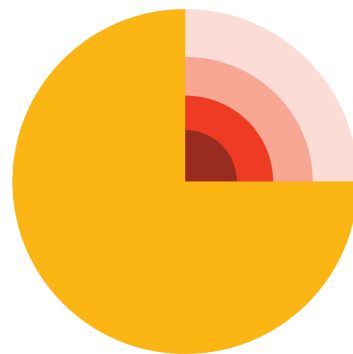




ChEESE

D7.3 Collaboration plan with complementary projects



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ChEESE-2P Deliverable

D7.3 Collaboration plan with complementary projects

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Abstract

This deliverable outlines the collaboration with other Centres of Excellence for HPC applications, NCCs, industry as well other EU funded activities.

I. Copyright

Copyright Members of ChEESE collaboration, 2023/2026.

II. Delivery Slip

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III. Version control

Version	Date	Description of change	Author/Partner
V1	09/06/2023	Initial draft	Maria Jose Garcia (CSIC)
V2	19/06/2023	Reviewed	Arnau Folch (CSIC)
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V4	26/06/2023	Reviewed	Dr. Piero Lanucara (CINECA)
V5	27/06/2023	Final version	Maria Jose Garcia (CSIC)

IV. List of Acronyms

Acronym	Description
CoE	Center of Excellence
EC	Equality Committee
EAB	External Advisory Board
GA	Grant Agreement
HE	Horizon Europe
IP	Intellectual Property
IUB	Industry and Users Board
KoM	Kick-off Meeting
NCC	National Competence Center
SE	Solid Earth
SO	Specific Objective

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1. Introduction

This document details the plan to ensure efficient collaboration with other EuroHPC Centres of Excellence (CoE) for HPC applications and National Competence Centers (NCCs), as well as third-party stakeholders (public, industry) and other international and EU funded activities. The goal is to boost synergies contributing to make ChEESE a hub for HPC in the Solid Earth (SE) community.

The SE ecosystem is indeed multidisciplinary and transversal, comprising Earth Observatories, research and academia institutions, model developers, and different typologies of end-users from the public and private domains. This diversity requires a proactive effort to prepare for the upcoming massive data streams and extreme-scale computing.

A Specific Objective (SO#13) related to task T7.2 has been set in the project Grant Agreement (GA) to align and liaise with other projects:

SO	Target	Means of verification (KPI)	Task
13	Coordinate with SE/HPC ecosystem in all phases of the definition, implementation, validation and evolution of ChEESE-2P activities	Successful activity of the liaison officers	T7.2

This document excludes the collaboration activities with the CASTIEL-2 Coordination Support Action (CSA) regarding the EuroHPC Special Access Scheme and the Continuous Integration and Deployment (CI/CD) of flagship applications because these aspects are covered by CASTIEL's deliverable D1.7: "Collaboration Plan with the CoEs" (delivered at M5). Moreover, a Collaboration Agreement with CASTIEL-2 is expected to be signed by the end of June, which will regulate legal aspects, including confidentiality and access rights for use of GDPR issues.

1.1. Collaboration steps and results from ChEESE-1P

During the first implementation phase of ChEESE (2018-2022) many synergies and collaborations were set at both national and international levels, although several face-to-face collaboration activities had to be cancelled (postponed) because of the COVID-19 pandemics. This said, some collaboration results included:

- PRACE: ChEESE used the existing PATC training network from PRACE to maximize the impact of its training activities.
- POP2 CoE: The collaboration between ChEESE and PoP in code audit and optimization were publicly communicated regularly through various channels. ChEESE presented a webinar hosted by PoP called « 12th PoP User Webinar - The Successful Interaction of ChEESE and PoP »
- Focus CoE: ChEESE was featured on the Focus CoE website in relation to how EU citizens benefit from Centres of Excellence.
- ModCompShock: ModCompShock used Tsunami-HySEA models and numerical schemes that were improved by ChEESE.
- VESTEC and LEXIS: ChEESE presented at the UrgentHPC (collocated with SC19), which was co-organised by VESTEC and LEXIS.
- IUB: the Industry and Users Board (IUB) at ChEESE was comprised of organizations from all around the world. They furnished the appropriate use-cases and requirements to perform 6 live exercises in which ChEESE services reaching high TRL (larger than 6) ran in operational mode.
- EPOS ERIC and service providers: first steps to make some ChEESE codes and workflows available through EPOS. Additionally, an article about ChEESE's intention to put codes in EPOS was published on the EPOS website. Part of these activities are continuing under the umbrella of the Geo-INQUIRE project (GA No 101058518, <https://www.geo-inquire.eu/>) to offer virtual and trans-national access to a set of Software as a Service (SaaS) and Workflows as a Service (WaaS) derived from ChEESE-1P (the so-called ChEESE-CoE Research Infrastructure).

