ChEESE

D6.7 Dissemination and Exploitation Report

Version 2.5

Document Information

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Change Log

Version	Description of Change
V1.0	Initial draft for internal review
V2.0	Initial draft for internal review (including exploitation)
V2.1	Revised by Project Coordinator
V2.2	Draft including PC suggestions
V2.3	Further modifications
V2.4	Revised by Reviewers
V2.5	Final version

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List of Acronyms

CoE	Center of Excellence
GA	General Assembly
HPC	High Performance Computing
IPR	Intellectual Property Rights
IUB	Industry and Users Board
NDA	Non-disclosure agreement
PC	Project Coordinator
PD	Pilot Demonstrator
PEC	Project Executive Committee
PIM	Project Innovation Manager
PSB	Project Supervisory Board
TRL	Technology Readiness Level
WP	Work Package

1. Executive summary

This report summarizes the dissemination and exploitation activities carried out by the ChEESE CoE from 1 November 2018 (M1) to 31 October 2020 (M24). The report includes a complete list of tasks related to the corporate image of the project as well as of its communication channels (website and social media), dissemination materials, press coverage, events, and publications.

During the first 24 months of the project, the consortium participated in a total of 56 events, and organized and co-organized 8 training courses. Up to 27 press mentions were recorded and 30 open access scientific papers were published. With the aim to build a community around the project, the dissemination team posted regular updates on the project's dedicated Twitter and LinkedIn channels.

In terms of exploitation, a growing list of exploitable assets has been identified. The market context has been analyzed and the technologies, use cases and promotion activities have been aligned to it. A growing number of exploitation activities per partner have been identified. The two IUB meetings, embedded in the General Assemblies (Rome, Paris), allowed collecting relevant feedback from the IUB experts. The activities have been implemented between M1 and M24, and include:

1. Description of the main mission, vision and objectives, altogether with the used methodology.
2. Identification, collection and grouping of exploitable results generated.
3. Analysis of exploitable results towards their exploitation validation at CoE level and market uptake.
4. Selection of highly promising results and identification of Pilot exploitation strategies.
5. Assessment of the external experts according to their technological and market potential. Inclusion and growth of the IUB members.
6. Initial discussion about the long-term sustainability strategy of ChEESE, becoming a legal status entity.

We already envision several success stories that will make sure of ChEESE's technologies being further developed, used and adopted on top of the project context.

The dissemination and exploitation team has successfully carried out several tasks indicated in D6.1 (Communication and Dissemination Plan), D6.5 (Training Plan), and D6.6 (Exploitation Plan).

2. Introduction

The objective of this report is to present a detailed list of the dissemination and exploitation activities which took place during the project's initial 24-month period, as planned in D6.1, D6.5 and D6.6. The activities were carried out in order to establish the ChEESE brand and build a community around the project. This deliverable covers the progress of tasks T6.1, T6.2 and T6.3 over this period.

3. Dissemination and Exploitation Objectives and Target Audiences

The overall goal of ChEESE WP6 is to maximize the impact of the project, increase awareness, identify exploitable results and engage key stakeholders through training activities. The specific dissemination and exploitation objectives for the ChEESE project are the following:

1. To identify and perform communication and dissemination activities in order to maximize the impact of the project, in collaboration with other EU research activities, scientific audiences and industry forums.
2. To identify the exploitable results of the project and to define the potential commercial strategies and services for the ChEESE results (market study, business models, distribution channel and promotional strategy) to reach the market.
3. To identify and perform training activities in order to engage interested parties in the usage of the ChEESE results.

In order to achieve the 3 objectives above, a number of target audiences and stakeholders were identified in D6.1 (Communication and Dissemination Plan) that are still in force:

1. Scientific community in geoscience and High Performance Computing (HPC)
2. Industrial stakeholders and policy makers
3. Young researchers
4. General public

4. Corporate image

In accordance with D6.1, a common graphic identity was developed in order to create a recognizable brand associated to the project. This image has been consistently applied by all partners and in all communication and dissemination materials. A brand guide was developed and serves as a manual to define the usage of the ChEESE brand including the color palette, different types of logos, font size, typography, etc. This brand guide is available to download on the ChEESE wiki for all partners to apply correctly.

4.1 Logo

The logo of the project has been defined and used in all project communication and dissemination channels (Table 1). A color version has been created for light backgrounds and a negative version for dark backgrounds. They are available for download on the website and the project Wiki.

Colour version	Negative version

Table 1. ChEESE logos

4.2 Presentation template

The presentation template (Figure 1) was designed in order to be used in all presentations done by ChEESE partners in workshops, conferences, training courses, etc. This template gives some design guidelines by defining common layouts, font sizes, etc. The presentation template is available both in Microsoft PowerPoint and Open Office in 16:9 format. It has been uploaded to the project Wiki and shared with all the partners.

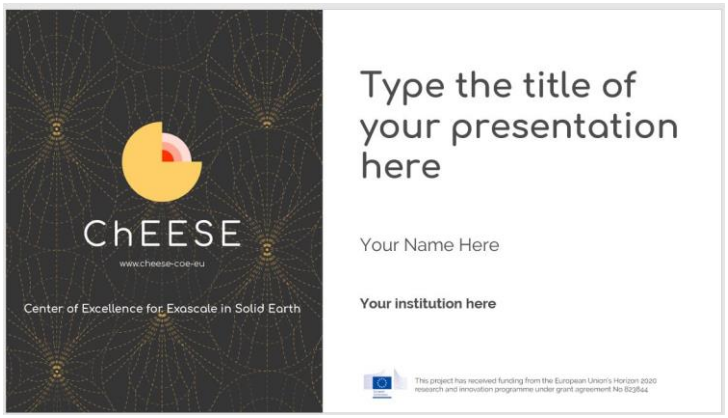


Figure 1. ChEESE presentation template

5. Dissemination channels and tools

In order to efficiently reach the targets for promoting the results and maximizing the visibility of the project, a broad spectrum of dissemination channels and tools are used. The public website plays the central role in dissemination as it is the most important channel for communicating the project's information. Social media is also a very useful tool to reach out to society together with press releases, leaflet, presence in events, etc. The following sections describe in detail the selected channels and tools.

5.1 Website

The website (https://cheese-coe.eu/) was launched in December 2018. It was built with the Drupal system and complies with the technical requirements of performance and security. The website also provides information on how to access the project Wiki, an internal repository where ChEESE partners can share and upload files and documents.

During the first 24 months of the project, the performance of the ChEESE website has been excellent.

Sessions	Users	Page views	Av. Session duration
12,271	8,234	31,289	00:02:27

Table 2. ChEESE website analytics, M1 to M24

The main indicators of the ChEESE website, shown in Table 2 above, show that the page is achieving its targets. The total number of sessions during the period M1-M24 is 12,271, well above the defined Key Performance Indicator (KPI) of 1,000 sessions per year, as established in D6.1 (Communication and dissemination plan).

The total number of users during the same period is 8,234 and the total number of page views is 31,289. Users show engagement with the website, as it is indicated by the average session duration found at 2:27 minutes. These numbers are expected to grow as the website will be populated with more content, such as news, research results and publications. More content on the project's use cases and success stories will also be created in the following months.

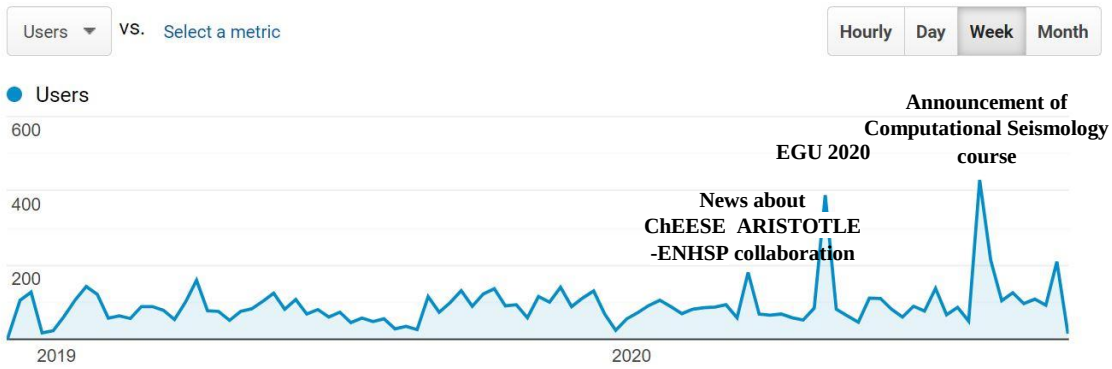


Figure 2. Website visits from M1 to M24

The flow of weekly sessions during the 24-month period, shown in Figure 2 above, helps to better understand the performance of the page. In 2020 we have seen very high spikes in web visits which can be traced through Google Analytics. News about ChEESE´s collaboration with ARISTOTLE-ENHSP was widely shared and liked on social media, leading to the high number of visits in March 2020. Another spike in web visits was caused by ChEESE partners´participation in EGU 2020 conference in May 2020. There were 12 presentations by ChEESE partners which resulted in a lot of interest in the project. Finally, the highest spike we have seen was recorded in August 2020 and was the result of ChEESE´s announcement of a PATC (Advanced Training on HPC for Computational Seismology) training course. That webpage announcement received 1,289 page views to date and shows that there is very high interest in the training courses and research of ChEESE.

The most visited pages of the ChEESE website are shown in Figure 3. The landing page is the most viewed page with 8,383 views followed by the CHEESE Advanced Training on HPC for Computational Seismology page with 1,289 views. The third most visited

page on the ChEESE website is the news page, which is updated regularly. The news articles are also promoted heavily on social media, which brings more views to the website.

	Page	Pageviews	% Pageviews
1.	/	8,383	26.79%
2.	/events/patc-cheese-advanced-training-hpc-computational-seismology	1,289	4.12%
3.	/events	1,067	3.41%
4.	/media/news	1,049	3.35%
5.	/about/partners-and-coordinator	978	3.13%
6.	/about/objectives	935	2.99%
7.	/publications	911	2.91%
8.	/results/pilots	822	2.63%
9.	/results/flagship-codes	603	1.93%
10.	/events/workshops	583	1.86%

Figure 3. Top 10 most visited pages, M1 to M24

Following the project mid-term review recommendations given in June 2020, the dissemination team has begun updating the ChEESE website with more results and data from the project. In order to further improve the website, a survey was sent to ChEESE partners asking them about their opinions about the website's usability and aesthetics. Based on the survey results a plan has been created in order to implement the changes. Members of ChEESE's Industry and Users Board (IUB) will also be asked to give their opinions about how informative and attractive the website is in order to further improve it.

5.2 Social media

The two main purposes of ChEESE´s social media channels are to engage target audiences through interesting and informative posts and to lead them to the website in order to learn more about the project. ChEESE´s Twitter and LinkedIn channels are updated three to five times a week. There has been a good level of engagement with ChEESE members and non-members, reflected in the growing number of followers and shares of ChEESE posts.

5.2.1 Twitter

There are 689 followers on the ChEESE Twitter channel as of M24 (Figure 4). Many ChEESE partners are active on Twitter, which has helped the dissemination of ChEESE news and results through this channel. Furthermore, ChEESE is engaged with other European initiatives such as Focus CoE, EXDCI, PRACE, EPOS, as well as other CoEs in sharing each other´s content.

Figure 4. Twitter followers at M24

The most popular tweet as of M24 is the announcement of ChEESE´s training course called "PATC: CHEESE Advanced Training on HPC for Computational Seismology" (Figure 5).

Figure 5. Most popular Twitter post at M24

According to Twitter Analytics, this post received 16,187 impressions and 678 total engagements (Figure 6).

