of proprietary rights of a third party resulting from any other Party (or its entities under the same control) exercising its Access Rights.

5.2 Limitations of contractual liability

No Party shall be responsible to any other Party for any indirect or consequential loss or similar damage such as, but not limited to, loss of profit, loss of revenue or loss of contracts, A Party's aggregate liability towards the other Parties collectively shall be limited to once the Party's share of the total costs of the Project as identified in Annex 2 of the Grant Agreement.

A Party's liability shall not be limited under either of the two foregoing paragraphs to the extent such damage was caused by a wilful act or gross negligence or to the extent that such limitation is not permitted by law.

5.3 Damage caused to third parties

Each Party shall be solely liable for any loss, damage or injury to third parties resulting from the performance of the said Party's obligations by it or on its behalf under this Consortium Agreement or from its use of Results or Background.

5.4 Force Majeure

No Party shall be considered to be in breach of this Consortium Agreement if it is prevented from fulfilling its obligations under the Consortium Agreement by Force Majeure.

Each Party will notify the General Assembly of any Force Majeure without undue delay. If the consequences of Force Majeure for the Project are not overcome within 6 weeks after such notice, the transfer of tasks - if any - shall be decided by the General Assembly.

6 Results

6.1 Ownership of Results

Results are owned by the Party that generates them.

6.2 Joint ownership

Joint ownership is governed by Grant Agreement Article 16.4 and its Annex 5, Section Ownership of results, with the following additions:

Unless otherwise agreed:

- each of the joint owners shall be entitled to use their jointly owned Results for non-commercial research and teaching activities on a royalty-free basis, and without requiring the prior consent of the other joint owner(s).
- each of the joint owners shall be entitled to otherwise Exploit the jointly owned Results and to grant non-exclusive licenses to third parties (without any right to sub-license), if the other joint owners are given: (a) at least 45 calendar days advance notice; and (b) fair and reasonable compensation.

The joint owners shall agree on all protection measures and the division of related cost in advance.

6.3 Transfer of Results

6.3.1

Each Party may transfer ownership of its own Results, including its share in jointly owned Results, following the procedures of the Grant Agreement Article 16.4 and its Annex 5, Section Transfer and licensing of results, sub-section "Transfer of ownership".

6.3.2

Each Party may identify specific third parties it intends to transfer the ownership of its Results to in Attachment (3) of this Consortium Agreement. The other Parties hereby waive their right to prior notice and their right to object to such a transfer to listed third parties according to the Grant Agreement Article

16.4 and its Annex 5, Section Transfer of licensing of results, sub-section "Transfer of ownership", 3rd paragraph.

6.3.3

The transferring Party shall, however, at the time of the transfer, inform the other Parties of such transfer and shall ensure that the rights of the other Parties under the Consortium Agreement and the Grant Agreement will not be affected by such transfer. Any addition to Attachment (3) after signature of this Consortium Agreement requires a decision of the General Assembly.

6.3.4

The Parties recognise that in the framework of a merger or an acquisition of an important part of its assets, it may be impossible under applicable EU and national laws on mergers and acquisitions for a Party to give at least 45 calendar days prior notice for the transfer as foreseen in the Grant Agreement.

6.3.5

The obligations above apply only for as long as other Parties still have - or still may request - Access Rights to the Results.

6.4 Dissemination

6.4.1

For the avoidance of doubt, the confidentiality obligations set out in Section 10 apply to all dissemination activities described in this Section 8.4 as far as Confidential Information is involved.

6.4.2 Dissemination of own (including jointly owned) Results

6.4.2.1

During the Project and for a period of 1 year after the end of the Project, the dissemination of own Results by one or several Parties including but not restricted to publications and presentations, shall be governed by the procedure of Article 17.4 of the Grant Agreement and its Annex 5, Section Dissemination, subject to the following provisions.

Prior notice of any planned publication shall be given to the other Parties at least 45 calendar days before the publication. Any objection to the planned publication shall be made in accordance with the Grant Agreement by written notice to the Coordinator and to the Party or Parties proposing the dissemination within 30 calendar days after receipt of the notice. If no objection is made within the time limit stated above, the publication is permitted.

6.4.2.2

An objection is justified if

- a) the protection of the objecting Party's Results or Background would be adversely affected, or
- b) the objecting Party's legitimate interests in relation to its Results or Background would be significantly harmed, or
- c) the proposed publication includes Confidential Information of the objecting Party.

The objection has to include a precise request for necessary modifications.

6.4.2.3

If an objection has been raised the involved Parties shall discuss how to overcome the justified grounds for the objection on a timely basis (for example by amendment to the planned publication and/or by protecting information before publication) and the objecting Party shall not unreasonably continue the opposition if appropriate measures are taken following the discussion.

6.4.2.4

The objecting Party can request a publication delay of not more than 90 calendar days from the time it raises such an objection. After 90 calendar days the publication is permitted, provided that the objections of the objecting Party have been addressed.

6.4.3 Dissemination of another Party's unpublished Results or Background

A Party shall not include in any dissemination activity another Party's Results or Background without obtaining the owning Party's prior written approval, unless they are already published.

6.4.4 Cooperation obligations

The Parties undertake to cooperate to allow the timely submission, examination, publication and defense of any dissertation or thesis for a degree that includes their Results or Background subject to the confidentiality and publication provisions agreed in this Consortium Agreement.

6.4.5 Use of names, logos or trademarks

Nothing in this Consortium Agreement shall be construed as conferring rights to use in advertising, publicity or otherwise the name of the Parties or any of their logos or trademarks without their prior written approval.

7 Access Rights

7.1 Background included

7.1.1

In Attachment 1, the Parties have identified and agreed on the Background for the Project and have also, where relevant, informed each other that Access to specific Background is subject to legal restrictions or limits.

Anything not identified in Attachment 1 shall not be the object of Access Right obligations regarding Background.

7.1.2

Any Party may add additional Background to Attachment 1 during the Project provided they give written notice to the other Parties. However, approval of the General Assembly is needed should a Party wish to modify or withdraw its Background in Attachment 1.

7.2 General Principles

7.2.1

Each Party shall implement its tasks in accordance with the Consortium Plan and shall bear sole responsibility for ensuring that its acts within the Project do not knowingly infringe third party property rights.

7.2.2

Any Access Rights granted exclude any rights to sublicense unless expressly stated otherwise.

7.2.3

Access Rights shall be free of any administrative transfer costs.

7.2.4

Access Rights are granted on a non-exclusive basis.

7.2.5

Results and Background shall be used only for the purposes for which Access Rights to it have been granted.

7.2.6

All requests for Access Rights shall be made in writing. The granting of Access Rights may be made conditional on the acceptance of specific conditions aimed at ensuring that these rights will be used only for the intended purpose and that appropriate confidentiality obligations are in place.

7.2.7

The requesting Party must show that the Access Rights are Needed.

7.3 Access Rights for implementation

Access Rights to Results and Background Needed for the performance of the own work of a Party under the Project shall be granted on a royalty-free basis, unless otherwise agreed for Background in Attachment 1. Additional Access Rights needed solely for execution of sub-projects (experiments or innovation studies) arising from the Open Calls as described in the project description are not covered and need to be obtained separately, but shall also be royalty-free unless agreed otherwise

7.4 Access Rights for Exploitation

7.4.1 Access Rights to Results

Access Rights to Results if Needed for Exploitation of a Party's own Results shall be granted on Fair and Reasonable conditions.

Access rights to Results for internal research and for teaching activities shall be granted on a royalty-free basis.

7.4.2

Access Rights to Background if Needed for Exploitation of a Party's own Results, shall be granted on Fair and Reasonable conditions.

7.4.3

A request for Access Rights may be made up to twelve months after the end of the Project or, in the case of Section 9.7.2.1.2, after the termination of the requesting Party's participation in the Project.