- European Geosciences Union (EGU): ChEESE submitted a proposal for a Galileo conference entitled “Computational Geosciences in the Exascale Era” which took place in May 2023 and was very successful.
- Marie Skłodowska-Curie Actions: ChEESE participated in a European Researchers’ Night event, which is supported by the Marie Skłodowska-Curie Actions program.
- ICG/NEAMTWS (IOC/UNESCO): ChEESE is part of the Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North-eastern Atlantic, the Mediterranean and connected seas (ICG/NEAMTWS), a group coordinated by the Intergovernmental Oceanographic Commission of UNESCO (IOC/UNESCO). ChEESE partners participated in the steering committee meetings, plenary ICG Sessions, and other workshops, where ChEESE was always properly highlighted. NEAMTWS was mentioned in the ChEESE website and on deliverables and reports.
- Southern California Earthquake Center (SCEC): ChEESE used Cybershake, a Probabilistic Seismic Hazard Assessment (PSHA) map platform that SCEC has developed.
- Asian agencies: ChEESE is in contact with Asian agencies having operational mandates on natural hazards early warning and forecast to discuss potential ways of collaboration. Representatives from Indonesia, Philippines, Brunei, and Thailand attended the ChEESE PATC courses and initial conversations were held on ways of collaboration.
- A Business Prototyping Project (BPP) of EuroLab4HPC finished and the report submitted. The project (called USER) explored the exploitation possibilities of Urgent Seismic Simulations, in full synergy with the ChEESE-1P Pilot Demonstrator (PD1) developments. The report was shared with PD1 leader for its use within ChEESE.

ChEESE was successful in integrating the community around HPC, becoming the seed of a growing ecosystem of projects and initiatives. This is flourishing with projects and initiatives that will benefit from (and leverage the use of) current pre-exascale and upcoming exascale EuroHPC infrastructures. It includes:

- eFlows4HPC (2021-2023, GA No 955558, 7.6M€, <https://eflows4hpc.eu/>). An EuroHPC project for workflow software stack integrating HPC simulations with big data analytics and machine learning, with a pillar use-case on natural catastrophes (earthquakes and tsunamis).
- Geo-INQUIRE (INFRA-SERV call, 2022-2025, GA No 101058518, 13.9M€, <https://www.geo-inquire.eu/>). This HE project will provide virtual and trans-national service access to data and state-of-the-art numerical models and workflows with HPC resources.
- DT-GEO project (INFRA-TECH call, 2022-2025, GA No 101058129, 15.1M€, <https://dtgeo.eu/>). This HE project will deploy a prototype Digital Twin (DT) on geophysical extremes with long-term ambition towards Destination Earth.

Naturally, since these projects are ongoing they will continue promoting synergies during this second phase of ChEESE.

2. Collaboration Goals in ChEESE-2P

The collaboration goals for ChEESE-2P are defined in the GA (and in Task T7.6 in particular):

- Actively contribute to the coordination activities with complementary projects.
- Contribute to the knowledge pool in C2ISS, an information sharing system established by CASTIEL-2 to collect all kinds of information on training, success stories, available codes, and documentation of new developments.
- Establish effective collaborations and jointly addressing cross-cutting issues and participate in regular meetings to plan, implement and monitor collaborations and to synchronize research and development activities.
- Participate in benchmarking exercises and share results and best practices as relevant.
- Promote joint publication and dissemination of results through shared events.
- Actively contribute to a common Continuous Integration and Deployment of the ChEESE-2P flagship codes with automated

testing (e.g., using Special Access scheme in collaboration with CASTIEL 2) on all EuroHPC systems.

- Establish common best practices for IP management and development including effective measures to ensure code quality (e.g. get the EOSC-synergy SQAaaS badge for repositories), reviews, testing, management and development cycles
- Actively advancing modularization: implementation of concrete measures for identification of common routines/algorithms/modules, creation and extension of software libraries used by multiple codes across disciplines.

During our Kick off Meeting (KoM) in Barcelona (19-20 January 2023) we identified liaison officers for some projects or initiatives whose goals are closely aligned to the ones in ChEESE-2P. The role of the liaison officers, defined in Task T7.2, is to maintain efficient communication and seek collaboration opportunities between the related project and ChEESE-2P.