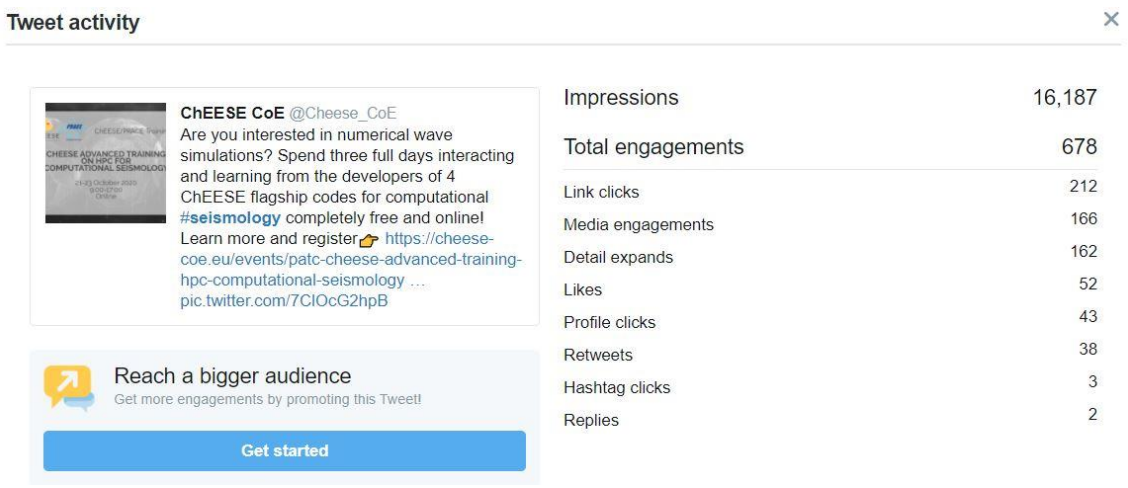


Figure 6. Twitter analytics of most popular post at M24

5.2.2 LinkedIn

The ChEESE LinkedIn page has 247 followers as of M24 (Figure 7). ChEESE posts are disseminated by several partners who are active on LinkedIn as well as other European initiatives such as Focus CoE.

Figure 7. LinkedIn followers at M24

The most popular LinkedIn post as of M24 is a social media banner containing a quote by Alejandro Marti from Mitiga Solutions, one of ChEESE´s IUB members (Figure8).

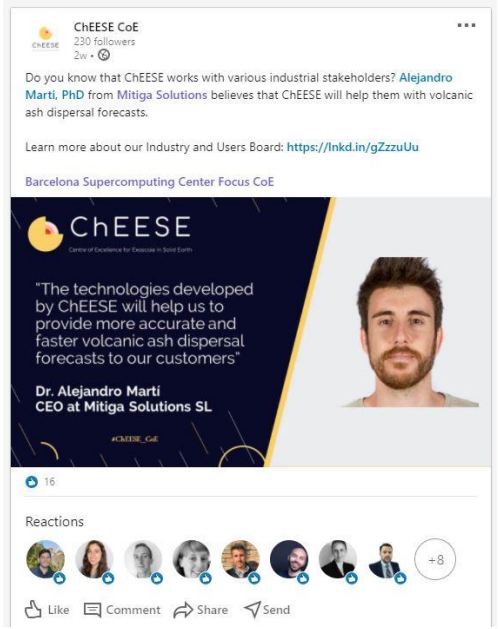


Figure 8. Most popular LinkedIn post

According to LinkedIn analytics, this post has received 901 impressions, 27 clicks and 16 reactions (Figure 9).

Read about the latest news and updates of ChEESE and other CoEs in this latest issue ... All followers	Rose Gregorio	9/28/2020	66	-	2	3.03%	3	0	0
ChEESE coordinator Arnau Folch Duran was invited to speak at a very important Italia... All followers	Rose Gregorio	9/23/2020	834	-	8	1.32%	9	0	0
Do you know that ChEESE works with various industrial stakeholders? Alejandro... All followers	Rose Gregorio	9/18/2020	901	-	27	3%	16	0	0
Attending the #OpenPOWERSummit today? Don´t miss "CINECA OpenPower-based H... All followers	Rose Gregorio	9/15/2020	124	-	3	2.42%	6	0	0
📣📣New ChEESE publication alert 📣📣 Click to read the paper:... All followers	Rose Gregorio	9/14/2020	277	-	6	2.17%	10	0	2

Figure 9. LinkedIn analytics of most popular post at M24

LinkedIn analytics provides demographics information about ChEESE followers. The information presented in Figure 10 shows the type of audiences that visit the ChEESE website. They are in line with the target audience mentioned in D6.1 Communication and Dissemination Plan.

The figure below shows that those in research and higher education are the top visitors of ChEESE, followed by industrial stakeholders such as those working in information technology and services, civil engineering, computer software and policy makers.

Figure 10. Top visitors on LinkedIn at M24

5.3 Videos

ChEESE has produced two official videos that talk about the research of the project. They have been uploaded to the Barcelona Supercomputing Center YouTube channel and can be viewed at https://youtu.be/p0HbxE7J_qA and https://youtu.be/IjpwNQPq_cU. They have been uploaded to the ChEESE website and shared on various social media channels.

The first video, titled "ChEESE: the HPC center of excellence in Solid Earth in three minutes", currently has 510 views.

The second video, titled "ChEESE: Saving lives and mitigating the effects of natural catastrophes" currently has 887 views. It has been featured on the main page of the Focus CoE website.

A third video, which will focus on ChEESE results and data, will be ready by M33.

In order to promote women in science, a video featuring ChEESE´s women researchers will be produced and promoted on the website and social media.

Figure 11. A frame taken from the first video entitled; ChEESE: the HPC center of excellence in Solid Earth in three minutes

Figure 12. A frame taken from the second video entitled: ChEESE: Saving lives and mitigating the effects of natural catastrophes

5.4 Webinars

ChEESE researchers have participated in a POP webinar entitled "12th POP User Webinar - The Successful Interaction of ChEESE and POP" in November 2019. ChEESE also intends to collaborate with other projects or initiatives in creating other webinars in the future.

5.5 Dissemination pack

5.5.1 Brochure

The general ChEESE brochure provides an overview of ChEESE's project's objectives, main features, partners, and website and social media links. The design was approved by all partners. It has been printed to be distributed in events or local actions defined by each partner. It is available to download on the ChEESE branding page and the project Wiki.

Figure 13. ChEESE brochure front and back

5.5.2 ChEESE introduction poster

The ChEESE introduction poster, which contains general information about the project, is available on the Wiki (Figure 14). It has also been shared will all partners. It is editable so partners may modify it to suit their presentations.

Figure 14. ChEESE introduction poster

5.5.3 ChEESE introduction PowerPoint presentation

The ChEESE introduction PowerPoint presentation contains all the basic information about ChEESE such as funding information, coordinators and partners, as well as objectives and tasks included in the project (Figure 15). This presentation has been shared with all partners and is available on the project Wiki.

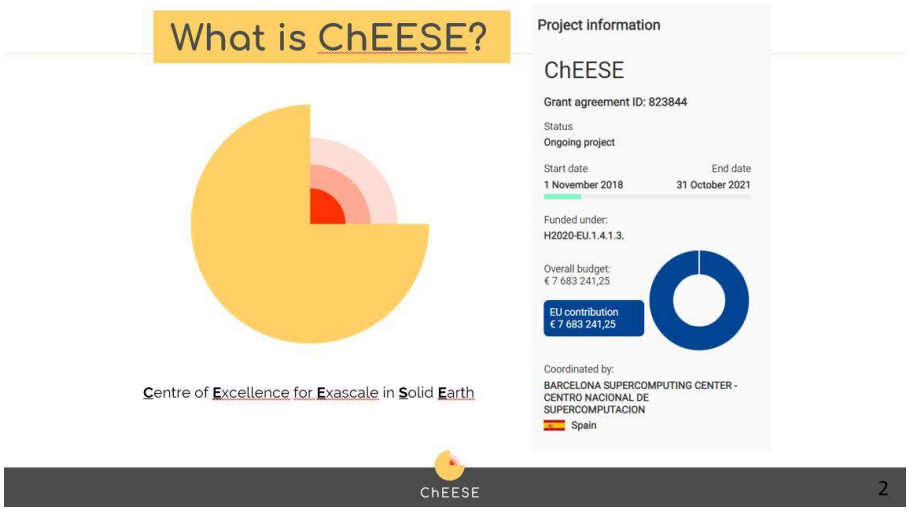


Figure 15. ChEESE introduction PowerPoint presentation

5.6 Press releases and mentions

ChEESE had launched one official press release in the beginning of the project that had limited reach. A strategy to contact individual media outlets was developed, resulting in more press mentions. Besides the dissemination team´s efforts, the activities of ChEESE partners have also resulted in a lot of press mentions.

As listed in Table 3, ChEESE has recorded a total of 27 press clippings for M1-M24, some of which are mainstream media such as BBC and National Geographic, as well as Spanish television channels CanalSur and RTV Marbella. The following list enumerates the media that have featured ChEESE research or activities:

#	Website	Date	Title
1	Eurolab4HPC	23 February 2019	The first Eurolab4HPC Business prototyping Projects kicking off: "USER"!
2	The EPOS Newsletter issue 03 July 2019	31 July 2019	Riding the wave of the future in supercomputing: Center of Excellence for Exascale in Solid Earth (ChEESE) will share Exascale-compatible codes on EPOS repository
3	Scientific Computing World HPC Yearbook 2019-2020	8 October 2019	Say ChEESE
4	Focus CoE	17 December 2019	How do EU citizens benefit?
5	PRACE	8 January 2020	Dr. Alice-Agnes Gabriel wins 2020 PRACE Ada Lovelace Award for HPC
6	HPCwire	8 January 2020	Dr. Alice-Agnes Gabriel Wins 2020 PRACE Ada Lovelace Award for HPC
7	InsideHPC	8 January 2020	Dr. Alice-Agnes Gabriel from LMU wins Ada Lovelace Award for HPC
8	Scientific Computing World	9 January 2020	Dr Alice-Agnes Gabriel wins the 2020 PRACE Ada Lovelace award
9	EPOS website	13 January 2020	ChEESE doubles speedup of seismic wave propagation code SPECFEM3D
10	CORDIS	6 February 2020	ChEESE doubles speedup of seismic wave propagation code SPECFEM3D
11	BSC website	27 February 2020	The paradox of Anak Krakatau, the Indonesian volcano that froze the atmosphere
12	Earth Networks	28 February 2020	How Volcanic Lightning Happened for Six Days

13	BBC	28 February 2020	Anak Krakatau: Lightning frenzy points to scale of volcanic plume
14	National Geographic	28 February 2020	Volcanic eruption sparked a weeklong thunderstorm, and scientists want to know why
15	The Nation	2 March 2020	Flash frenzy reveals scale of Anak Krakatau plume
16	CORDIS	6 March 2020	Boosting EU's research and innovation potential with a cutting-edge computing ecosystem
17	MeteoWeb	10 March 2020	L'eruzione del vulcano Anak Krakatau ha congelato l'atmosfera: ha generato dieci milioni di tonnellate di ghiaccio e 100.000 fulmini
18	Sicilia Report	10 March 2020	L'eruzione dell'Anak Krakatau ha creato ghiaccio e fulmini
19	Canal Ansa	11 March 2020	Il vulcano che nel 2018 ha congelato l'atmosfera
20	Villaggio Globale	10 March 2020	L'eruzione dell'Anak Krakatau ha creato ghiaccio e fulmini
21	Popular Science	11 March 2020	Anak Krakatau: il vulcano indonesiano che ha congelato l'atmosfera
22	Forbes	29 March 2020	Eruption Triggers 'Volcanic Freeze'
23	Mother Nature Network	1 April 2020	Fatal eruption triggered a 'volcanic freeze'
24	Canal Sur	2 April 2020	La Universidad de Málaga, a la cabeza en la prevención de tsunamis
25	Lava and Lightning	27 April 2020	Lava and lightning
26	NIUS	5 July 2020	El tiempo de reacción ante un tsunami sería de 45 minutos en las costas de Huelva y Cádiz
27	RTV Marbella	3 August 2020	Microplaya: El Cable y la Bajadilla

Table 3. List of press mentions

5.7 News articles

The WP6 team writes news articles about ChEESE regarding the events that partners attended, and general news and updates on the research of each work package (WP). The aim of these articles is to keep the ChEESE news page updated, drive traffic to the website

and share content on the social media channels in order to increase the number of followers and, in fact, to increase its engagement. During the reported period, there were 31 project-related news articles written by ChEESE partners and uploaded to the website.