7.5 Access Rights for entities under the same control

Entities under the same control have Access Rights under the conditions of the Grant Agreement Article 16.4 and its Annex 5, Section "Access rights to results and background", sub-section "Access rights for entities under the same control" [Optional, if they are identified in [Attachment 4 (Identified entities under the same control) to this Consortium Agreement].

Such Access Rights must be requested by the entity under the same control from the Party that holds the Background or Results. Alternatively, the Party granting the Access Rights may individually agree with the Party requesting the Access Rights to have the Access Rights include the right to sublicense to the latter's entity under the same control [listed in Attachment 4]. Access Rights to an entity under the same control shall be granted on Fair and Reasonable conditions and upon written bilateral agreement.

Entities under the same control which obtain Access Rights in return fulfil all confidentiality obligations accepted by the Parties under the Grant Agreement or this Consortium Agreement as if such entities were Parties.

Access Rights may be refused to entities under the same control if such granting is contrary to the legitimate interests of the Party which owns the Background or the Results.

Access Rights granted to any entity under the same control are subject to the continuation of the Access Rights of the Party with whom it is under the same control, and shall automatically terminate upon termination of the Access Rights granted to such Party.

Upon cessation of the status as an entity under the same control, any Access Rights granted to such former entity under the same control shall lapse.

Further arrangements with entities under the same control may be negotiated in separate agreements.

7.6 Additional Access Rights

For the avoidance of doubt any grant of Access Rights not covered by the Grant Agreement or this Consortium Agreement shall be at the absolute discretion of the owning Party and subject to such terms and conditions as may be agreed between the owning and receiving Parties.

7.7 Access Rights for Parties entering or leaving the consortium

7.7.1 New Parties entering the consortium

As regards Results developed before the accession of the new Party, the new Party will be granted Access Rights on the conditions applying for Access Rights to Background.

7.7.2 Parties leaving the consortium

7.7.2.1 Access Rights granted to a leaving Party

7.7.2.1.1 Defaulting Party

Access Rights granted to a Defaulting Party and such Party's right to request Access Rights shall cease immediately upon receipt by the Defaulting Party of the formal notice of the decision of the General Assembly to terminate its participation in the consortium.

7.7.2.1.2 Non-defaulting Party

A non-defaulting Party leaving voluntarily and with the other Parties' consent shall have Access Rights to the Results developed until the date of the termination of its participation.

It may request Access Rights within the period of time specified in Section 9.4.3.

7.7.2.2 Access Rights to be granted by any leaving Party

Any Party leaving the Project shall continue to grant Access Rights pursuant to the Grant Agreement and this Consortium Agreement as if it had remained a Party for the whole duration of the Project.

7.8 Specific Provisions for Access Rights to Software

For the avoidance of doubt, the general provisions for Access Rights provided for in this Section 9 are applicable also to Software.

Parties' Access Rights to Software do not include any right to receive source code or object code ported to a certain hardware platform or any right to receive respective Software documentation in any particular form or detail, but only as available from the Party granting the Access Rights.

8 Non-disclosure of information

8.1

All information in whatever form or mode of communication, which is disclosed by a Party (the "Disclosing Party") to any other Party (the "Recipient") in connection with the Project during its implementation and which has been explicitly marked as "confidential" at the time of disclosure, or when disclosed orally has been identified as confidential at the time of disclosure and has been confirmed and designated in writing within 15 calendar days from oral disclosure at the latest as confidential information by the Disclosing Party, is "Confidential Information".

8.2

The Recipient hereby undertakes in addition and without prejudice to any commitment on non-disclosure under the Grant Agreement, for a period of 5 years after the final payment of the Granting Authority:

- not to use Confidential Information otherwise than for the purpose for which it was disclosed;
- not to disclose Confidential Information without the prior written consent by the Disclosing Party;
- to ensure that internal distribution of Confidential Information by a Recipient shall take place on a strict need-to-know basis; and

- to return to the Disclosing Party, or destroy, on request all Confidential Information that has been disclosed to the Recipients including all copies thereof and to delete all information stored in a machine-readable form to the extent practically possible. The Recipient may keep a copy to the extent it is required to keep, archive or store such Confidential Information because of compliance with applicable laws and regulations or for the proof of on-going obligations provided that the Recipient complies with the confidentiality obligations herein contained with respect to such copy.

The need to know principle is not violated if the information needs to be revealed to internal supervisory bodies or internal monitoring bodies, if the members of these bodies are obligated to maintain confidentiality

8.3

The Recipient shall be responsible for the fulfilment of the above obligations on the part of its employees or third parties involved in the Project and shall ensure that they remain so obliged, as far as legally possible, during and after the end of the Project and/or after the termination of the contractual relationship with the employee or third party.

8.4

The above shall not apply for disclosure or use of Confidential Information, if and in so far as the Recipient can show that:

- the Confidential Information has become or becomes publicly available by means other than a breach of the Recipient's confidentiality obligations;
- the Disclosing Party subsequently informs the Recipient that the Confidential Information is no longer confidential;
- the Confidential Information is communicated to the Recipient without any obligation of confidentiality by a third party who is to the best knowledge of the Recipient in lawful possession thereof and under no obligation of confidentiality to the Disclosing Party;
- the disclosure or communication of the Confidential Information is foreseen by provisions of the Grant Agreement;
- the Confidential Information, at any time, was developed by the Recipient completely independently of any such disclosure by the Disclosing Party;
- the Confidential Information was already known to the Recipient prior to disclosure, or
- the Recipient is required to disclose the Confidential Information in order to comply with applicable laws or regulations or with a court or administrative order, subject to the provision Section 10.7 hereunder.

8.5

The Recipient shall apply the same degree of care with regard to the Confidential Information disclosed within the scope of the Project as with its own confidential and/or proprietary information, but in no case less than reasonable care

8.6

Each Recipient shall promptly inform the relevant Disclosing Party by written notice of any unauthorised disclosure, misappropriation or misuse of Confidential Information after it becomes aware of such unauthorised disclosure, misappropriation or misuse.

8.7

If any Recipient becomes aware that it will be required, or is likely to be required, to disclose Confidential Information in order to comply with applicable laws or regulations or with a court or administrative order, it shall, to the extent it is lawfully able to do so, prior to any such disclosure

- notify the Disclosing Party, and
- comply with the Disclosing Party's reasonable instructions to protect the confidentiality of the information.

Part 3 – Excerpt of the FFplus Grant Agreement



GRANT AGREEMENT

Project 101163317 — FFplus

PREAMBLE

This **Agreement** ('the Agreement') is **between** the following parties:

on the one part,

European High-Performance Computing Joint Undertaking ('granting authority'), under the powers delegated by the European Commission ('European Commission'),

and

on the other part,

1. 'the coordinator':

UNIVERSITY OF STUTTGART (USTUTT), PIC 999974747, established in KEPLERSTRASSE 7, STUTTGART 70174, Germany,

and the following other beneficiaries, if they sign their 'accession form' (see Annex 3 and Article 40):

2. **SCAPOS AG (SCAPOS)**, PIC 952497903, established in FRAUNHOFER INSTITUTSZENTRUM SCHLOSS BIRLINGHOVEN, SANKT AUGUSTIN 53757, Germany,

3. **CINECA CONSORZIO INTERUNIVERSITARIO (CINECA)**, PIC 999843409, established in VIA MAGNANELLI 6/3, CASALECCHIO DI RENO BO 40033, Italy,

4. **FUNDACION PUBLICA GALLEGA CENTRO TECNOLÓGICO DE SUPERCOMPUTACION DE GALICIA (CESGA)**, PIC 999794521, established in AVENIDA DE VIGO, SANTIAGO DE COMPOSTELA 15705, Spain,

5. **TERATEC (TERATEC)**, PIC 934216119, established in CAMPUS TERATEC 2 RUE DE LA PIQUETTERIE, BRUYERES-LE-CHATEL 91680, France,

6. **ARCTUR RACUNALNISKI INZENIRING DOO (ARCTUR)**, PIC 991568048, established in INDUSTRIJSKA CESTA 1A, NOVA GORICA 5000, Slovenia,

7. **AKADEMIA GORNICZO-HUTNICZA IM. STANISŁAWA STASZICA W KRAKOWIE (CYFRONET)**, PIC 999844573, established in AL ADAMA MICKIEWICZA 30, KRAKOW 30-059, Poland,

Unless otherwise specified, references to ‘beneficiary’ or ‘beneficiaries’ include the coordinator and affiliated entities (if any).