No	Project/	Project	Officer	Partner
1	Destination Earth		Arnau Folch	CSIC
2	CASTIEL-2 CSA and other CoEs	CASTIEL-2	Jose Gracia	HLRS
3		EsiWACE3	Erwan Raffin	BA
4		HPC3	Joan Farnos	BSC
5	EuroHPC and REA/HE funded projects	EuPILOT	Marta Garcia	BSC
6		EuPEX	Erwan Raffin	BA
7		eFlows4PC	Josep de la Puente	BSC
8		DT-GEO	Ramon Carbonell	CSIC
9		GEO-Inquire	Stefano Lorito	INGV
10		EOSC (and EOSC - synergy 2)	To be decided	CSIC
11	ERIC	EPOS	Stefano Lorito	INGV
12	NCCs		Joan Farnos / Maria Jose Garcia	CSIC BSC

During the KoM it was decided that for EOSC-synergy the officer will be decided once the project starts. Very close ties will be kept with Destination Earth (DestinE) initiative of the Europe Programme, specifically with the digital twins and geophysical extremes atmosphere, and ocean. The project officer of DestinE has been appointed as a member of the external advisory board (EAB).

Liaison officers are expected to come up with concrete actions to promote cooperation. In a sense they are responsible for community building activities which will federate with end-users across the National Competence Centres (NCCs) and IUB members, including training and capacity building to widen the access to codes and fostering transfer of know-how to end-user Communities.

3. Collaboration with Industry

Industry involvement is essential for ChEESE-2P, especially when it comes to identifying all project exploitable outcomes. We envision that the project will conclude with several potentially commercial services to ensure the sustainability for most relevant innovations of the project market. With this in mind a sustainability plan will be created (M25-M48). The plan will require end-users engagement to identify the various target audiences related to industry (HPC vendors, HPC users and industry that covers the SE community), academia, public bodies and policy makers.

The Industry and Users Board (IUB) was created to promote interaction and it became a pivotal body already in the first phase of ChEESE. The IUB serves as an independent, industry-based mechanism for obtaining feedback on project interim results. Moreover, and in collaboration with the Project Innovation Manager (PIM), a role who is being carried by Dr. Joan Farnos (BSC), it facilitates Industry and project end-user communities direct participation in identifying and pursuing exploitation opportunities. It comprises representatives of industry, SMEs, academic networks, and public governance bodies.

In ChEESE-2P and in order to facilitate a more efficient collaboration, we created two different types of IUB membership:

- A full-time membership: IUB full-time members will be invited to meetings, general assemblies and will provide essential feedback that

will impact the progress of the project. They have been requested to sign a non-disclosure agreement (NDA) to ensure confidentiality.

- A collaboration membership: IUB collaboration members will be informed of ChEESE-2P progress throughout the project, but they will not be actively involved in the discussions.

The decision regarding which organizations would be in either category was taken by the Project Supervisory Board (PSB) (See annex 1)

4. Collaboration with NCCs

The NCCs have established European-level collaborations between each other through the project CASTIEL-2, for instance, in the form of mentoring and twinning activities, but also networking in the form of joint events and other collaborative activities.

A survey will shortly be conducted to identify NCCs with interest in the two specific topics of geophysics and emergency management. Based on the results, twinning between NCCs on a similar level and mentoring or training between NCCs with different levels will be established. We can anticipate that, given the high likelihood of geophysical extremes, collaboration will concentrate on NCCs based in Italy, Spain, Iceland, Turkey and Portugal.

5. Collaboration with other CoEs

Besides the steps we have already established to promote collaboration, we expect some additional results from the mechanisms CASTIEL-2 will put in place to enable organic, individual collaborations between CoEs, as this one is one of CASTILE-2 objectives. In case POP3 is finally funded in the new round, we plan to perform ChEESE Task 2.1 (code audits) in close collaboration.

5.1 Leading a common training series dedicated to equality

ChEESE has since the beginning been committed to embracing diversity and inclusion. The Equality Committee and the ShEESE initiative to promote gender balance during the first ChEESE are illustrative measures to this commitment.

We believe diversity is an essential element to delivering excellence in science. For this reason, we are planning to lead a training series dedicated to equality and gender balance in HPC. ChEESE will act as the organizer and other CoEs will be invited to attend. We plan to bring real experts on the field in order to make this meaningful, and all involved can be educated and ultimately act on equality principles.

We expect some of these workshops to be open to everyone, however others will be dedicated to the pressing topic of moving towards gender balance in HPC and will target female participation.

Some of the topics of these workshops are as follows:

- How to move towards inclusiveness in European Projects
- Overcoming impostor syndrome as a female scientist
- Leadership tools for women in HPC

The details of these workshops are still being discussed in our Equality Committee meetings. However, in principle we will offer 3 or 4 workshops and prioritize a hybrid or virtual format to encourage further participation and align with European sustainability goals.

Deliverable D7.4 – Training Plan (Month 8) will also include this training series. The impact of all these activities will be carefully considered and the evolution of relevant KPIs monitored and quantified in the D7.6 – Training Report (Month 42).