An editorial plan was created early on in the project indicating that different partners are expected to take turns writing a technical news item for the website. Partners have been very collaborative in helping WP6 fulfil its objectives with regards to populating the news section of the website.

5.8 Events

As of M24 ChEESE partners have now participated in 56 international conferences, workshops and other events. Events where partners attended but did not present ChEESE research are not taken into account in this report. Partners have given 101 presentations in total, with a whopping 16 presentations coming from AGU Fall Meeting 2019 alone.

It is worth noting that several events were cancelled due to COVID-19. For example, ChEESE was supposed to give a presentation at DGG 2020 and the project had spent a significant amount of effort organising the cancelled European Urgent Computing Workshop at EuroHPC Summit Week 2020. However, the project is still committed to organizing this workshop at EuroHPC Summit Week 2021.

ChEESE submitted a Galileo Conference proposal to the European Geosciences Union (EGU) in February 2020. This was a task that that ChEESE committed to in the project proposal. We are currently still waiting for the results.

ChEESE partners have adapted their dissemination activities very well despite the restrictions caused by COVID-19. From mid-March 2020 until the end of October 2020 (M24), partners have participated in events virtually, sometimes pre-recording their talks to comply with conference presentation formats.

#	Type	Event	Date	Presentations
1	Workshop	PRACE, CoEs, FET-HPC, EXDCI workshop	30 October 2018	1
2	Workshop	FAULT2SHA Workshop	26 November 2018	1
3	Conference	AGU Fall Meeting 2018	10-14 December 2019	2
4	Workshop	Third Schatzalp Workshop on Induced Seismicity	5-8 March 2019	1
5	Meeting	ESiWACE2 kickoff meeting	12-13 March 2019	1
6	Conference	EGU General Assembly 2019	7-12 April 2019	5
7	Conference	EuroHPC Summit Week 2019	13-17 May 2019	1
8	Seminar	Pint for Science	20 May 2019	1
9	Workshop	Northquake 2019 Workshop	21-24 May 2019	2
10	Workshop	Modelling of nonlinear dispersive waves: Mathematical	27-29 May 2019	1

		theory and numerical approximation workshop		
11	Conference	deRSE19	4-6 June 2019	1
12	Conference	TERATEC 2019	11-12 June 2019	1
13	Conference	SIAM Conference on Mathematical & Computational Issues in the Geosciences	11 June 2019	1
14	Conference	ISC19	16-20 June 2019	1
15	Workshop	NMEM 2019 workshop	30 June-4 July 2019	4
16	Conference	27th IUGG General Assembly	8-18 July 2019	4
17	Seminar	IMCE-UC seminar	22 July 2019	1
18	Workshop	Advanced Workshop on Earthquake Fault Mechanics: Theory, Simulation and Observations	2-14 September 2019	1
19	Conference	SCEC Annual Meeting	7-11 September 2019	1
20	Conference	PPAM 2019	8-11 September 2019	1
21	Seminar	Presentation of the Socio-economic Impact Report of Mathematics	19 September 2019	1
22	Seminar	European Researchers´ Night	27 September 2019	1
23	Workshop	MCS Megathrust Modeling Workshop	6-9 October 2019	1
24	Meeting	AGITHAR Kick-off meeting	7-9 October 2019	1
25	Hackathon	CINECA GPU Hackathon	7-10 October 2019	2
26	Workshop	Alboran Domain and Gibraltar Arc: Geological Research and Natural Hazards	16-18 October 2019	1
27	Workshop	Wind- Remobilisation Processes of Volcanic Ash Workshop	23-26 October 2019	2
28	Webinar	12th POP User Webinar - The Successful Interaction of ChEESE and POP	12 November 2019	1
29	Workshop	International Workshop on Tsunamis	14 November 2019	1
30	Workshop	2019 International Workshop on Software Engineering for HPC-Enabled Research (SC19)	17 November 2019	1
31	Workshop	UrgentHPC workshop	17 November 2019	1

32	Seminar	Insurance Compensation Consortium Annual Meeting 2019	28 November 2019	1
33	Workshop	ICG/NEAMTWS 2019	2-4 December 2019	1
34	Conference	Computing Insight UK 2019	5-6 December 2019	1
35	Conference	AGU Fall Meeting 2019	9-13 December	16
36	Workshop	SCEC Dynamic Rupture Group Ingredients Workshop on Fault Friction	8 January 2020	1
37	Conference	SIAM PP 2020	12-15 February 2020	4
38	Seminar	Bojos per la Supercomputacio	1 March 2020	1
39	Conference	Supercomputing Frontiers Europe 2020 (Virtual)	23 March 2020	1
40	Conference	High Performance Innovation Conference (Online)	30 March 2020	1
41	Seminar	The Deformation & Tectonics Talk Series (Online)	10 April 2020	1
42	Workshop	ExaHyPE user/dissemination workshop (Online)	22-26 April 2020	1
43	Conference	EGU 20 (Online)	4-8 May 2020	12
44	Meeting	VECMA All-hands meeting	12 May 2020	1
45	Conference	ISC 2020	22-25 June 2020	1
46	Conference	LOD2020	19-23 July 2020	1
47	Conference	CMMSE 2020	30 July 2020	1
48	Workshop	SCEC CVM Workshop	1 September 2020	1
49	Conference	106 Congresso Nazionale	14-18 September	1
50	Conference	SCEC Annual Meeting 2020	14-17 September 2020	3
51	Conference	OpenPOWER Summit North America 2020	15 September 2020	1
52	Workshop	Virtual Seismic Tomography	6 October 2020	1
53	Workshop	Advancing Our Understanding of Earth Dynamics in CIG IV workshop	13-15 October 2020	1
54	Workshop	Beyond the Horizon	15 October 2020	1
55	Workshop	Micromechanics, Statistics and Hazards of Mechanical Failure Workshop	19-22 October 2020	1
56	Seminar	Enzo Levi Seminar	30 October 2020	1

Table 4. List of ChEESE events

Events that fall outside of the reporting period were not included in the table above. However, it is worth noting that ChEESE has encouraged women partners to participate in more conferences and workshops. This has resulted in two confirmed talks at the upcoming Women in HPC workshop at SC20 and several others at AGU Fall Meeting 2020.

5.9 Training

ChEESE has collaborated with PRACE in order to use their PRACE Advanced Training Centre (PATC) platform for four of the project´s training courses. This is in line with what was committed to in the grant agreement, wherein four PATC course were proposed. Specific training courses on codes Tsunami Hy-SEA and ExaHyPe, as well as one on seismic risk analysis have also been organised. The PATC course called CHEESE Advanced Training on HPC for Computational Seismology was very popular with participants. We had received 160 registrations to this course and its announcement had resulted in over 1,200 visits to the website. Despite the huge number of registrations, the course only had space for 50 participants. ChEESE will organise another computational seismology course in the future if necessary.

It is worth noting that changing training courses to online format has widened the reach of ChEESE, allowing for more people from all around the world to be able to participate.

#	Training course	Date
1	2nd ExaHyPE user workshop	22-26 July 2019
2	Tsunami-HySEA training course (UTFSM)	23-26 July 2019
3	Tsunami-HySEA training course (UNA)	4-8 November 2019
4	PATC: School on Numerical Methods for Parallel CFD	2-6 December 2019
5	PATC: HPC and natural hazards: modelling tsunamis and volcanic plumes using European flagship codes	2-5 December 2019
6	Curso sobre el Analisis del Riesgo Sísmico (Seismic Risk Analysis Course)	9 March 2020
7	PATC: CHEESE Advanced Training on HPC for Computational Seismology	21-23 October 2020
8	PATC: Tools and techniques to quickly improve performances of HPC applications in Solid Earth	26-28 October 2020

Table 5. List of ChEESE training courses

The chart and images in Figure 16 show the number and type of training course participants as well as the countries they are from.

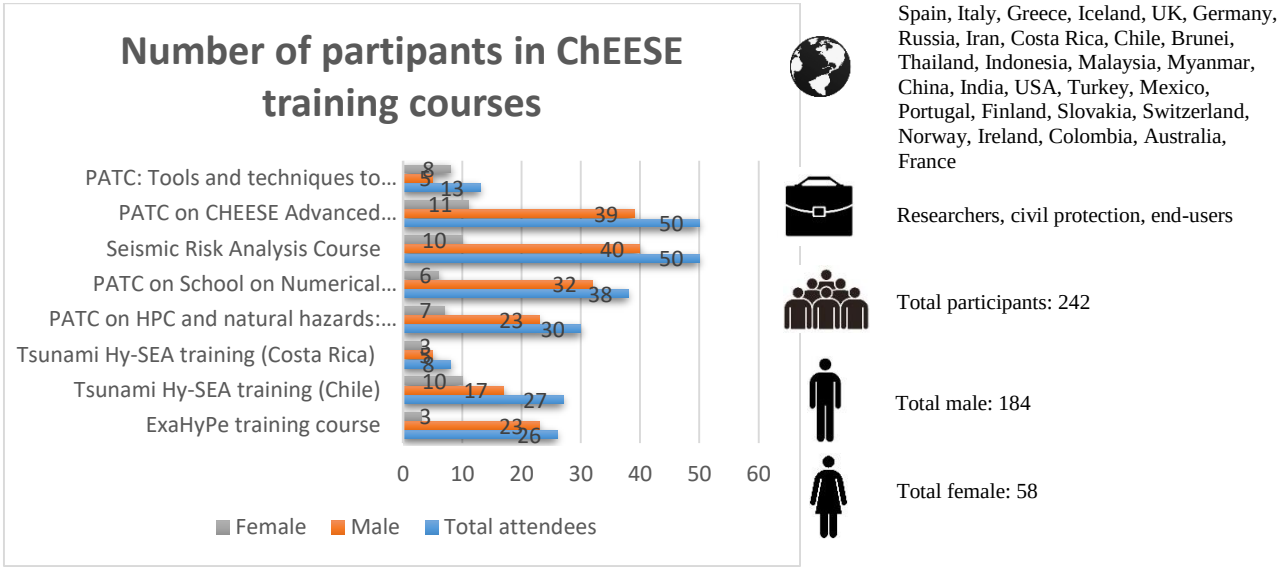


Figure 16. Training course participants

5.10 Publications

As of M24 there are now 30 peer-reviewed open access scientific publications, 24 in journals (87% in Q1 journals, 13% in Q2) and 6 in conference/workshop proceedings. ChEESE also published 1 white paper during this period.

The publications listed are open access and include the ChEESE acknowledgment sentence.