If only one beneficiary signs the grant agreement (‘mono-beneficiary grant’), all provisions referring to the ‘coordinator’ or the ‘beneficiaries’ will be considered — mutatis mutandis — as referring to the beneficiary.

The parties referred to above have agreed to enter into the Agreement.

By signing the Agreement and the accession forms, the beneficiaries accept the grant and agree to implement the action under their own responsibility and in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

The Agreement is composed of:

Preamble

Terms and Conditions (including Data Sheet)

- Annex 1 Description of the action¹
- Annex 2 Estimated budget for the action
- Annex 2a Additional information on unit costs and contributions (if applicable)
- Annex 3 Accession forms (if applicable)²
- Annex 3a Declaration on joint and several liability of affiliated entities (if applicable)³
- Annex 4 Model for the financial statements
- Annex 5 Specific rules (if applicable)

¹ Template published on [Portal Reference Documents](#).

² Template published on [Portal Reference Documents](#).

³ Template published on [Portal Reference Documents](#).

ARTICLE 5 — GRANT

5.1 Form of grant

The grant is an action grant¹ which takes the form of a budget-based mixed actual cost grant (i.e. a grant based on actual costs incurred, but which may also include other forms of funding, such as unit costs or contributions, flat-rate costs or contributions, lump sum costs or contributions or financing not linked to costs).

5.2 Maximum grant amount

The maximum grant amount is set out in the Data Sheet (see Point 3) and in the estimated budget (Annex 2).

5.3 Funding rate

The funding rate for costs is 100% of the action's eligible costs.

Contributions are not subject to any funding rate.

5.4 Estimated budget, budget categories and forms of funding

The estimated budget for the action is set out in Annex 2.

It contains the estimated eligible costs and contributions for the action, broken down by participant and budget category.

Annex 2 also shows the types of costs and contributions (forms of funding)² to be used for each budget category.

If unit costs or contributions are used, the details on the calculation will be explained in Annex 2a.

5.5 Budget flexibility

The budget breakdown may be adjusted — without an amendment (see Article 39) — by transfers (between participants and budget categories), as long as this does not imply any substantive or important change to the description of the action in Annex 1.

However:

- changes to the budget category for volunteers (if used) always require an amendment
- changes to budget categories with lump sums costs or contributions (if used; including financing not linked to costs) always require an amendment
- changes to budget categories with higher funding rates or budget ceilings (if used) always require an amendment
- addition of amounts for subcontracts not provided for in Annex 1 either require an

¹ For the definition, see Article 180(2)(a) EU Financial Regulation 2018/1046: ‘**action grant**’ means an EU grant to finance “an action intended to help achieve a Union policy objective” grant based on actual costs incurred, but which may also include other forms of funding, such as unit costs or contributions, flat-rate costs or contributions, lump sum costs or contributions or financing not linked to costs).

² See Article 125 EU Financial Regulation 2018/1046.

amendment or simplified approval in accordance with Article 6.2

- other changes require an amendment or simplified approval, if specifically provided for in Article 6.2
- flexibility caps: not applicable.

ARTICLE 6 — ELIGIBLE AND INELIGIBLE COSTS AND CONTRIBUTIONS

In order to be eligible, costs and contributions must meet the **eligibility** conditions set out in this Article.

6.1 General eligibility conditions

The **general eligibility conditions** are the following:

- (a) for actual costs:
 - (i) they must be actually incurred by the beneficiary
 - (ii) they must be incurred in the period set out in Article 4 (with the exception of costs relating to the submission of the final periodic report, which may be incurred afterwards; see Article 21)
 - (iii) they must be declared under one of the budget categories set out in Article 6.2 and Annex 2
 - (iv) they must be incurred in connection with the action as described in Annex 1 and necessary for its implementation
 - (v) they must be identifiable and verifiable, in particular recorded in the beneficiary's accounts in accordance with the accounting standards applicable in the country where the beneficiary is established and with the beneficiary's usual cost accounting practices
 - (vi) they must comply with the applicable national law on taxes, labour and social security and
 - (vii) they must be reasonable, justified and must comply with the principle of sound financial management, in particular regarding economy and efficiency
- (b) for unit costs or contributions (if any):
 - (i) they must be declared under one of the budget categories set out in Article 6.2 and Annex 2
 - (ii) the units must:
 - be actually used or produced by the beneficiary in the period set out in Article 4 (with the exception of units relating to the submission of the final periodic report, which may be used or produced afterwards; see Article 21)
 - be necessary for the implementation of the action and
 - (iii) the number of units must be identifiable and verifiable, in particular supported by records and documentation (see Article 20)

(c) for flat-rate costs or contributions (if any):

- (i) they must be declared under one of the budget categories set out in Article 6.2 and Annex 2
- (ii) the costs or contributions to which the flat-rate is applied must:
 - be eligible
 - relate to the period set out in Article 4 (with the exception of costs or contributions relating to the submission of the final periodic report, which may be incurred afterwards; see Article 21)

(d) for lump sum costs or contributions (if any):

- (i) they must be declared under one of the budget categories set out in Article 6.2 and Annex 2
- (ii) the work must be properly implemented by the beneficiary in accordance with Annex 1
- (iii) the deliverables/outputs must be achieved in the period set out in Article 4 (with the exception of deliverables/outputs relating to the submission of the final periodic report, which may be achieved afterwards; see Article 21)

(e) for unit, flat-rate or lump sum costs or contributions according to usual cost accounting practices (if any):

- (i) they must fulfil the general eligibility conditions for the type of cost concerned
- (ii) the cost accounting practices must be applied in a consistent manner, based on objective criteria, regardless of the source of funding

(f) for financing not linked to costs (if any): the results must be achieved or the conditions must be fulfilled as described in Annex 1.

In addition, for direct cost categories (e.g. personnel, travel & subsistence, subcontracting and other direct costs) only costs that are directly linked to the action implementation and can therefore be attributed to it directly are eligible. They must not include any indirect costs (i.e. costs that are only indirectly linked to the action, e.g. via cost drivers).

6.2 Specific eligibility conditions for each budget category

For each budget category, the **specific eligibility conditions** are as follows:

Direct costs

A. Personnel costs

A.1 Costs for employees (or equivalent) are eligible as personnel costs if they fulfil the general eligibility conditions and are related to personnel working for the beneficiary under an employment contract (or equivalent appointing act) and assigned to the action.

They must be limited to salaries, social security contributions, taxes and other costs linked to the remuneration, if they arise from national law or the employment contract (or equivalent appointing act) and be calculated on the basis of the costs actually incurred, in accordance with the following method:

{daily rate for the person
multiplied by
number of day-equivalents worked on the action (rounded up or down to the nearest half-day)}.

The daily rate must be calculated as:

{annual personnel costs for the person
divided by
215}.

The number of day-equivalents declared for a person must be identifiable and verifiable (see Article 20).

The total number of day-equivalents declared in EU grants, for a person for a year, cannot be higher than 215.

The personnel costs may also include supplementary payments for personnel assigned to the action (including payments on the basis of supplementary contracts regardless of their nature), if:

- it is part of the beneficiary's usual remuneration practices and is paid in a consistent manner whenever the same kind of work or expertise is required
- the criteria used to calculate the supplementary payments are objective and generally applied by the beneficiary, regardless of the source of funding used.