6. Outlook & Next Steps

In short, computational geosciences needs to rely on shared knowledge in order to prepare for upcoming challenges and achieve its ultimate goals which are saving lives and anticipate future scenarios.

ChEESE-2P emphasizes the idea on the uptake by science, public administration and industry, including training and capacity building in cooperation with National Competence Centers (NCCs). The collaboration with other projects and initiatives which started already in the first phase of ChEESE is expected to continue and even intensify in this second phase.

When it comes to SE we must into Destination Earth (DestinE) updates and developments in the future (<https://destination-earth.eu/destination-earth/>). This EU initiative will keep close ties with EuroHPC Joint Undertaking and aims at coming up with a digital replica of the Earth. Because of its relevance and impact is expected that ChEESE-2P will liaise, align, and synergize with this longer-term mission initiative.

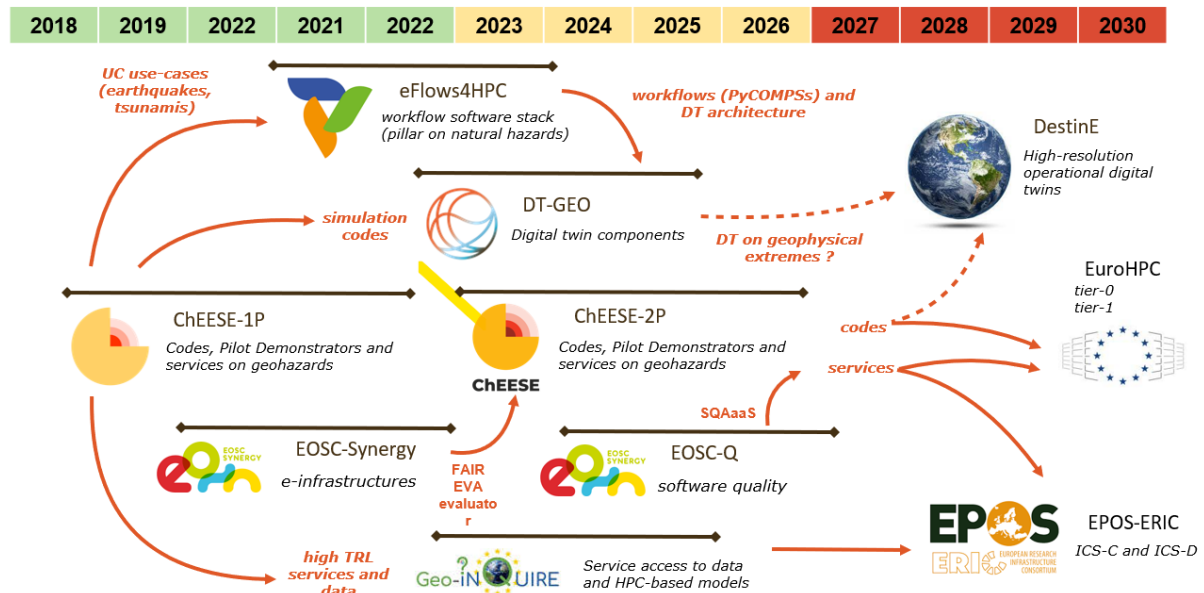


Figure 1: Overview of interrelated projects with long-term ambitions in the SE ecosystem

Annex 1

No	Name	Full member status	IUB	Observer
1	Italian Civil Protection Department (DCP)	X		
2	Icelandic Civil Protection			X
3	Spanish Geographic National Institute (IGN)	X		
4	International Association of Seismology and Phys. Earth's Interior (IASPEI)			X
5	International Association of Volcanology and Chem. Earth's Interior (IAVCEI)			X
6	European Plate Observing System (EPOS)	X		
7	Geohazard Supersites and Natural Laboratory (GEO-GSNL)			X
8	REPSOL			X
9	Schlumberger			X
10	Global Parametrics			X
11	ARM			X
12	FAULT2SHA			X
13	Modeling Collaboratory for Subduction (MCS)			X
14	ARISTOTLE	X		
15	Norwegian Water Resources and Energy Directorate (NVE)			X
16	AuScope	X		
17	National Computational Infrastructure Australia (NCI)	X		
18	International Center for Earth Simulation (ICES)			X
19	NVIDIA			X

20	Global Earthquake Modeling Foundation (GEMF)		X
21	Mexican National Seismic Institute (<u>SSN</u>)	X	
22	The Buenos Aires Volcanic Ash Advisory Center (VAAC)	X	
23	Norwegian Meteorological Institute		X
24	CAT-INGV	X	
25	Centro PLINIVS	X	