#	Year	Publication	Journal/Conference	SJR 2018 (*)	Quartile
1	2019	A Stochastic Rupture Earthquake Code Based On The Fiber Bundle Model (Tremol V0.1): Application To Mexican Subduction Earthquakes	Geoscientific Model Development	3.16	Q1
2	2019	Bayesian Dynamic Finite-Fault Inversion: 2. Application To The 2016 Mw6.2 Amatrice, Italy, Earthquake	JGR Solid Earth	1.96	Q1
3	2019	Bayesian Dynamic Finite-Fault Inversion: 1. Method And Synthetic Test	JGR Solid Earth	1.96	Q1
4	2019	Coupled, Physics-Based Modeling Reveals Earthquake Displacements Are Critical To The 2018 Palu, Sulawesi Tsunami	Pure and Applied Geophysics	0.6	Q2
5	2019	Delayed And Sustained Remote Triggering Of Small Earthquakes In The San Jacinto Fault Region By	Geophysical Research Letters	2.66	Q1

		The 2014 Mw 7.2 Papanoa, Mexico Earthquake			
6	2019	Dynamic Viability Of The 2016 Mw 7.8 Kaikōura Earthquake Cascade On Weak Crustal Faults	Nature Communications	5.99	Q1
7	2019	Landers 1992 "Reloaded": Integrative Dynamic Earthquake Rupture Modeling	JGR Solid Earth	1.96	Q1
8	2019	Modeling Active Fault Systems And Seismic Events By Using A Fiber Bundle Model – Example Case: The Northridge Aftershock Sequence	Solid Earth	0.8	Q1
9	2019	Modeling Megathrust Earthquakes Across Scales: One-Way Coupling From Geodynamics And Seismic Cycles To Dynamic Rupture	JGR Solid Earth	1.96	Q1
10	2019	Parallel 3-D Marine Controlled-Source Electromagnetic Modelling Using High-Order Tetrahedral Nédélec Elements	Geophysical Journal International	1.3	Q1
11	2019	On Energy Stable Discontinuous Galerkin Spectral Element Approximations Of The Perfectly Matched Layer For The Wave Equation	Computer Methods in Applied Mechanics and Engineering	3	Q1
12	2019	Volcanic Ash Forecast Using Ensemble-Based Data Assimilation: The Ensemble Transform Kalman Filter Coupled With Fall3d-7.2 Model (Etkf-Fall3d, Version 1.0)	Geoscientific Model Development	3.16	Q1
13	2020	Accelerating numerical wave propagation by wavefield adapted meshes. Part II: full-waveform inversion	Geophysical Journal International	1.3	Q1
14	2020	Alternating direction implicit time integrations for finite difference acoustic wave propagation: Parallelization and convergence	Computers and Fluids	0.999	Q1
15	2020	On the landslide tsunami uncertainty and hazard	Landslides	1.638	Q1
16	2020	Volcanic Ash Resuspension in Patagonia: Numerical Simulations and Observations	Atmosphere	0.7	Q2

17	2020	Space-time adaptive ADER discontinuous Galerkin schemes for nonlinear hyperelasticity with material failure	Journal of Computational Physics	1.94	Q1
18	2020	Anak Krakatau Triggers Volcanic Freezer in the Upper Troposphere	Scientific Reports	1.41	Q1
19	2020	Comparison Of Expansion-Based Explicit Time-Integration Schemes For Acoustic Wave Propagation	Geophysics	1.35	Q1
20	2020	Ensemble-Based Data Assimilation Of Volcanic Ash Clouds From Satellite Observations: Application To The 24 December 2018 Mt.Etna Explosive Eruption	Atmosphere	0.63	Q2
21	2020	Exahype: An Engine For Parallel Dynamically Adaptive Simulations Of Wave Problems	Computer Physics Communications	1.26	Q1
22	2020	FALL3D-8.0: A Computational Model For Atmospheric Transport And Deposition Of Particles, Aerosols And Radionuclides – Part 1: Model Physics And Numerics	Geoscientific Model Development	3.16	Q1
23	2020	Dynamic Fault Interaction during a Fluid-Injection-Induced Earthquake: The 2017 Mw 5.5 Pohang Event	Bulletin of the Seismological Society of America (2020)	1.35	Q1
24	2020	Evolutionary full-waveform inversion	Geophysical Journal International	1.34	Q1
25	2019	A Microservices Approach for Parallel Applications Design: A Case Study for CDF Simulation in Geoscience Domain (Winner of Best Paper Award)	12th International Conference on Advanced Geographic Information Systems, Applications, and Services (GEOProcessing 2020)	-	-
26	2019	Towards Physics-Based Probabilistic Seismic Hazard Assessment in Complex Fault Networks - The Cheese Project	3rd International Workshop on Earthquakes in North Iceland (Northquake 2019)	-	-
27	2019	Urgent Tsunami Computing	UrgentHPC workshop (SC19)	-	-
28	2019	Towards Improved Seismic Monitoring, Earthquake Modeling and Ground Motion Simulation for	3rd International Workshop on Earthquakes in North	-	-

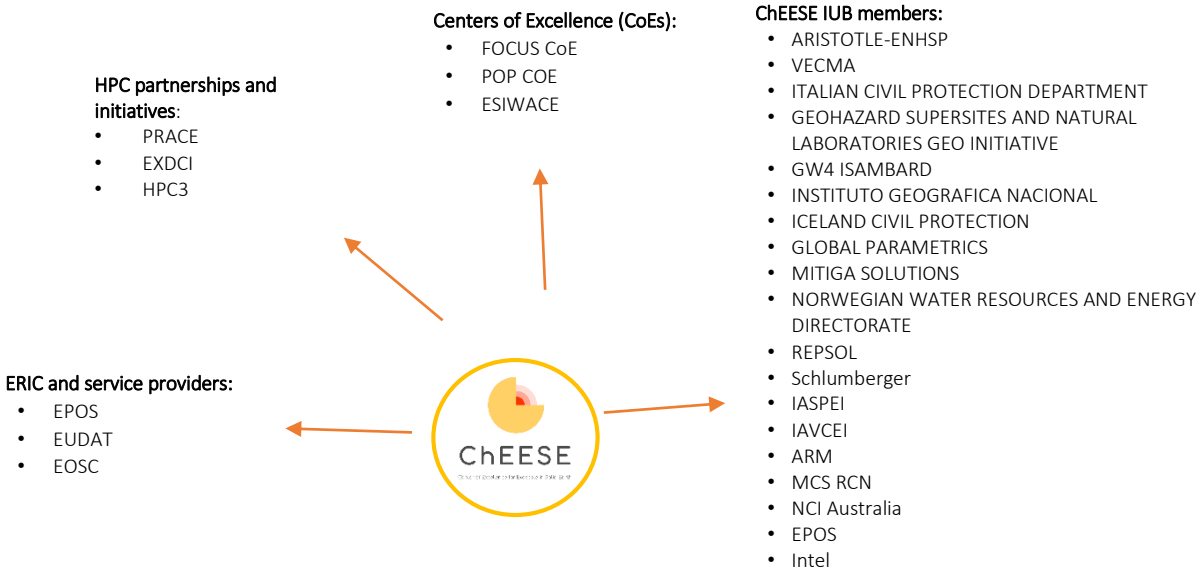
		Early Warning and Hazard Estimates in North Iceland	Iceland (Northquake 2019)		
29	2020	A High-Order Discontinuous Galerkin Solver with Dynamic Adaptive Mesh Refinement to Simulate Cloud Formation Processes	PPAM 2019 - 13th International Conference on Parallel Processing and Applied Mathematics	-	-
30	2020	Urgent Supercomputing of Earthquakes: Use Case for Civil Protection	Platform for Advanced Scientific Computing Conference	-	-
31	2019	Modeling Earthquake Source Processes: From Tectonics to Dynamic Rupture	White paper	-	-

Table 6. ChEESE scientific publications at M24

ChEESE has published two papers that have gained significant attention and recognition in M1-M24. Anak Krakatau Triggers Volcanic Freezer in the Upper Troposphere covers interesting research that has been featured on various press including BBC, National Geographic, Forbes, etc. Another paper, A Microservices Approach for Parallel Applications Design: A Case Study for CDF Simulation in Geoscience Domain, has won the Best Paper Award at GEOProcessing 2020.

6. Synergies and collaborations with other projects and initiatives

ChEESE has synergized, collaborated or supported various European and international projects, initiatives and organizations throughout the first 24 months of the project, as shown in the image below.



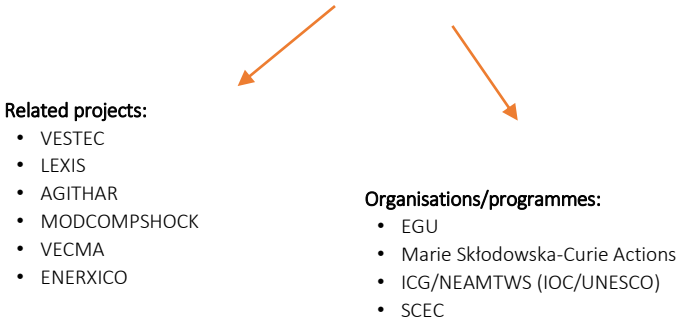


Figure 17. Synergies and collaborations with other projects and initiatives at M24

6.1 HPC partnerships and initiatives

6.1.1 PRACE

ChEESE has used the existing training platform from PRACE to maximize the impact of its training activities. The following courses have been organized using PRACE Advanced Training Centre platform:

1. PATC: School on Numerical Methods for Parallel CFD
2. PATC: HPC and natural hazards: modelling tsunamis and volcanic plumes using European flagship codes
3. PATC: CHEESE Advanced Training on HPC for Computational Seismology
4. PATC: Tools and techniques to quickly improve performances of HPC applications in Solid Earth

6.1.2 EXDCI

ChEESE had organized a EuroHPC Summit Week 2020 workshop titled "European Urgent Computing" workshop that was supposed to be held on 25 March 2020. Unfortunately, the event was cancelled due to COVID-19. However, ChEESE intends to organise the same workshop at the 2021 edition of EuroHPC Summit Week. ChEESE and EXDCI social media channels have also had regular interactions (sharing and liking) via Twitter.

6.2 Centres of Excellence

6.2.1 POP

The collaboration between ChEESE and POP in code optimization has been 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", POP has featured its work on ChEESE code PARODY_PDAF in its September 2019 newsletter, and POP has been mentioned in a news item on the ChEESE website.

Besides that, both ChEESE and POP social media channels have shared each other´s posts.

6.2.2 Focus CoE

ChEESE and Focus CoE have collaborated or supported each other throughout the first 24 months of the project. Besides joining the Focus CoE booth at TERATEC 19 and various interactions on social media, ChEESE has also been featured on the Focus CoE website in relation to how EU citizens benefit from Centres of Excellence. ChEESE was supposed to take part in a Focus CoE podcast to be recorded at EuroHPC Summit Week 2020 but it´s cancellation led to the postponement of the podcast. ChEESE will participate in a joint CoE workshop organised by Focus CoE that will be held at the HiPEAC conference in January 2021. Additionally, ChEESE is in touch with Focus CoE regarding possible promotion of ChEESE activities and potential participation in Focus CoE booths at various events.

6.2.3 ESiWACE

ChEESE presented a talk at the ESiWACE kick-off meeting while a partner from ESiWACE had been a confirmed speaker at the cancelled European Urgent Computing at EuroHPC Summit Week 2020.

6. 3 Related projects

6.3.1 AGITHAR

ChEESE presented at the AGITHAR kick-off meeting.

6.3.2 ModCompShock

ModCompShock is using Tsunami-HySEA models and numerical schemes that are being improved by ChEESE.

6.3.3 VESTEC and LEXIS

ChEESE presented at the UrgentHPC workshop (collocated with SC19), which was co-organised by VESTEC and LEXIS. Furthermore, partners from VESTEC and LEXIS were confirmed panel speakers at the cancelled European Urgent Computing workshop organised by ChEESE. There are also plans for ChEESE to participate in the UrgentHPC workshop at SC20.

6.3.4 VECMA

ChEESE presented at an Invited Talks session organised by the VECMA project.

6.3.5. ENERXICO

ENERXICO supported ChEESE in the CHEESE Advanced Training on HPC for Computational Seismology through its work with the ExaHyPE code.

6.4 Projects, institutions and companies in ChEESE IUB

The IUB members of ChEESE are composed of organizations from all around the world. The IUB will use the project´s flagship codes and improve them by giving valuable feedback. The current member list includes:

- ARISTOTLE-ENHSP
- VECMA
- ITALIAN CIVIL PROTECTION DEPARTMENT
- GEOHAZARD SUPERSITES AND NATURAL LABORATORIES GEO INITIATIVE
- GW4 ISAMBARD
- INSTITUTO GEOGRAFICA NACIONAL
- ICELAND CIVIL PROTECTION
- GLOBAL PARAMETRICS
- MITIGA SOLUTIONS
- NORWEGIAN WATER RESOURCES AND ENERGY DIRECTORATE
- REPSOL
- Schlumberger
- IASPEI
- IAVCEI
- ARM
- MCS RCN
- NCI Australia
- EPOS
- Intel

6.5 ERIC and service providers

6.5.1 EPOS, EOSC and EUDAT

ChEESE codes will be available in the EPOS, and EUDAT repositories. Additionally, an article about ChEESE´s intention to put codes in EPOS has been published on the EPOS website.