If the beneficiary uses average personnel costs (unit cost according to usual cost accounting practices), the personnel costs must fulfil the general eligibility conditions for such unit costs and the daily rate must be calculated:

- using the actual personnel costs recorded in the beneficiary's accounts and excluding any costs which are ineligible or already included in other budget categories; the actual personnel costs may be adjusted on the basis of budgeted or estimated elements, if they are relevant for calculating the personnel costs, reasonable and correspond to objective and verifiable information

and

- according to usual cost accounting practices which are applied in a consistent manner, based on objective criteria, regardless of the source of funding.

A.2 and A.3 Costs for natural persons working under a direct contract other than an employment contract and costs for **seconded persons by a third party against payment** are also eligible as personnel costs, if they are assigned to the action, fulfil the general eligibility conditions and:

- (a) work under conditions similar to those of an employee (in particular regarding the way the work is organised, the tasks that are performed and the premises where they are performed) and
- (b) the result of the work belongs to the beneficiary (unless agreed otherwise).

They must be calculated on the basis of a rate which corresponds to the costs actually incurred for

the direct contract or secondment and must not be significantly different from those for personnel performing similar tasks under an employment contract with the beneficiary.

A.4 The work of **SME owners** for the action (i.e. owners of beneficiaries that are small and medium-sized enterprises³ not receiving a salary) or **natural person beneficiaries** (i.e. beneficiaries that are natural persons not receiving a salary) may be declared as personnel costs, if they fulfil the general eligibility conditions and are calculated as unit costs in accordance with the method set out in Annex 2a.

B. Subcontracting costs

Subcontracting costs for the action (including related duties, taxes and charges, such as non-deductible or non-refundable value added tax (VAT)) are eligible, if they are calculated on the basis of the costs actually incurred, fulfil the general eligibility conditions and are awarded using the beneficiary's usual purchasing practices — provided these ensure subcontracts with best value for money (or if appropriate the lowest price) and that there is no conflict of interests (see Article 12).

Beneficiaries that are 'contracting authorities/entities' within the meaning of the EU Directives on public procurement must also comply with the applicable national law on public procurement.

Subcontracting may cover only a limited part of the action.

The tasks to be subcontracted and the estimated cost for each subcontract must be set out in Annex 1 and the total estimated costs of subcontracting per beneficiary must be set out in Annex 2 (or may be approved ex post in the periodic report, if the use of subcontracting does not entail changes to the Agreement which would call into question the decision awarding the grant or breach the principle of equal treatment of applicants; 'simplified approval procedure').

C. Purchase costs

Purchase costs for the action (including related duties, taxes and charges, such as non-deductible or non-refundable value added tax (VAT)) are eligible if they fulfil the general eligibility conditions and are bought using the beneficiary's usual purchasing practices — provided these ensure purchases with best value for money (or if appropriate the lowest price) and that there is no conflict of interests (see Article 12).

Beneficiaries that are 'contracting authorities/entities' within the meaning of the EU Directives on public procurement must also comply with the applicable national law on public procurement.

C.1 Travel and subsistence

Purchases for **travel, accommodation and subsistence** must be calculated as follows:

- engaged in an economic activity, irrespective of their legal form (including, in particular, self-employed persons and family businesses engaged in craft or other activities, and partnerships or associations regularly engaged in an economic activity) and
- employing fewer than 250 persons (expressed in 'annual working units' as defined in Article 5 of the Recommendation) and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million.

³ For the definition, see Commission Recommendation 2003/361/EC: micro, small or medium-sized enterprise (SME) are enterprises

- travel: on the basis of the costs actually incurred and in line with the beneficiary's usual practices on travel
- accommodation: on the basis of the costs actually incurred and in line with the beneficiary's usual practices on travel
- subsistence: on the basis of the costs actually incurred and in line with the beneficiary's usual practices on travel.

C.2 Equipment

Purchases of **equipment, infrastructure or other assets** used for the action must be declared as depreciation costs, calculated on the basis of the costs actually incurred and written off in accordance with international accounting standards and the beneficiary's usual accounting practices.

Only the portion of the costs that corresponds to the rate of actual use for the action during the action duration can be taken into account.

Costs for **renting or leasing** equipment, infrastructure or other assets are also eligible, if they do not exceed the depreciation costs of similar equipment, infrastructure or assets and do not include any financing fees.

C.3 Other goods, works and services

Purchases of **other goods, works and services** must be calculated on the basis of the costs actually incurred.

Such goods, works and services include, for instance, consumables and supplies, promotion, dissemination, protection of results, translations, publications, certificates and financial guarantees, if required under the Agreement.

D. Other cost categories

D.1 Financial support to third parties

Costs for providing financial support to third parties (in the form of **grants, prizes** or similar forms of support; if any) are eligible, if and as declared eligible in the call conditions, if they fulfil the general eligibility conditions, are calculated on the basis of the costs actually incurred and the support is implemented in accordance with the conditions set out in Annex 1.

These conditions must ensure objective and transparent selection procedures and include at least the following:

- (a) for grants (or similar):
 - (i) the maximum amount of financial support for each third party ('recipient'); this amount may not exceed the amount set out in the Data Sheet (see Point 3) or otherwise agreed with the granting authority
 - (ii) the criteria for calculating the exact amount of the financial support
 - (iii) the different types of activity that qualify for financial support, on the basis of a closed list

- (iv) the persons or categories of persons that will be supported and
- (v) the criteria and procedures for giving financial support
- (b) for prizes (or similar):
 - (i) the eligibility and award criteria
 - (ii) the amount of the prize and
 - (iii) the payment arrangements.

D.2 Internally invoiced goods and services

Costs for internally invoiced goods and services directly used for the action may be declared as unit cost according to usual cost accounting practices, if and as declared eligible in the call conditions, if they fulfil the general eligibility conditions for such unit costs and the amount per unit is calculated:

- using the actual costs for the good or service recorded in the beneficiary's accounts, attributed either by direct measurement or on the basis of cost drivers, and excluding any cost which are ineligible or already included in other budget categories; the actual costs may be adjusted on the basis of budgeted or estimated elements, if they are relevant for calculating the costs, reasonable and correspond to objective and verifiable information

and

- according to usual cost accounting practices which are applied in a consistent manner, based on objective criteria, regardless of the source of funding.

'Internally invoiced goods and services' means goods or services which are provided within the beneficiary's organisation directly for the action and which the beneficiary values on the basis of its usual cost accounting practices.

Indirect costs

E. Indirect costs

Indirect costs will be reimbursed at the flat-rate of 7% of the eligible direct costs (categories A-D, except volunteers costs and exempted specific cost categories, if any).

Contributions

Not applicable

6.3 Ineligible costs and contributions

The following costs or contributions are **ineligible**:

6.3.1 costs or contributions that do not comply with the conditions set out above (Article 6.1 and 6.2), in particular:

6.3.1.1 costs related to return on capital and dividends paid by a beneficiary

- 6.3.1.2 debt and debt service charges
- 6.3.1.3 provisions for future losses or debts
- 6.3.1.4 interest owed
- 6.3.1.5 currency exchange losses
- 6.3.1.6 bank costs charged by the beneficiary's bank for transfers from the granting authority
- 6.3.1.7 excessive or reckless expenditure
- 6.3.1.8 deductible or refundable VAT (including VAT paid by public bodies acting as public authority)
- 6.3.1.9 costs incurred or contributions for activities implemented during grant agreement suspension (see Article 31)
- 6.3.1.10 in-kind contributions by third parties
- 6.3.2 costs or contributions declared under other EU grants (or grants awarded by an EU Member State, non-EU country or other body implementing the EU budget), except for the following cases:
 - 6.3.2.1 Synergy actions: not applicable
 - 6.3.2.2 if the action grant is combined with an operating grant⁴ running during the same period and the beneficiary can demonstrate that the operating grant does not cover any (direct or indirect) costs of the action grant
- 6.3.3 costs or contributions for staff of a national (or regional/local) administration, for activities that are part of the administration's normal activities (i.e. not undertaken only because of the grant)
- 6.3.4 costs or contributions (especially travel and subsistence) for staff or representatives of EU institutions, bodies or agencies
- 6.3.5 other:
 - 6.3.5.1 country restrictions for eligible costs: not applicable
 - 6.3.5.2 costs or contributions declared specifically ineligible in the call conditions.

6.4 Consequences of non-compliance

If a beneficiary declares costs or contributions that are ineligible, they will be rejected (see Article 27).

This may also lead to other measures described in Chapter 5.

⁴ For the definition, see Article 180(2)(b) of EU Financial Regulation 2018/1046: '**operating grant**' means an EU grant to finance "the functioning of a body which has an objective forming part of and supporting an EU policy".

ARTICLE 12 — CONFLICT OF INTERESTS

12.1 Conflict of interests

The beneficiaries must take all measures to prevent any situation where the impartial and objective implementation of the Agreement could be compromised for reasons involving family, emotional life, political or national affinity, economic interest or any other direct or indirect interest ('conflict of interests').

They must formally notify the granting authority without delay of any situation constituting or likely to lead to a conflict of interests and immediately take all the necessary steps to rectify this situation.

The granting authority may verify that the measures taken are appropriate and may require additional measures to be taken by a specified deadline.

12.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 28) and the grant or the beneficiary may be terminated (see Article 32).

Such breaches may also lead to other measures described in Chapter 5.

ARTICLE 13 — CONFIDENTIALITY AND SECURITY

13.1 Sensitive information

The parties must keep confidential any data, documents or other material (in any form) that is identified as sensitive in writing ('sensitive information') — during the implementation of the action and for at least until the time-limit set out in the Data Sheet (see Point 6).

If a beneficiary requests, the granting authority may agree to keep such information confidential for a longer period.

Unless otherwise agreed between the parties, they may use sensitive information only to implement the Agreement.

The beneficiaries may disclose sensitive information to their personnel or other participants involved in the action only if they:

- (a) need to know it in order to implement the Agreement and
- (b) are bound by an obligation of confidentiality.

The granting authority may disclose sensitive information to its staff and to other EU institutions and bodies.

It may moreover disclose sensitive information to third parties, if:

- (a) this is necessary to implement the Agreement or safeguard the EU financial interests and
- (b) the recipients of the information are bound by an obligation of confidentiality.

The confidentiality obligations no longer apply if:

- (a) the disclosing party agrees to release the other party
- (b) the information becomes publicly available, without breaching any confidentiality obligation
- (c) the disclosure of the sensitive information is required by EU, international or national law.

Specific confidentiality rules (if any) are set out in Annex 5.

13.2 Classified information

The parties must handle classified information in accordance with the applicable EU, international or national law on classified information (in particular, Decision 2015/444⁵ and its implementing rules).

Deliverables which contain classified information must be submitted according to special procedures agreed with the granting authority.

Action tasks involving classified information may be subcontracted only after explicit approval (in writing) from the granting authority.

Classified information may not be disclosed to any third party (including participants involved in the action implementation) without prior explicit written approval from the granting authority.

Specific security rules (if any) are set out in Annex 5.

13.3 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 28).

Such breaches may also lead to other measures described in Chapter 5.

ARTICLE 17 — COMMUNICATION, DISSEMINATION AND VISIBILITY

17.1 Communication — Dissemination — Promoting the action

Unless otherwise agreed with the granting authority, the beneficiaries must promote the action and its results by providing targeted information to multiple audiences (including the media and the public), in accordance with Annex 1 and in a strategic, coherent and effective manner.

Before engaging in a communication or dissemination activity expected to have a major media impact, the beneficiaries must inform the granting authority.

17.2 Visibility — European flag and funding statement

Unless otherwise agreed with the granting authority, communication activities of the beneficiaries related to the action (including media relations, conferences, seminars, information material, such as brochures, leaflets, posters, presentations, etc., in electronic form, via traditional or social media, etc.), dissemination activities and any infrastructure, equipment, vehicles, supplies or major result funded by the grant must acknowledge EU support and display the European flag (emblem) and funding statement (translated into local languages, where appropriate):

⁵ Commission Decision 2015/444/EC, Euratom of 13 March 2015 on the security rules for protecting EU classified information (OJ L 72, 17.3.2015, p. 53).



Funded by the
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European Union



Funded by the
European Union



Co-funded by the
European Union

The emblem must remain distinct and separate and cannot be modified by adding other visual marks, brands or text.

Apart from the emblem, no other visual identity or logo may be used to highlight the EU support.

When displayed in association with other logos (e.g. of beneficiaries or sponsors), the emblem must be displayed at least as prominently and visibly as the other logos.

For the purposes of their obligations under this Article, the beneficiaries may use the emblem without first obtaining approval from the granting authority. This does not, however, give them the right to exclusive use. Moreover, they may not appropriate the emblem or any similar trademark or logo, either by registration or by any other means.

17.3 Quality of information — Disclaimer

Any communication or dissemination activity related to the action must use factually accurate information.

Moreover, it must indicate the following disclaimer (translated into local languages where appropriate):

“Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or [name of the granting authority]. Neither the European Union nor the granting authority can be held responsible for them.”

17.4 Specific communication, dissemination and visibility rules

Specific communication, dissemination and visibility rules (if any) are set out in Annex 5.

17.5 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 28).

Such breaches may also lead to other measures described in Chapter 5.

ARTICLE 15 — DATA PROTECTION

15.1 Data processing by the granting authority

Any personal data under the Agreement will be processed under the responsibility of the data controller of the granting authority in accordance with and for the purposes set out in the Portal Privacy Statement.

For grants where the granting authority is the European Commission, an EU regulatory or executive agency, joint undertaking or other EU body, the processing will be subject to Regulation 2018/1725⁶.

15.2 Data processing by the beneficiaries

The beneficiaries must process personal data under the Agreement in compliance with the applicable EU, international and national law on data protection (in particular, Regulation 2016/679¹⁶).

They must ensure that personal data is:

- processed lawfully, fairly and in a transparent manner in relation to the data subjects
- collected for specified, explicit and legitimate purposes and not further processed in a manner that is incompatible with those purposes
- adequate, relevant and limited to what is necessary in relation to the purposes for which they are processed
- accurate and, where necessary, kept up to date
- kept in a form which permits identification of data subjects for no longer than is necessary for the purposes for which the data is processed and
- processed in a manner that ensures appropriate security of the data.

The beneficiaries may grant their personnel access to personal data only if it is strictly necessary for implementing, managing and monitoring the Agreement. The beneficiaries must ensure that the personnel is under a confidentiality obligation.

The beneficiaries must inform the persons whose data are transferred to the granting authority and provide them with the Portal Privacy Statement.

15.3 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 28).

Such breaches may also lead to other measures described in Chapter 5.

⁶ Regulation (EU) 2018/1725 of the European Parliament and of the Council of 23 October 2018 on the protection of natural persons with regard to the processing of personal data by the Union institutions, bodies, offices and agencies and on the free movement of such data, and repealing Regulation (EC) No 45/2001 and Decision No 1247/2002/EC (OJ L 295, 21.11.2018, p. 39).

ARTICLE 22 — PAYMENTS AND RECOVERIES — CALCULATION OF AMOUNTS DUE

22.1 Payments and payment arrangements

Payments will be made in accordance with the schedule and modalities set out in the Data Sheet (see Point 4.2).

They will be made in euro to the bank account indicated by the coordinator (see Data Sheet, Point 4.2) and must be distributed without unjustified delay (restrictions may apply to distribution of the initial prefinancing payment; see Data Sheet, Point 4.2).

Payments to this bank account will discharge the granting authority from its payment obligation.

The cost of payment transfers will be borne as follows:

- the granting authority bears the cost of transfers charged by its bank
- the beneficiary bears the cost of transfers charged by its bank
- the party causing a repetition of a transfer bears all costs of the repeated transfer.