6.6 Organizations and Programmes

6.6.1 European Geosciences Union

Besides attending the annual EGU General Assembly, ChEESE has also submitted a proposal for a Galileo conference entitled “Computational Geosciences in the Exascale Era”.

6.6.2 Marie Skłodowska-Curie Actions

ChEESE participated in a European Researchers´ Night event, which is supported by the Marie Skłodowska-Curie Actions programme.

6.6.3 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 have

participated in steering committee meetings, plenary ICG Sessions, and other workshops, where ChEESE was always properly highlighted. NEAMTWS has been mentioned in the ChEESE website and on deliverables and reports.

6.6. 4 Southern California Earthquake Center (SCEC)

ChEESE is using Cybershake, a PSHA map platform that SCEC has developed. ChEESE members have also given talks in SCEC workshops and annual meetings in 2019 and 2020.

7. Dissemination Key Performance Indicators

All dissemination activities and tasks are carefully monitored through the metrics defined in D6.1 Communication and dissemination plan. The WP6 KPIs' monitoring details (M1-M24) can be seen in Table 7 below:

KPI name	Description	Total target (by the end of the project)	Status as of M24
Press releases	At the beginning and towards the project end	2	1
Press impacts	ChEESE presence in mainly technical and scientific (and, if possible in generic) media	25	27
Website sessions	Number of sessions (Google analytics)	1000 sessions /year	12,271
Project flyer	General information flyer (to be updated regularly)	1	1
Trainings	PATC and other training courses	4	8
Scientific publications	Peer-reviewed journals and conference proceedings	40	30
Project videos	One teaser video to explain the project and its objectives and another video (5min) to show the project results and services.	2	2
Participation at events	Presentation of ChEESE results at conferences, workshops, etc.	12	101
Organization of conferences	Galileo conference	1	Proposal submitted

Table 7. ChEESE dissemination and communication KPIs

Future actions have been developed to address the current status of dissemination KPIs:

- **Press releases**
  Currently, only one press release has been launched. WP6 plans to launch another official press release towards the end of the project when there are substantial results to announce.
- **Press impacts/mentions**
  In the following months, ChEESE will try to increase the press clippings by establishing contacts with Solid Earth, HPC and general press.
- **Website sessions**
  The number of website sessions has surpassed the number defined in the KPI. The KPI is 1,000 sessions per year, while the ChEESE website has recorded a total of 12,271 sessions already in the first 24 months of the project. This is an average of over 6,000 sessions a year. The increasing trend is expected to continue as the project progresses, more content, news, and publications are generated on the website.
- **Project flyer**
  The ChEESE flyer will be updated with new results in the second year of the project. It will be available digitally only for the time being.
- **Trainings**
  ChEESE training courses have proven to be of high interest to researchers, civil protection officers and end-users in Europe and around the world. ChEESE will consider organising other training courses in 2021 if there is a need for them.
- **Scientific publications**
  Thirty peer-reviewed scientific publications has been reported so far. There are many more in the pipeline so we expect this number to go up in the next few months.
- **Project videos**
  ChEESE plans to make at least two more videos in the next year. The first one will focus on the women researchers in ChEESE and the second one will be an official ChEESE video that will present the results and achievements of the project.
- **Participation at events**
  ChEESE researchers will continue attending virtual events for the foreseeable future. Events drive additional traffic to the website, as well as help to disseminate the project among the scientific and industrial target audience. ChEESE has plans present at many more high-profile events such as SC20, AGU Fall Meeting 2020 and EGU21.
- **Organisation of conferences**
  ChEESE had already sent a Galileo Conference proposal to the European Geosciences Union (EGU) in February 2020. Due to internal delays, EGU has postponed the announcement of the results.

8. Overview of ChEESE exploitation strategy

This document reports up to M24, focusing on executed tasks related to exploitation and sustainability strategy for ChEESE as the European Centre of Excellence (CoE) for Solid

Earth. Exploitation from a scientific, societal and industrial perspective is a major commitment for ChEESE, as testified by the balanced consortium including a diversity of organizations. Another sign of the interest of the consortium for the utilization of project results is the creation and involvement of an Industry and Users Board (IUB), which follows the progress of the project not only during the face-to-face meetings but also provides continuous feedback, aiming to be part of the validation of the Pilot(s) Demonstrator(s) (PD) services in an operational environment.

8.1. M1-M24 activities in a glance

This deliverable overviews the **exploitation activities,** widely discussed up to M18 in the already submitted and accepted D6.6, and describes the tasks and methodologies conducted along the project execution:

i) **Identification, Collection and grouping of exploitable outcomes**, including interim and final results, with emphasis in the PDs and the services that will be validated in WP5, as to conclude on potential commercial services, business ideas and exploitation pathways.

ii) **Intellectual Property Rights (IPR) protection** of the individual codes, workflows and toolkits developed by ChEESE.

iii) **Identification and analysis of the target users and stakeholders** that may benefit from the project findings and achievements. Initial identified target users are civil protection and other governmental organizations, (re)insurance companies, and companies providing services in natural hazard assessment and forecast or geophysical exploration for the Oil & Gas industry. It has also been of interest to briefly describe the **main targeted markets** (see D6.6 if more details are needed).

iv) Engagement of complementary stakeholders, and **creation and evolution of an IUB.** According to the exploitation tasks, the initial composition of the IUB (12 members) has been largely increased, including new **12 new engaged institutions** which are committed to be part of the ChEESE eco-system, increasing the impact of the CoE. **More than 40 interviews have been conducted** by Pilot Demonstrator(s) and WP Leaders, the IUB members and the Project Innovation Manager (PIM). Additionally, personalized interviews with each PD Leader and IUB member have been done to fully understand the interest and the initial technical and partnership requirements. All actions regarding IUB interaction are carried out together with WP5 leader (Task 5.2), as the User Support Service needs IUB feedback for exploitation of Pilot Services.

v) **Analysis of the exploitation context and business opportunities** to find out what is the actual market situation for the different applications covered in the project (computational seismology, magneto-hydrodynamics, physical volcanology, tsunami modelling and early warning, and data analysis and predictive techniques). Besides the IUB interest, the major topics with regards to the potential **exploitation strategy of the ChEESE partners' owned foreground** has been also addressed. The ChEESE consortium has built an understanding of the project market and exploitation context, providing a solid base for further exploitation actions. All the already identified outcomes include a brief description of the knowledge and technology transfer initial discussion, including topics such as join exploitation strategy, PD(s) interests,

exploitable assets, and exploitation plans from each individual partners. More details can be found in D6.6.

vi) Assessment of the competitive environment of the project: technology readiness, integration, standardization and regulatory, policy framework at the targeted markets, and future trends at the social, business and policy levels. Either way and focusing on **business**, a real exercise to quantify and evaluate the interest of the foreground was done by in the framework of a **Business Prototyping Project (BPP) of EuroLab4HPC**. The project (called USER) explores the exploitation possibilities of Urgent Seismic Simulations, in full synergy with PD1 developments. The report was shared with PD(s) leader(s) for its use within ChEESE.

vii) **Dissemination activities** related to the exploitation of results, such as publications in international conferences and journals, and presentation of results in trade fairs, workshops and related events or press releases in technical media.

viii) **Long-term sustainability strategy**. ChEESE would evolve into a **partnership** that drives a collaborative effort to develop scientific and high-quality resources for transparent assessment of Solid Earth hazards and to facilitate their application for risk management around the globe. **HPC tools** are of extreme importance to achieve the goal. An initial analysis is herein presented and has been already discussed at ChEESE corresponding governance bodies.

Finally, according to the initial discussion about ChEESE long-term sustainability strategy, an initial document which explores different legal status beyond the end of the CoE funded stage, has been prepared and discussed at **ChEESE governance bodies** (Project Executive Committee (PEC)-*Meeting September 30th 2020*, Project Supervisory Board (PSB) -*Meeting October 6th 2020*), including the close collaboration with FocusCoE and **HPC3**. This has been possible because of the participation at the HPC3 council by the ChEESE PC (Dr. Arnau Folch) and the PIM (Dr. Joan Farnós), which is an active member in the Business Development and Sustainability Working Group from HPC3 and participates also in the Sustainability workshops organized by FocusCOE.

Finally, other activities have also been carried out on behalf of WP6. With regards to the General Assembly (GA), WP6 responsible staff have had F2F inter-WP meeting in Rome, September 19-20th, 2019. The meeting gathered WP leaders of WP4 and WP5, Pilot Demonstrator leaders, Task leaders, and IUB representatives to coordinate the strategy for pilots and services. Beyond this, other related tasks have been the preparation of the mid-term meeting GA in Paris (March 4th-6th, 2020) and later on due to Covid-19 situation, the remote GA, including a full working day with the IUB members. This meeting gathered the Project Management Board, WP leaders of WP4 and WP5, Pilot Demonstrator leaders, Task leaders, and IUB representatives to coordinate the strategy for pilots and services. And, the last but not least, the exploitation activities have also included the drafting and internal iteration process of the already submitted and accepted Deliverable D6.6-Exploitation Plan (M18), and the writing and submission of this Deliverable D6.7 Dissemination and Exploitation Report (M24).

8.2. Relations to other activities in the project

There is a strong interrelation of D6.6. and D6.7 with the following WP(s):

WP4: The data received through the interviews with PD leaders is relevant to orient and support an initial exploitation strategy for the Pilots.

Either way, experts from the software development and also from optimization (**WP2-WP3**), have provided their feedback to validate the quality and market potential of the highly promising innovations and exploitable results and to provide publishable summaries that can be used to be provided to future end users or investors. Software, workflows, and final products data have been discussed as potential assets.

WP5: A strong interaction and exchange has taken place with the WP5 leader to identify synergies, especially with the information gathered within the Task 5.1 interviews, oriented to service definition.

WP6: The interviews, workshops and trainings conducted in Task 6.1 were used to inform partners about dissemination activities, particularly the opportunity to attend a joint stall at a fair/conference and to make projects aware of the opportunity to present their exploitable technologies in information brochures (technology cluster brochures). From this strategy new IUB(s) members have been accepted to the board and included as new potential exploitation partners at the PSB meetings (ChEESE exploitation: test in an operational environment the Pilot Demonstrator).

9. Exploitable Results and Plans

This section collects the most relevant points from the **exploitation strategy,** widely described in the exploitation plan (D6.6). All this information is being developed, agreed and coordinated with WP5 leader and is complementary to what is described in D5.1 (*Pilot analysis and service development strategy*). Overall, 8 of the targeted 12 PDs are being upgraded to reach a TRL of 5+.

9.1 Knowledge and technology transfer to industry and scientific community

The Exploitation Strategy is outlined in line with the project progress at M24. This strategy, which is an initial one and will be updated as the project evolves, incorporates on the one hand, a market mapping directly linked to needs and assets offered by ChEESE and, on the other hand, defines a joint exploitation strategy which also incorporates elements of a future ChEESE business plan that will be finalized by the end of the project. These three main pillars of the project's exploitation strategy will be:

- **Joint exploitation of the project results in the scope of the ChEESE ecosystem**: The ChEESE partners will engage in joint exploitation activities within the project's (business) ecosystem. Different alternatives are being discussed to assure the long-term sustainability of the CoE core goals: science (including grants and trainings) and asset delivery (product and services).
- **Exploitation of the ChEESE Pilots**: The Pilots associated to the IUBs act as key business channels to exploit CHEESE foreground, as they constitute a real proof of the added value that CHEESE can provide, becoming an essential part of the CHEESE business plan. Exascale PDs are proofs of concept aimed at testing codes and workflows on Exascale hardware prototypes. Up to 12 different PDs

have been defined to address the 15 ECC. Pilots with a target TRL higher than 4 will also evolve into a service during the project (from M12 onwards). Objectives:

i. Increase TRL of all PDs by at least 2 points.
ii. Increase TRL to ≥ 5 for 8 PDs (8 potential Services).
iii. A minimum of 3 Services to be tested operationally (TRL ≥ 7) at the end of the project.