Payments by the granting authority will be considered to have been carried out on the date when they are debited to its account.

22.2 Recoveries

Recoveries will be made, if — at beneficiary termination, final payment or afterwards — it turns out that the granting authority has paid too much and needs to recover the amounts undue.

The general liability regime for recoveries (first-line liability) is as follows: At final payment, the coordinator will be fully liable for recoveries, even if it has not been the final recipient of the undue amounts. At beneficiary termination or after final payment, recoveries will be made directly against the beneficiaries concerned.

Beneficiaries will be fully liable for repaying the debts of their affiliated entities.

In case of enforced recoveries (see Article 22.4):

- the beneficiaries will be jointly and severally liable for repaying debts of another beneficiary under the Agreement (including late-payment interest), if required by the granting authority (see Data Sheet, Point 4.4)
- affiliated entities will be held liable for repaying debts of their beneficiaries under the Agreement (including late-payment interest), if required by the granting authority (see Data Sheet, Point 4.4).

22.3 Amounts due

22.3.1 Prefinancing payments

The aim of the prefinancing is to provide the beneficiaries with a float.

It remains the property of the EU until the final payment.

For **initial prefinancings** (if any), the amount due, schedule and modalities are set out in the Data Sheet (see Point 4.2).

For **additional prefinancings** (if any), the amount due, schedule and modalities are also set out in the Data Sheet (see Point 4.2). However, if the statement on the use of the previous prefinancing payment shows that less than 70% was used, the amount set out in the Data Sheet will be reduced by the difference between the 70% threshold and the amount used.

Prefinancing payments (or parts of them) may be offset (without the beneficiaries' consent) against amounts owed by a beneficiary to the granting authority — up to the amount due to that beneficiary.

For grants where the granting authority is the European Commission or an EU executive agency, offsetting may also be done against amounts owed to other Commission services or executive agencies.

Payments will not be made if the payment deadline or payments are suspended (see Articles 29 and 30).

22.3.2 Amount due at beneficiary termination — Recovery

In case of beneficiary termination, the granting authority will determine the provisional amount due for the beneficiary concerned. Payments (if any) will be made with the next interim or final payment.

The **amount due** will be calculated in the following step:

Step 1 — Calculation of the total accepted EU contribution

Step 1 — Calculation of the total accepted EU contribution

The granting authority will first calculate the 'accepted EU contribution' for the beneficiary for all reporting periods, by calculating the 'maximum EU contribution to costs' (applying the funding rate to the accepted costs of the beneficiary), taking into account requests for a lower contribution to costs and CFS threshold cappings (if any; see Article 24.5) and adding the contributions (accepted unit, flat-rate or lump sum contributions and financing not linked to costs, if any).

After that, the granting authority will take into account grant reductions (if any). The resulting amount is the 'total accepted EU contribution' for the beneficiary.

The **balance** is then calculated by deducting the payments received (if any; see report on the distribution of payments in Article 32), from the total accepted EU contribution:

$$\left\{ \begin{array}{l} \text{total accepted EU contribution for the beneficiary} \\ \text{minus} \\ \text{\{prefinancing and interim payments received (if any)\}} \end{array} \right\}.$$

If the balance is **positive**, the amount will be included in the next interim or final payment to the consortium.

If the balance is **negative**, it will be **recovered** in accordance with the following procedure:

The granting authority will send a **pre-information letter** to the beneficiary concerned:

- formally notifying the intention to recover, the amount due, the amount to be recovered and the reasons why and

- requesting observations within 30 days of receiving notification.

If no observations are submitted (or the granting authority decides to pursue recovery despite the observations it has received), it will confirm the amount to be recovered and ask this amount to be paid to the coordinator (**confirmation letter**).

The amounts will later on also be taken into account for the next interim or final payment.

22.3.3 Interim payments

Interim payments reimburse the eligible costs and contributions claimed for the implementation of the action during the reporting periods (if any).

Interim payments (if any) will be made in accordance with the schedule and modalities set out the Data Sheet (see Point 4.2).

Payment is subject to the approval of the periodic report. Its approval does not imply recognition of compliance, authenticity, completeness or correctness of its content.

The **interim payment** will be calculated by the granting authority in the following steps:

Step 1 — Calculation of the total accepted EU contribution

Step 2 — Limit to the interim payment ceiling

Step 1 — Calculation of the total accepted EU contribution

The granting authority will calculate the ‘accepted EU contribution’ for the action for the reporting period, by first calculating the ‘maximum EU contribution to costs’ (applying the funding rate to the accepted costs of each beneficiary), taking into account requests for a lower contribution to costs, and CFS threshold cappings (if any; see Article 24.5) and adding the contributions (accepted unit, flat-rate or lump sum contributions and financing not linked to costs, if any).

After that, the granting authority will take into account grant reductions from beneficiary termination (if any). The resulting amount is the ‘total accepted EU contribution’.

Step 2 — Limit to the interim payment ceiling

The resulting amount is then capped to ensure that the total amount of prefinancing and interim payments (if any) does not exceed the interim payment ceiling set out in the Data Sheet (see Point 4.2).

Interim payments (or parts of them) may be offset (without the beneficiaries' consent) against amounts owed by a beneficiary to the granting authority — up to the amount due to that beneficiary.

For grants where the granting authority is the European Commission or an EU executive agency, offsetting may also be done against amounts owed to other Commission services or executive agencies.

Payments will not be made if the payment deadline or payments are suspended (see Articles 29 and 30).

22.3.4 Final payment — Final grant amount — Revenues and Profit — Recovery

The final payment (payment of the balance) reimburses the remaining part of the eligible costs and contributions claimed for the implementation of the action (if any).

The final payment will be made in accordance with the schedule and modalities set out in the Data Sheet (see Point 4.2).

Payment is subject to the approval of the final periodic report. Its approval does not imply recognition of compliance, authenticity, completeness or correctness of its content.

The **final grant amount for the action** will be calculated in the following steps:

Step 1 — Calculation of the total accepted EU contribution

Step 2 — Limit to the maximum grant amount

Step 3 — Reduction due to the no-profit rule

Step 1 — Calculation of the total accepted EU contribution

The granting authority will first calculate the 'accepted EU contribution' for the action for all reporting periods, by calculating the 'maximum EU contribution to costs' (applying the funding rate to the total accepted costs of each beneficiary), taking into account requests for a lower contribution to costs, CFS threshold cappings (if any; see Article 24.5) and adding the contributions (accepted unit, flat-rate or lump sum contributions and financing not linked to costs, if any).

After that, the granting authority will take into account grant reductions (if any). The resulting amount is the 'total accepted EU contribution'.

Step 2 — Limit to the maximum grant amount

If the resulting amount is higher than the maximum grant amount set out in Article 5.2, it will be limited to the latter.

Step 3 — Reduction due to the no-profit rule

If the no-profit rule is provided for in the Data Sheet (see Point 4.2), the grant must not produce a profit (i.e. surplus of the amount obtained following Step 2 plus the action's revenues, over the eligible costs and contributions approved by the granting authority).

'Revenue' is all income generated by the action, during its duration (see Article 4), for beneficiaries that are profit legal entities.

If there is a profit, it will be deducted in proportion to the final rate of reimbursement of the eligible costs approved by the granting authority (as compared to the amount calculated following Steps 1 and 2 minus the contributions).

The **balance** (final payment) is then calculated by deducting the total amount of prefinancing and interim payments already made (if any), from the final grant amount:

$$\begin{aligned} & \{ \text{final grant amount} \\ & \text{minus} \\ & \{ \text{prefinancing and interim payments made (if any)} \} \}. \end{aligned}$$

If the balance is **positive**, it will be **paid** to the coordinator.

The final payment (or part of it) may be offset (without the beneficiaries' consent) against amounts owed by a beneficiary to the granting authority — up to the amount due to that beneficiary.

For grants where the granting authority is the European Commission or an EU executive agency, offsetting may also be done against amounts owed to other Commission services or executive agencies.

Payments will not be made if the payment deadline or payments are suspended (see Articles 29 and 30).

If the balance is **negative**, it will be **recovered** in accordance with the following procedure:

The granting authority will send a **pre-information letter** to the coordinator:

- formally notifying the intention to recover, the final grant amount, the amount to be recovered and the reasons why
- requesting observations within 30 days of receiving notification.

If no observations are submitted (or the granting authority decides to pursue recovery despite the observations it has received), it will confirm the amount to be recovered (**confirmation letter**), together with a **debit note** with the terms and date for payment.

If payment is not made by the date specified in the debit note, the granting authority will **enforce recovery** in accordance with Article 22.4.

22.3.5 Audit implementation after final payment — Revised final grant amount — Recovery

If — after the final payment (in particular, after checks, reviews, audits or investigations; see Article 25) — the granting authority rejects costs or contributions (see Article 27) or reduces the grant (see Article 28), it will calculate the **revised final grant amount** for the beneficiary concerned.

The **beneficiary revised final grant amount** will be calculated in the following step:

Step 1 — Calculation of the revised total accepted EU contribution

Step 1 — Calculation of the revised total accepted EU contribution

The granting authority will first calculate the ‘revised accepted EU contribution’ for the beneficiary, by calculating the ‘revised accepted costs’ and ‘revised accepted contributions’.

After that, it will take into account grant reductions (if any). The resulting ‘revised total accepted EU contribution’ is the beneficiary revised final grant amount.

If the revised final grant amount is lower than the beneficiary’s final grant amount (i.e. its share in the final grant amount for the action), it will be **recovered** in accordance with the following procedure:

The **beneficiary final grant amount** (i.e. share in the final grant amount for the action) is calculated as follows:

$$\left\{ \begin{array}{l} \text{total accepted EU contribution for the beneficiary} \\ \text{divided by} \\ \text{total accepted EU contribution for the action} \end{array} \right\} \times \left\{ \begin{array}{l} \text{multiplied by} \\ \text{final grant amount for the action} \end{array} \right\}.$$

The granting authority will send a **pre-information letter** to the beneficiary concerned:

- formally notifying the intention to recover, the amount to be recovered and the reasons why and
- requesting observations within 30 days of receiving notification.

If no observations are submitted (or the granting authority decides to pursue recovery despite the observations it has received), it will confirm the amount to be recovered (**confirmation letter**), together with a **debit note** with the terms and the date for payment.

Recoveries against affiliated entities (if any) will be handled through their beneficiaries.

If payment is not made by the date specified in the debit note, the granting authority will **enforce recovery** in accordance with Article 22.4.

22.4 Enforced recovery

If payment is not made by the date specified in the debit note, the amount due will be recovered:

- (a) by offsetting the amount — without the coordinator or beneficiary’s consent — against any amounts owed to the coordinator or beneficiary by the granting authority.

In exceptional circumstances, to safeguard the EU financial interests, the amount may be offset before the payment date specified in the debit note.

For grants where the granting authority is the European Commission or an EU executive agency, debts may also be offset against amounts owed by other Commission services or executive agencies.

- (b) by drawing on the financial guarantee(s) (if any)
- (c) by holding other beneficiaries jointly and severally liable (if any; see Data Sheet, Point 4.4)

- (d) by holding affiliated entities jointly and severally liable (if any, see Data Sheet, Point 4.4)
- (e) by taking legal action (see Article 43) or, provided that the granting authority is the European Commission or an EU executive agency, by adopting an enforceable decision under Article 299 of the Treaty on the Functioning of the EU (TFEU) and Article 100(2) of EU Financial Regulation 2018/1046.

The amount to be recovered will be increased by **late-payment interest** at the rate set out in Article 22.5, from the day following the payment date in the debit note, up to and including the date the full payment is received.

Partial payments will be first credited against expenses, charges and late-payment interest and then against the principal.

Bank charges incurred in the recovery process will be borne by the beneficiary, unless Directive 2015/2366⁷ applies.

For grants where the granting authority is an EU executive agency, enforced recovery by offsetting or enforceable decision will be done by the services of the European Commission (see also Article 43).

22.5 Consequences of non-compliance

22.5.1 If the granting authority does not pay within the payment deadlines (see above), the beneficiaries are entitled to **late-payment interest** at the rate applied by the European Central Bank (ECB) for its main refinancing operations in euros ('reference rate'), plus the rate specified in the Data Sheet (Point 4.2). The reference rate is the rate in force on the first day of the month in which the payment deadline expires, as published in the C series of the *Official Journal of the European Union*.

If the late-payment interest is lower than or equal to EUR 200, it will be paid to the coordinator only on request submitted within two months of receiving the late payment.

Late-payment interest is not due if all beneficiaries are EU Member States (including regional and local government authorities or other public bodies acting on behalf of a Member State for the purpose of this Agreement).

If payments or the payment deadline are suspended (see Articles 29 and 30), payment will not be considered as late.

Late-payment interest covers the period running from the day following the due date for payment (see above), up to and including the date of payment.

Late-payment interest is not considered for the purposes of calculating the final grant amount.

22.5.2 If the coordinator breaches any of its obligations under this Article, the grant may be reduced (see Article 28) and the grant or the coordinator may be terminated (see Article 32).

Such breaches may also lead to other measures described in Chapter 5.

⁷ Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC (OJ L 337, 23.12.2015, p. 35).

ARTICLE 25 — CHECKS, REVIEWS, AUDITS AND INVESTIGATIONS — EXTENSION OF FINDINGS

25.1 Granting authority checks, reviews and audits

25.1.1 Internal checks

The granting authority may — during the action or afterwards — check the proper implementation of the action and compliance with the obligations under the Agreement, including assessing costs and contributions, deliverables and reports.

25.1.2 Project reviews

The granting authority may carry out reviews on the proper implementation of the action and compliance with the obligations under the Agreement (general project reviews or specific issues reviews).

Such project reviews may be started during the implementation of the action and until the time-limit set out in the Data Sheet (see Point 6). They will be formally notified to the coordinator or beneficiary concerned and will be considered to start on the date of the notification.

If needed, the granting authority may be assisted by independent, outside experts. If it uses outside experts, the coordinator or beneficiary concerned will be informed and have the right to object on grounds of commercial confidentiality or conflict of interest.

The coordinator or beneficiary concerned must cooperate diligently and provide — within the deadline requested — any information and data in addition to deliverables and reports already submitted (including information on the use of resources). The granting authority may request beneficiaries to provide such information to it directly. Sensitive information and documents will be treated in accordance with Article 13.

The coordinator or beneficiary concerned may be requested to participate in meetings, including with the outside experts.

For **on-the-spot visits**, the beneficiary concerned must allow access to sites and premises (including to the outside experts) and must ensure that information requested is readily available.

Information provided must be accurate, precise and complete and in the format requested, including electronic format.

On the basis of the review findings, a **project review report** will be drawn up.

The granting authority will formally notify the project review report to the coordinator or beneficiary concerned, which has 30 days from receiving notification to make observations.

Project reviews (including project review reports) will be in the language of the Agreement, unless otherwise agreed with the granting authority (see Data Sheet, Point 4.2).

25.1.3 Audits

The granting authority may carry out audits on the proper implementation of the action and compliance with the obligations under the Agreement.

Such audits may be started during the implementation of the action and until the time-limit set out in the Data Sheet (see Point 6). They will be formally notified to the beneficiary concerned and will be considered to start on the date of the notification.

The granting authority may use its own audit service, delegate audits to a centralised service or use external audit firms. If it uses an external firm, the beneficiary concerned will be informed and have the right to object on grounds of commercial confidentiality or conflict of interest.