The explanation of the TRL scale in the context of ChEESE technology is reported in D5.1. Finally, success exploitation milestones have also been presented: a) a component of Pilot Demonstrator 2 has already been integrated in ARISTOTLE (IUB member) and, b) there are other relevant on-going discussions among different pilots in terms of ChEESE exploitation strategy, oriented to validate the service in an operational environment.

- **Partners' individual exploitation plans**: As explained in detail in D6.6, most partners are already involved in research activities in HPC-enabling activities. ChEESE is also helping all the Consortium partners by making more visible all these scientific and technical activities, and allowing them to acquire greater market impacts. Either way, the project results are mainly validated together with the IUB partners as they are applying the innovative ideas and tools of the project to their internal interests. Main tasks in collaboration with the IUB are:
  i. Provide feedback about potential interest in Pilot developments.
  ii. Test the Services in an operational environment to foster its deployment and use by a broader community of users.
  iii. Perform a market analysis for exploitation of services.
  iv. Required strong involvement of the **IUB partners and Pilot Leader(s)** in the Service implementation and exploitation.

Going into this relevant IUB Board role, the identification of potential members should establish the basis to cover the whole service value chain. HPC providers, consultancy companies, insurance companies, Oil&Gas companies, Academia, EU Projects, Civil Protection Agencies, Solid Earth scientific communities, etc. have already been engaged, covering different needs at different TRL requirements (see Table 10). Based on this interest, many discussions have begun among PDs and IUB, allowing Pilot Leaders to understand the existence of different needs and requirements.

The IUB provides an efficient, independent, industry-based mechanism for quickly obtaining real-world feedback on project interim results. Moreover, it facilitates industry's direct participation in identifying and pursuing exploitation opportunities. In the first three months of the project, the GA identified an initial IUB that has been tasked with providing input to the team on an annual basis.

In the initial phase of the project (M1-M12), the IUB was focused on the feature requirements formulated by the project team, offering suggestions for prioritization based on currently industry roadmap planning. During the Phase 2 of the project (M12-M24), the IUB has helped to reassess and reprioritize based on the implementation status and preliminary results. In the final phase of the project (M24-M36), the IUB will be privy to the initial results and will assist in the dissemination of these results. In the first two years

of the project, the IUB has interact in conjunction with the joint GA / Technical Meetings in order to avoid unnecessary travel time and expenses.

Finally, and as part of the stakeholder engagement strategy, within M1-M24 new IUB members have been proposed, engaged, and accepted by the ChEESE PSB, enabling PDs to receive more feedback from different types of end-users. It has to be remarked that the IUB was initially composed of 12 members, and is currently composed of 24, with the expectation of being increased even further. IUB engagement is crucial and its information, suggestion, and feedback is being provided under GA Assembly, etc.

The new IUB members have been informed of their acceptance in the project. A letter of acceptance and a non-disclosure agreement (NDA) document has been sent to all the new IUB members. We are currently following up on the signature of the NDA by all members. Other organizations related to ChEESE activities have been identified and will be invited to join the IUB: a) ChEESE is in contact with Asean agencies to discuss potential ways of collaboration. Representatives from Indonesia, Philippines, Brunei, and Thailand attended ChEESE PATC courses and, b) IUB members from Japan (Tsunamis/Earthquakes) and from Iran (International Institute of Earthquake and Seismology) are followed-up in order to analyze their potential added value that can bring to the ChEESE community. India is also now in the scope of joint collaboration.

IUB members have been informed in detail, through specific talks and invited at the mid-term GA, about the PDs foreseen in the project and have expressed which PDs are of their interest to follow up closely. Additionally, IUB members have answered a survey directly addressed to optimize the interaction among IUB and PD leader(s). This task has been done together with the WP5 leader (Task 5.2). Moreover, some IUB members and PDs are beginning to elaborate a working framework to validate the potential ChEESE asset in an operational environment.

9.2 Intellectual property management

For an effective exploitation of the project results and an accurate long-term sustainability strategy, it is necessary to establish the main aspects of the methodology that we will further develop on IPR. IPR Management for ChEESE is based on the following principles which are **being monitored every 6 months** (through the internal ChEESE wiki: https://wiki.cheese-coe.eu):

1. **Background knowledge and Access Rights**. Each partner owns the background that it brings to the project.

2. **Patents**. In case a partner wants to submit a patent application, the PC and the PIM have to determine if it is a joint foreground or not and initiate if deemed, the appropriate study. All required measures will be taken to guarantee that there is no disclosure that can ruin the patent possibility. Therefore, all partners will be communicated and special measures to confidentiality will be taken. Information of patent applications will be made available to the EU through regular management reports. The costs of the patent applications will be covered by the submitters.

3. **Foreground knowledge and IP ownership**. Results are owned by the project partner carrying out the work leading to such results, independently of whether they can be

protected or not. If any results are created jointly by at least two project partners and it is not possible to distinguish between the contributions of each of the project partners, such results, including inventions and all related patent applications and patents, will be jointly owned by the contributing project partners. Each partner may use the results and material produced within the project for project purposes provided that such use does not come into conflict with the terms of the project Grant Agreement or the European legislation.

4. **IPR log.** An IP log has been established at the ChEESE intranet (Wiki), where the services developed by the partners is registered periodically and maintained. After this initial setup, new services are being monitored and added to the IPR-Log in order to protect the partners' efforts and provide a clear basis for any discussions about IP and its origin. This forms a stable basis for the partners to work on when they exchange ideas for the development of new offerings. The Intellectual Property (IP) generated in the project must be reported **every 6 months** by the project partners in the IP Log. The IP can be software (code, module, script), but also a workflow, a methodology, an invention, a dataset, or even a design).

10. Business modelling and planning: Pilot level

10.1. Value proposition

In ChEESE, leading European HPC centers, academia, hardware developers, as well as SMEs, industry and public governance bodies such as civil protection are working together to prepare European flagship codes for upcoming pre-Exascale and Exascale supercomputing systems to tackle global challenges in the domain of Solid Earth. Potential services include urgent computing, probabilistic hazard assessment and early warning, together with 3D imaging of the subsurface. Finally, ChEESE aims at acting as a hub to foster HPC across the Solid Earth Community and related stakeholders and to provide specialized training on services and capacity building measures.

Services related to Pilot Demonstrators are described in D5.1. In addition, other services that ChEESE CoE may offer to the community include:

i. Repository. Various tools provided, including user-friendly and efficient systems for workflow executions and data processing
ii. Workshops (cheese-coe.eu/events/workshops)
iii. Meetings (cheese-coe.eu/events/meetings)
iv. Training courses (cheese-coe.eu/events/training)
v. Webinars (cheese-coe.eu/events)
vi. New business models based on Urgent Computing

10.2. Vision and Plan for Business Development at Sustainability Level

As it has been described in previous sections, ChEESE is facing its sustainability at 3 different levels: a) Pilot Demonstrators, b) Partner interests, and c) ChEESE as a whole. Thus, all foreground developed within the CoE must be covered by an exploitation strategy, aligning these three exploitation layers.

10.2.1. ChEESE as a whole

Regarding ChEESE as a whole, some of the PDs are being developed towards being validated in real operational environments. This step is strictly necessary to be prepared to face the last step, which is to prepare the asset to be launched to the market. All these assets, together with other relevant services which the CoE wills to provide (trainings, workshops, data, etc.) must be organized inside an organization. Different options are analyzed taking into account the inputs received from FocusCOE, HPC3 and also by boosting and converging all ChEESE partners' interests.

Focus CoE and HPC3 collaboration framework

Once the PDs will be validated in an operational environment, assets will be closer to the commercial service stage. ChEESE does not currently have a current legal status as a brand. According to the advances in Pilots and to the HPC3 exploitation strategy Working Group, where the ChEESE PIM is involved, the Consortium will decide to boost a feasible legal status aiming to exploit the ChEESE portfolio as well as put science as core business of the institution, or to propose new exploitation procedures in accordance to the other Centers of Excellence, represented at FocusCoE and HPC3. Many workshops are being held among all the CoEs, coordinated by FocusCoE, aiming to exchange different points of views and boost those which are really aligned with the sustainability objectives.

In that sense, Focus CoE launched the HPC3 group in 2018 at the EuroHPC Summit Week in Poznan. HPC3 is a kind of federation of the current approved Centers of Excellence which is used as a platform to discuss and propose initiatives aiming at supporting the long term sustainability of the centers. The main objectives are:

i. Coordination of activities and service offerings for the set of CoE projects.
ii. Collaborative definition of an overall (cross-CoE) strategy & identification of joint activities.
iii. Common strategy to support role of Applications in HPC Ecosystems and EuroHPC.

The main current activity of the HPC3 is to draft a Research position paper, to establish direct interaction with the RIAG (EuroHPC), and to work on business development to assure the sustainability of the CoEs. This starting point brings ChEESE to also consider this future legal organization as a potential path to exploit the associated assets. HPC3 is currently analyzing which business models, legal entity forms and governance models are most applicable based on CoE positioning, being ChEESE an active member of these discussions.

With regard to **business development and sustainability working group** (kicked-off 18th February 2020)**,** the HPC3 working group **s**tarted with an overview of some applicable business models, as considered by some CoEs, to include options for, e.g. public funding, private funding (investments), commercial revenue, challenges around setting up a commercial entity (distributed teams, different national laws, host institution rules etc.), challenges with operating both as a project and as a business. Several points are expected to be addressed: Level of scientific expertise that is not replicable, Global picture of HPC provision and use, i.e. public vs. private, Companies such as Amazon can also be regarded as competitors (cloud computing).

All these common topics are bringing the HPC3 members to consider which l**egal entity** forms would be the most suitable, analyzing the applicability of legal entity forms that have been considered by the CoEs, the common challenges and opportunities, together with new **governance models** internally discussed by each CoEs, including what will be the legacy of the long-term investments and what is the impact on society and research communities.

Internal analysis of ChEESE long-term sustainability framework (up to Month 24)

A long-term sustainability discussion at ChEESE governance bodies (PEC and PSB) has been fostered from M18 up to M24 (including previous at WP4, WP5, and WP6 levels), bringing different long-term sustainability options to the last PSB meeting, held in October 6th 2020, where all the partners which are part of the consortium were represented.

The main objective of ChEESE PSB meeting was to achieve an agreement to boost the fundamentals of the organization which may assure the continuity of the CoE, following the recommendations of the EC in terms of sustainability but also defining a structure which clearly faces Science (including research and trainings) and Assets, allowing the engagement of different kind of institutions and becoming the pool of reference in HPC for Solid Earth Sciences. A large presentation was carried out by the PIM, facing different pros and cons with regards to different exploitation strategies when ChEESE sustainability is considered as a whole. In the next table many different options are presented, as well as some of the advantages and disadvantages that ChEESE partners, representing Universities, R&D Centers, Non-profit Foundations, etc. consider appropriate to be continuously discussed in the period M24-M36.

Option	Advantages	Disadvantages
Profit organization	Easy implementation. Investment in R&D Projects.	Fix costs. Private entities may take profit of the organization, mainly in IP. Science investment would be compromised. Ownership sharing of the Company. Strategic control. Difficult entrance for public bodies (e.g. Universities, R&D Centers). Humanitarian projects may not be properly handled. Interaction with public bodies.
HPC3 branch	Sharing fixed costs (dissemination, communication, management, etc.) Supra-entity which directly interacts with RIAG.	Many CoES at different maturity status have to agree. Uncertain, HPC3 does not have legal status yet.

Non-profit Foundation	Direct reinvestment in R&D projects. Direct reinvestment in Grants Academia and R&D centers are used to be part of Foundations. Possibility to have Access to EU funds (Horizon Europe/DestinE). Clustering and Lobbying. Ownership of the institution. Easy engagement for Universities and R&D Centers.	Fix costs. Different boarding members from different kinds of institutions with different strategic interests.
NGO	R&D projects oriented to public interest. Ownership of the institution.	Fully independent of institutions, public bodies and political parties. ChEESE needs this interaction and commitment from public bodies. The legal status does not facilitate the entrance of Universities and R&D Centers. No possibility of access to grants for Partners.
Association	For the purpose of coordination of business activities, representation and protection of common property and other interests, profit-making legal entities can create an association by agreement between each other and jointly with non-profit organizations. Non-profit organizations may unite on a voluntary basis into associations (units) of such organizations. Members of such association will retain their autonomy and corporate privileges and rights.	Such association shall not be held liable for obligations of their members, while members of the association shall bear subsidiary liability for obligations of the above association. Even though unincorporated **associations** technically do not exist as a **legal entity** apart from its members, many state legislatures have recognized the separate existence of an **association** by statute. Thus, submission of proposals to the EC would not be allowed under the whole circumstances.
European Research Infrastructure Consortium (ERIC)	An ERIC is a legal entity with legal personality and full legal capacity recognized in all EU Member States. Its basic internal structure is very flexible, leaving the members to define in the statutes, case by case, membership rights and obligations, the bodies of the ERIC and their competences.	It should be noted that the ERIC is a legal tool which is appropriate only for high-profile research infrastructures with a European dimension. Therefore, only a limited number of ERICs are expected to be set up in the coming years.

Table 8. ChEESE legal status comparison

Based on the different legal status organizations, ChEESE would evolve into a **partnership** that drives a collaborative effort to develop scientific and high-quality resources for transparent assessment of Solid Earth hazards, and to facilitate their application for risk management around the globe. Thus, targeting real Exascale **HPC tools** are of extreme importance to achieve the goal.

As it has been above-mentioned, **Community building, real assets and Science** are in the core business of the ChEESE long-term sustainability strategy. Thus it will be mandatory to provide, at least, some of the benefits which are described here:

i. Access to a highly-skilled international **network** in Solid Earth: clustering and networking.
ii. Interaction with policy-makers, public institutions, entities in charge of critical infrastructures.
iii. Lobbying and definition of a scientific and humanitarian strategic agenda.
iv. Access to Project funding (R&D and Humanitarian).
v. Access to sabbatical options.
vi. Co-design with the relevant HPC players of the market.
vii. Easy recruitment of personnel (IT personnel) which collaborates with partners on specific topics/projects.
viii. Can access to the portfolio (and pay for it): marketplace services, training, projects, etc.
ix. Access to **scientific repositories**: papers, reports, codes, data, etc.
x. Access to **trainings** and courses for member's staff: For young researchers (PhD students) and ad-hoc.
xi. **Grants** (co-funding) to ChEESE members.
xii. **Lessons learnt** (e.g. from urgent computing services to be applied in epidemiology, climate/weather, synergies).
xiii. **Entity able to receive IP and exploit it** through strategic projects.

Additionally, the ChEESE institution will produce and/or manage software, datasets, hazard models, scientific and informative articles, research reports, slides presentation, infographics, etc. These types of materials should be protected by IPR. The associated exploitation strategy will be discussed according to the Partner interest. Either way, open and free distribution of data, models and tools are at the core of ChEESE work. All ChEESE products will address different target audiences: public, non and commercial use, but with different license restrictions. Thus, ChEESE may offer collaborative services, products and resources that can be used for public and commercial purposes by organizations or individuals worldwide.

Finally, and focusing on the monetary long-term sustainability of the ChEESE CoE, it requires a strategy to identify which incomes and outcomes are expected. Next are both initially detailed:

In terms of sustainability...		
Incomes	Marketplace	HPC services (subcontracted to 1 or more associated partners, that pay an overhead to the institution) on urgent computing, early warning systems, hazard assessment, etc.
		Code and/or workflow licencing by partners (e.g. licenced). The institution would handle repositories, tech transfer assistance on IP agreements (e.g. LuLs), etc.
		Other products and services based on data and services produced by ChEESE based on open-source codes and data.

		Consultancy through ChEESE is: a) Done by ChEESE if owns IP (with the possibility of sub-contracting in codes, workflows, co-design) and b) Directly transferred to a Partner (including overhead).
	Trainings	Organized on-demand or regularly by Partners for Members
	Projects	EU (Horizon Europe), DestinE and other competitive calls
	Sponsorship	Governor (voting sponsors that pay a financial contribution) Advisor (non-voting sponsors that pay a financial contribution) Associates (non-voting sponsors that do not pay financial contribution; but may nominate a delegate to attend Governing Board meetings)
	EU funding	Discussion with different DG(s)
	Private	Emergency centers
	Overheads	Since the Foundation is non-profit, yearly remaining overheads are reinvested into internally-funded scientific projects, R&D (e.g. PhD grants) and humanitarian purposes participated by Partners (and eventually also by members)

Table 9. ChEESE expected incomes

Asset	**Marketplace**				**Trainings**	**R&D Projects**	**Sponsorship**	**EU funding (e.g. Horizon Europe)**	**Private**	**Overheads**
	HPC services	***Code and/or workflow IP licencing***	***Other products and services based on data and services produced by ChEESE***	***Direct services***						
Beneficiaries	HPC Centers	All codes, workflows and toolkits owners through direct and indirect IP exploitation.	IP owners of data and services.	All partners which provide services through ChEESE (e.g. Pilot associated services)	Partners, members	Partner, member, ChEESE	ChEESE	ChEESE	Partners ChEESE	ChEESE

Stakeholders (already engaged at IUB board)	HPC Providers	Scientific and Public bodies	SMEs and Data Management experts	Reinsurance and Oil&Gas companies	Universities, R&D Centers, Private companies.	Universities, R&D Centers, Private and Public Institutions	-	ERIC	First responders	-
Example	Co-design of a new processor which should handle application-related simulations	Scientific projects based on hazards analysis.	New business models First-responders necessities, etc.	Simulation of hazard phenomena for insurance industry.	HPC, Hazards	Solid Earth, HPC	Annual fee	New R&D projects	Agreement on basic services according to the annual fee	Directly reinvested in ChEESE

Table 10. ChEESE assets: beneficiaries

On the other hand, in terms of outcomes, it is expected that different costs will need to be handled:

In terms of sustainability...	
Outcomes	Human resources (hired personnel)
	Computational Resources (on tier-0 and tier-1 machines access)
	Dissemination activities about: Success Stories, R&D Projects, Partners skills, Policy which affects Solid Earth Community, etc.

Table 11. ChEESE identified outcomes

11. Conclusions and next steps

In the next period M24-M36, ChEESE has the necessity to define the long-term status of the organization which should handle all the ChEESE related services and it associated scientific agenda. Only then we will be able to develop the activities for the business, marketing plan and to confirm the business model proposed. In the meantime, the business assessment will be focused on the analysis of these above-mentioned initial options. Furthermore, a major engagement of IUB members while WP5 is executed will be crucial to properly orient the exploitation path of the Pilot Demonstrators.

Future plans for the next period (M24 to M36):

i. Keep collecting and publishing testimonials from the IUB members.
ii. Keep collecting updates about IP generation in the project.
iii. Help in organizing Face-2-Face and remote meetings to boost the definition of an exploitation roadmap for the high TRL PD(s), including IUB members in the discussion.
iv. Support crossing the bridge between WP4 and WP5 for those Pilot Demonstrators with higher TRL.
v. Boost ChEESE CoE as a whole, defining a sustainability plan in synergy with HPC3 guidelines.
vi. Analyze in deep those suitable options which should evolve in a potential sustainability tool for ChEESE CoE goals.
vii. Prepare the D6.8 according to the final audience.

Annex 1: Dissemination Register

The ChEESE dissemination register, where all dissemination activities are recorded for M1-M24, can be found below:

Type of activity	Details	Starting date	Total audience size
Participation to a workshop	Alice-Agnes Gabriel presents at the FAULT2SHA workshop held in King Abdullah University of Science and Technology in Saudi Arabia	26-Nov-18	45
Participation to a conference	Marisol Monterrubio and Thomas Ulrich presented at AGU Fall Meeting 2018	12-Dec-18	24250
Website	News article: ChEESE: HPC Centre of Excellence in solid earth to mitigate impacts of geohazards	18-Dec-18	247
Other	ChEESE mentioned on Eurolab4HPC website	23-Feb-19	300
Participation to a workshop	Alice-Agnes Gabriel presents at the Third Schatzalp Workshop on Induced Seismicity held in Davos, Switzerland.	5-Mar-19	53
Participation in activities organised jointly with other H2020	Arnau Folch presents at the ESiWACE 2 kick-off	12-Mar-19	60
Participation to a conference	Arnaul Folch (BSC), Marisol Monterubbio (BSC) and Alice-Agnes Gabriel (LMU) present at EGU 2019	8-Apr-19	16263
Participation to a workshop	ExaHype workshop in Durham, UK	22-Apr-19	22
Website	News: ChEESE's strong presence at EGU 2019	25-Apr-19	67
Video / film	ChEESE: the HPC center of excellence in Solid Earth in three minutes	2-May-19	457
Participation to an event other than conference / workshop	Jorge Macias presents ChEESE at Pint for Science	20-May-19	50
Participation to a conference	ChEESE researchers present at EuroHPC Summit Week 2019	13-May-19	60
Participation to a workshop	ChEESE researchers present at Northquake2019	21-May-19	47
Participation to a conference	Manuel J. Castro Díaz presents at at CIEM Workshop at University of Cantabria	28-May-19	50
Participation to a conference	Alice-Agnes Gabriel and Duo Li present at deRSE19 - first Conference for Research Software Engineers	4-Jun-19	35
Participation to an event other than conference / workshop	Erwan Raffin exhibit at TERATEC 2019 Forum at the Focus CoE booth	11-Jun-19	1700
Participation to a conference	Alexandre Fournier presents at SIAM 2019	11-Mar-19	100

Participation to a conference	Erwan Raffin (Bull Atos) presents at ISC19and Alice-Agnes Gabriel represents ChEESE at the INTEL plenary discussion on Exascale Computing Applications	16-Jun-19	3573
Website	News article from WP2 - The ChEESE methodology: code audit towards exascale performance portability of ten European flagship applications in Solid Earth	26-Jun-19	93
Participation to a workshop	ChEESE researchers present at NMEM Workshop (Numerical Modeling of Earthquake Motions)	30-Jun-19	76
Participation to a conference	ChEESE researchers present at IUGG 2019	8-Jul-19	4000
Organisation of a Workshop	2nd ExaHyPE User Workshop	22-Jul-19	30
Participation to an event other than conference / workshop	Invited talk at the Seminar of the Mathematical and Computational Engineering group at UPSC, IIMC (Instituto de Ingeniería Matemática), Santiago de Chile, Chile	22-Jul-19	25
Organisation of a Workshop	Tsunami-HySEA training course at Universidad Técnica Federico de Santa María (UTFSM), Valparaiso, Chile	23-Jul-19	25
Website	News article: ChEESE in full force at IUGG2019	26-Jul-19	94
Press Release	On EPOS newsletter: https://www.epos-ip.org/riding-wave-future-supercomputing-center-excellence-exascale-solid-earth-cheese-will-share-exascale	31-Jul-19	1230
Website	News article from WP3: ChEESE will explore parallel mesh partitioning strategies of simulation codes	15-Aug-19	56
Website	News article from WP4: about HPC for simulation local tsunami hazard	16-Aug-19	40
Participation in activities organised jointly with other H2020	Contribution to 12th POP COE newsletter of September 2019	1-Sep-19	847
Participation to a workshop	Alice-Agnes Gabriel and Luo Li present SeisSol Training at the ICTP Advanced Workshop on Earthquake Fault Mechanics: Theory, Simulation and Observations Trieste	2-Sep-19	82
Participation to a conference	Alice-Agnes Gabriel presents at 2019 SCEC Annual Meeting	8-Sep-19	541
Participation to a conference	Lukas Krenz, Leonhard Rannabauer and Michael Bader present at the 13th International Conference on parallel processing and applied mathematics (PPAM 2019)	10-Sep-19	15
Participation to a conference	Manuel Castro Diaz gives a talk at the Presentation of the Socio-economic Impact Report of Mathematics at the University of Sevilla	19-Sep-19	80
Website	News article from WP5: ChEESE HPC service prototypes	20-Sep-19	51
Participation to an event other than conference / workshop	Jorge Macias presents at European Researchers Night in Málaga, Spain	27-Sep-19	10