The beneficiary concerned must cooperate diligently and provide — within the deadline requested — any information (including complete accounts, individual salary statements or other personal data) to verify compliance with the Agreement. Sensitive information and documents will be treated in accordance with Article 13.

For **on-the-spot** visits, the beneficiary concerned must allow access to sites and premises (including for the external audit firm) and must ensure that information requested is readily available.

Information provided must be accurate, precise and complete and in the format requested, including electronic format.

On the basis of the audit findings, a **draft audit report** will be drawn up.

The auditors will formally notify the draft audit report to the beneficiary concerned, which has 30 days from receiving notification to make observations (contradictory audit procedure).

The **final audit report** will take into account observations by the beneficiary concerned and will be formally notified to them.

Audits (including audit reports) will be in the language of the Agreement, unless otherwise agreed with the granting authority (see Data Sheet, Point 4.2).

25.2 European Commission checks, reviews and audits in grants of other granting authorities

Where the granting authority is not the European Commission, the latter has the same rights of checks, reviews and audits as the granting authority.

25.3 Access to records for assessing simplified forms of funding

The beneficiaries must give the European Commission access to their statutory records for the periodic assessment of simplified forms of funding which are used in EU programmes.

25.4 OLAF, EPPO and ECA audits and investigations

The following bodies may also carry out checks, reviews, audits and investigations — during the action or afterwards:

- the European Anti-Fraud Office (OLAF) under Regulations No 883/2013⁸ and No 2185/96⁹

⁸ Regulation (EU, Euratom) No 883/2013 of the European Parliament and of the Council of 11 September 2013 concerning investigations conducted by the European Anti-Fraud Office (OLAF) and repealing Regulation (EC) No 1073/1999 of the European Parliament and of the Council and Council Regulation (Euratom) No 1074/1999 (OJ L 248, 18/09/2013, p. 1).

⁹ Council Regulation (Euratom, EC) No 2185/96 of 11 November 1996 concerning on-the-spot checks and inspections carried out by the Commission in order to protect the European Communities' financial interests against fraud and other irregularities (OJ L 292, 15/11/1996, p. 2).

- the European Public Prosecutor's Office (EPPO) under Regulation 2017/1939
- the European Court of Auditors (ECA) under Article 287 of the Treaty on the Functioning of the EU (TFEU) and Article 257 of EU Financial Regulation 2018/1046.

If requested by these bodies, the beneficiary concerned must provide full, accurate and complete information in the format requested (including complete accounts, individual salary statements or other personal data, including in electronic format) and allow access to sites and premises for on-the-spot visits or inspections — as provided for under these Regulations.

To this end, the beneficiary concerned must keep all relevant information relating to the action, at least until the time-limit set out in the Data Sheet (Point 6) and, in any case, until any ongoing checks, reviews, audits, investigations, litigation or other pursuits of claims have been concluded.

25.5 Consequences of checks, reviews, audits and investigations — Extension of results of reviews, audits or investigations

25.5.1 Consequences of checks, reviews, audits and investigations in this grant

Findings in checks, reviews, audits or investigations carried out in the context of this grant may lead to rejections (see Article 27), grant reduction (see Article 28) or other measures described in Chapter 5.

Rejections or grant reductions after the final payment will lead to a revised final grant amount (see Article 22).

Findings in checks, reviews, audits or investigations during the action implementation may lead to a request for amendment (see Article 39), to change the description of the action set out in Annex 1.

Checks, reviews, audits or investigations that find systemic or recurrent errors, irregularities, fraud or breach of obligations in any EU grant may also lead to consequences in other EU grants awarded under similar conditions ('extension to other grants').

Moreover, findings arising from an OLAF or EPPO investigation may lead to criminal prosecution under national law.

25.5.2 Extension from other grants

Results of checks, reviews, audits or investigations in other grants may be extended to this grant, if:

- (a) the beneficiary concerned is found, in other EU grants awarded under similar conditions, to have committed systemic or recurrent errors, irregularities, fraud or breach of obligations that have a material impact on this grant and
- (b) those findings are formally notified to the beneficiary concerned — together with the list of grants affected by the findings — within the time-limit for audits set out in the Data Sheet (see Point 6).

The granting authority will formally notify the beneficiary concerned of the intention to extend the findings and the list of grants affected.

If the extension concerns **rejections of costs or contributions**: the notification will include:

- (a) an invitation to submit observations on the list of grants affected by the findings
- (b) the request to submit revised financial statements for all grants affected
- (c) the correction rate for extrapolation, established on the basis of the systemic or recurrent errors, to calculate the amounts to be rejected, if the beneficiary concerned:
 - (i) considers that the submission of revised financial statements is not possible or practicable or
 - (ii) does not submit revised financial statements.

If the extension concerns **grant reductions**: the notification will include:

- (a) an invitation to submit observations on the list of grants affected by the findings and
- (b) the **correction rate for extrapolation**, established on the basis of the systemic or recurrent errors and the principle of proportionality.

The beneficiary concerned has **60 days** from receiving notification to submit observations, revised financial statements or to propose a duly substantiated **alternative correction method/rate**.

On the basis of this, the granting authority will analyse the impact and decide on the implementation (i.e. start rejection or grant reduction procedures, either on the basis of the revised financial statements or the announced/alternative method/rate or a mix of those; see Articles 27 and 28).

25.6 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, costs or contributions insufficiently substantiated will be ineligible (see Article 6) and will be rejected (see Article 27), and the grant may be reduced (see Article 28).

Such breaches may also lead to other measures described in Chapter 5.

ARTICLE 26 — IMPACT EVALUATIONS

26.1 Impact evaluation

The granting authority may carry out impact evaluations of the action, measured against the objectives and indicators of the EU programme funding the grant.

Such evaluations may be started during implementation of the action and until the time-limit set out in the Data Sheet (see Point 6). They will be formally notified to the coordinator or beneficiaries and will be considered to start on the date of the notification.

If needed, the granting authority may be assisted by independent outside experts.

The coordinator or beneficiaries must provide any information relevant to evaluate the impact

of the action, including information in electronic format.

26.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the granting authority may apply the measures described in Chapter 5.

ARTICLE 29 — PAYMENT DEADLINE SUSPENSION

29.1 Conditions

The granting authority may — at any moment — suspend the payment deadline if a payment cannot be processed because:

- (a) the required report (see Article 21) has not been submitted or is not complete or additional information is needed
- (b) there are doubts about the amount to be paid (e.g. ongoing audit extension procedure, queries about eligibility, need for a grant reduction, etc.) and additional checks, reviews, audits or investigations are necessary, or
- (c) there are other issues affecting the EU financial interests.

29.2 Procedure

The granting authority will formally notify the coordinator of the suspension and the reasons why.

The suspension will **take effect** the day the notification is sent.

If the conditions for suspending the payment deadline are no longer met, the suspension will be **lifted**

— and the remaining time to pay (see Data Sheet, Point 4.2) will resume.

If the suspension exceeds two months, the coordinator may request the granting authority to confirm if the suspension will continue.

If the payment deadline has been suspended due to the non-compliance of the report and the revised report is not submitted (or was submitted but is also rejected), the granting authority may also terminate the grant or the participation of the coordinator (see Article 32).

ARTICLE 33 — DAMAGES

33.1 Liability of the granting authority

The granting authority cannot be held liable for any damage caused to the beneficiaries or to third parties as a consequence of the implementation of the Agreement, including for gross negligence.

The granting authority cannot be held liable for any damage caused by any of the beneficiaries or other participants involved in the action, as a consequence of the

implementation of the Agreement.

33.2 Liability of the beneficiaries

The beneficiaries must compensate the granting authority for any damage it sustains as a result of the implementation of the action or because the action was not implemented in full compliance with the Agreement, provided that it was caused by gross negligence or wilful act.

The liability does not extend to indirect or consequential losses or similar damage (such as loss of profit, loss of revenue or loss of contracts), provided such damage was not caused by wilful act or by a breach of confidentiality.