Website	News article: ChEESE partners reunite at PSB and face-to-face meetings in Rome	2-Oct-19	39
Video / film	Video about ChEESE technical meeting in Rome on BSC Youtube	3-Oct-19	69
Participation in activities organised jointly with other H2020	Jorge Macias presents ChEESE at the COST Action AGITHAR (Accelerating Global Science in Tsunami Hazard and Risk Analysis) kick-off meeting in Malta	7-Oct-19	70
Participation to a workshop	Alice-Agnes Gabriel presents at MCS Megathrust Modeling Workshop in Eugene, Oregon	7-Oct-19	75
Participation to an event other than conference / workshop	ChEESE researchers participate in CINECA GPU Hackathon	7-Oct-19	30
Press Release	Scientific Computing World HPC yearbook 2019-2020	8-Oct-19	50,000
Website	News article from WP2: SPECFEM3D speedup	11-Oct-19	134
Participation to a workshop	Jorge Macias presents at the Alboran Domain and Gibraltar Arc: Geological Research and Natural Hazards Workshop	16-Oct-19	50
Website	News article: ChEESE researchers join CINECA GPU hackathon	22-Oct-19	39
Participation to a workshop	Arnau Folch and Leonardo Mingari present at the 1st Wind-remobilization processes on volcanic ash Workshop, Bariloche, Argentina	24-Oct-19	30
Organisation of a Workshop	Jorge Macias Sanchez gives a training course about Tsunami-HySEA at the Universidad Nacional de Costa Rica (UNA) in San Jose, Costa Rica	4-Nov-19	27
Participation in activities organised jointly with other H2020	Claudia Rosas and Mauricio Hanzich present a webinar hosted by POP	12-Nov-19	34
Participation to a workshop	Jorge Macias presents at the International workshop on tsunamis - Malaga Museum	14-Nov-19	60
Website	News article about MITIGA solutions and ChEESE	14-Nov-19	38
Participation to a workshop / Participation in activities organised jointly with other H2020	Steven Gibbons presents at the Urgent Computing Workshop collocated with SC19 (Organised by VESTEC and LEXIS projects)	17-Nov-19	50
Participation to a workshop	J.-M. Gallard presents at the International Workshop on Software Engineering for HPC-Enabled Research (SE-HER 2019) at SC19	17-Nov-19	25
Website	News article about ChEESE and POP webinar	21-Nov-19	30
Participation to an event other than conference / workshop	Jorge Macias presents at the annual meeting of directors and assistant directors of the Consorcio de Compensación de Seguros (Insurance Compensation Consortium) in Granada, Spain	28-Nov-19	25
Organisation of a Workshop	ChEESE organizes a PATC course: HPC and natural hazards: modelling tsunamis and volcanic plumes using European flagship codes	2-Dec-19	30
Participation to a workshop	Federico Brogi presents at a PATC course called School on Numerical Methods for Parallel CFD	2-Dec-19	38

Participation to a conference	Jorge Macias gives a talk at ICG/NEAMTWS 2019	4-Dec-19	20
Participation to a conference	Piero Lanucara presents at Computing Insight 2019	5-Dec-19	50
Participation to a conference	ChEESE researchers present at AGU Fall Meeting 2019	9-Dec-19	27,000
Video / film	ChEESE video about urgent computing on BSC YouTube	12-Dec-19	787
Other	Focus CoE mentioned ChEESE in an article on their website	17-Dec-19	3,890
Press Release	Alice Agnes Gabriel wins PRACE Ada Lovelace Award (PRACE website)	8-Jan-20	7,200
Press Release	Alice Agnes Gabriel wins PRACE Ada Lovelace Award (InsideHPC)	8-Jan-20	65,000
Press Release	Alice Agnes Gabriel wins PRACE Ada Lovelace Award (HPCwire)	8-Jan-20	160,000
Participation to a workshop	Alice-Agnes Gabriel presents at the SCEC Dynamic Rupture Group Ingredients Workshop on Fault Friction	8-Jan-20	38
Press Release	Alice Agnes Gabriel wins PRACE Ada Lovelace Award (Scientific Computing World)	9-Jan-20	10,000
Website	News article on ChEESE website about Alice winnings the Ada Lovelace Award	14-Jan-20	32
Press Release	ChEESE SPECFEM3D speedup on CORDIS	6-Feb-20	25
Website	News article about International Day of Women and Girls in Science	11-Feb-20	100
Participation to a conference	TUM and UMA researchers present at 2020 SIAM Conference on Parallel Processing for Scientific Computing	13-Feb-20	1700
Other	TUM and UMA organised a minisymposium about HPC Aspects of Tsunami Simulation at 2020 SIAM Conference on Parallel Processing for Scientific Computing	13-Feb-20	1700
Website	News article about ASEAN delegates joining ChEESE PATC course	14-Feb-20	40
Website	News article on BSC website about Anak Krakatau paper	27-Feb-20	71
Press release	Anak Krakatau paper on EarthNetworks	28-Feb-20	5,000
Press Release	Anak Krakatau paper on BBC	28-Feb-20	121,000,000
Press Release	Anak Krakatau paper on National Geographic	28-Feb-20	21,000,000
Participation to an event other than conference / workshop	Josep de la Puente presents ChEESE at Bojos per la Supercomputacio, an HPC training program for high school students	29-Feb-20	25
Press Release	Anak Krakatau paper on The Nation	2-Mar-20	1,000,000
Press Release	Cheese mentioned in CORDIS as part of Alice-Agnes Gabriel´s work	6-Mar-20	53
Other	Jorge Marcias presents at Curso sobre el Analisis del Riesgo Sísmico (Seismic Risk Analysis Course), organised by Direccion General de Proteccion Civil y Emergencias (General Directorate of Civil Protection and Emergencies) of Spain	9-Mar-20	50
Press Release	Anak Krakatau paper mentioned in Meteo Web	10-Mar-20	20,000
Press Release	Anak Krakatau paper mentioned in Sicilia Report	10-Mar-20	20,000
Press Release	Anak Krakatau paper mentioned in Canal Ansa	10-Mar-20	20,000

Press Release	Anak Krakatau paper mentioned in Vilaggio Globale	10-Mar-20	20,000
Press Release	Anak Krakatau paper mentioned in Popular Science	11-Mar-20	20,000
Website	News article from WP5 about ChEESE´s collaboration with ARISTOTLE-ENHSP	19-Mar-20	165
Participation to a conference	Michael Bader presents at Supercomputing Frontiers Europe	23-Mar-20	200
Participation in activities organised jointly with other H2020	ChEESE mentioned in booklet prepared by EOSC Secretariat	26-Mar-20	204
Press Release	Anak Krakatau paper mentioned in Forbes	29-Mar-20	7,000,000
Participation to a conference / Participation in activities organised jointly with other H2020	Arnau Folch will speak at the High Performance Innovation Conference	30-Mar-20	120
Website	News article about success of Anak Krakatau paper in popular media	31-Mar-20	41
Press Release	Anak Krakatau paper mentioned in Mother Nature Network	1-Apr-20	10,000
Communication campaign (e.g. Radio / TV)	ChEESE´s work on tsunami warning systems mentioned in Canal Sur (Spanish TV channel)	2-Apr-20	300,000
Other	Alice-Agnes Gabriel presents the Deformation & Tectonics talk series	10-Apr-20	25
Website	News about ChEESE presenting at High Performance Innovation Conference	13-Apr-20	40
Organisation of a workshop	ChEESE researchers organized the ExaHyPE user/dissemination workshop	22-Apr-20	30
Video / film	Video of Michael Bader´s Supercomputing Frontiersvi Europe conference presentation on YouTube	27-Apr-20	27
Website	News article about new workflow management system prototype for geoscience applications	27-Apr-20	43
Press Release	Anak Krakatau paper featured on Science Node	27-Apr-20	15,000
Participation to a conference	ChEESE researchers presented at EGU20 online	4-May-20	15,000
Website	News: ChEESE wins Best Paper Award at GEOProcessing 2020	11-May-20	44
Website	News: ChEESE awarded almost 110M core hours for earthquake, volcano and tsunami research	11-May-20	55
Participation in activities organised jointly with other H2020	Arnau Folch will present "Codes and Workflows in the Center of Excellence for Exascale in Solid Earth" at the VECMA all-hands meeting	12-May-20	30
Website	News: ChEESE flagship code XSHELLS simulates geomagnetic reversals with unprecedented realism	25-May-20	198
Participation in activities organised jointly with other H2020	ChEESE mentioned in Focus CoE newsletter #4	26-May-20	89
Website	News: ChEESE partner Alice-Agnes Gabriel wins SSA´s 2020 Charles F. Richter Early Career Award	10-Jun-20	38
Participation to a conference	Phillip Samfass presented at ISC20	23-Jun-20	3700

Press Release	ChEESE mentioned in NIUS	5-Jul-20	50,000
Website	News: ChEESE contributes to Spain´s unique insurance scheme against natural catastrophes	6-Jul-20	49
Website	News: First simulations with SeisSol on Marconi100 and Piz Daint	9-Jul-20	115
Participation to a conference	ChEESE results were presented at LOD 2020	19-Jul-20	50
Participation in activities organised jointly with other H2020	ChEESE appeared in the Focus CoE newsletter #5	22-Jul-20	89
Participation to a conference	Jorge Macias presented at CMMSE 2020	30-Jul-20	20
Press Release	ChEESE mentioned on RTV Marbella	3-Aug-20	60,000
Website	News: ChEESE infrastructures and datasets set to be integrated into EUDAT CDI	3-Aug-20	44
Website	News: Join the ChEESE Advanced Training on HPC for Computational Seismology	24-Aug-20	28
Participation in activities organised jointly with other H2020	ChEESE featured on Focus CoE newsletter #6 and Arnau Folch wrote the welcome message	1-Sep-20	89
Participation to a workshop	ETH Zurich participated in SCEC CVM Workshop	1-Sep-20	50
Participation to a conference	Arnau Folch presented "A computational model for atmospheric transport and deposition of tephra,dust, SO2and radionuclides" at the 106° Congresso Nazionale (106th National Congress)	14-Sep-20	100
Participation to a conference	ChEESE researchers presented at the SCEC Annual Meeting 2020	14-Sep-20	50
Participation to a conference	A presentation called "CINECA OpenPower-based HPC Infrastructure: Some porting results" at virtual OpenPOWER Summit North America 2020 mentioned ChEESE research and results	15-Sep-20	50
Website	News: ChEESE presents at the 106th Congresso Nazionale	22-Sep-20	25
Website	News: ChEESE awarded over 90M core hours for tsunami and earthquake research	29-Sep-20	82
Participation to a workshop	ETH Zurich participated in a Virtual Seismic Tomography webinar	6-Oct-20	200
Participation to a workshop	Alice-Agnes Gabriel presented at the virtual 2020 CIG Community Workshop	13-Oct-20	50
Participation to a conference	Bull Atos presented ChEESE at TERATEC Forum 2020 - Europa Village	13-Oct-20	900
Participation to a conference	INGV researchers presented at the OpenFOAM conference	14-Oct-20	40
Participation to an event other than conference / workshop	Antonio Costa participated in a Scientific Apereitifs session of a Beyond the Horizon public outreach event	15-Oct-20	50
Website	News: From research to societal relevance: How ChEESE and urgent computing may enhance INGV´s hazard forecasting	16-Oct-20	33
Participation to a workshop	Marisol Monterrubio-Velasco at the Micromechanics, Statistics and Hazards of Mechanical Failure Workshop	20-Oct-20	30

Organisation of a Workshop	ChEESE organizes a PATC course: CHEESE Advanced Training on HPC for Computational Seismology	21-Oct-20	50
Organisation of a Workshop	ChEESE organizes a PATC course: Tools and techniques to quickly improve performances of HPC applications in Solid Earth	26-Oct-20	13
Participation to an event other than conference / workshop	Josep de la Puente presented at the Enzo Levi Seminar	30-Oct-20	-
Website	News: Participants from all over the world join ChEESE´s computational seismology course	30-Oct-20	-