



## EUROPEAN RESEARCH EXECUTIVE AGENCY (REA)

REA.C – Future Society  
C.2 – Secure Society

### GRANT AGREEMENT

#### **Project 101073978 — DIRECTED**

#### **PREAMBLE**

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

**on the one part,**

the **European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and**

**on the other part,**

1. 'the coordinator':

**TECHNISCHE UNIVERSITAET BRAUNSCHWEIG (TUBS)**, PIC 999861257, established in UNIVERSITAETSPLATZ 2, BRAUNSCHWEIG 38106, Germany,

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

2. **POTSDAM-INSTITUT FUR KLIMAFOLGENFORSCHUNG EV (PIK)**, PIC 999464042, established in TELEGRAFENBERG A31, POTSDAM 14412, Germany,

3. **DANMARKS TEKNISKE UNIVERSITET (DTU)**, PIC 999990655, established in ANKER ENGELUNDSVEJ 1 BYGNING 101 A, KGS LYNGBY 2800, Denmark,

4. **GECOSISTEMA SRL (GECO)**, PIC 959248327, established in PIAZZA MALATESTA 21, RIMINI RN 47900, Italy,

5. **INSTITUTE FOR ADVANCED SUSTAINABILITY STUDIES EV (IASS)**, PIC 960542404, established in BERLINER STRASSE 130, POSTDAM 14467, Germany,

6. **UNIVERSITY COLLEGE CORK - NATIONAL UNIVERSITY OF IRELAND, CORK (UCC)**, PIC 999975717, established in WESTERN ROAD, CORK T12 YN60, Ireland,

7. **REGION HOVEDSTADEN (REGIONH)**, PIC 999654744, established in KONGENS VAENGE 2, HILLEROD 3400, Denmark,

8. **AGENZIA REGIONALE PER LA SICUREZZATERRITORIALE E LA PROTEZIONE CIVILE (ARSTPC-ER)**, PIC 998349803, established in VIALE SILVANI 6, BOLOGNA 40122, Italy,

9. **GENILLARD & CO GMBH (G&C)**, PIC 920168870, established in ISMANINGER STRASSE 102, MUNCHEN 81675, Germany,
10. **INTERNATIONALES INSTITUT FUER ANGEWANDTE SYSTEMANALYSE (IIASA)**, PIC 999452596, established in Schlossplatz 1, LAXENBURG 2361, Austria,
11. **ERFTVERBAND (EV)**, PIC 939668974, established in AM ERFTVERBAND 6, BERGHEIM 50126, Germany,
12. **ZALA KULONLEGES MENTOK ES ONKENTES TUZOLTO EGYSULET (ZSRT)**, PIC 888552981, established in EPITOK UTJA 5 3//9, ZALAEGERSZEG 8900, Hungary,
13. **AGENZIA REGIONALE PER LA PREVENZIONE, L'AMBIENTE E L'ENERGIA DELL'EMILIA-ROMAGNA (ARPAE)**, PIC 999454633, established in VIA PO 5, BOLOGNA 40139, Italy,
14. **HELMHOLTZ ZENTRUM POTSDAM DEUTSCHESGEOFORSCHUNGSZENTRUM GFZ (GFZ)**, PIC 999994341, established in TELEGRAFENBERG 17, POTSDAM 14473, Germany,
15. **52 NORTH SPATIAL INFORMATION RESEARCH GMBH (52N)**, PIC 997237407, established in MARTIN LUTHER KING WEG 24, MUNSTER 48155, Germany,

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

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

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

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

The Agreement is composed of:

Preamble

Terms and Conditions (including Data Sheet)

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

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<sup>1</sup> Template published on [Portal Reference Documents](#).

<sup>2</sup> Template published on [Portal Reference Documents](#).

<sup>3</sup> Template published on [Portal Reference Documents](#).

## **TERMS AND CONDITIONS**

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## DATA SHEET

### 1. General data

Project summary:

Project summary
<p>The recent droughts in central Europe and unprecedented floods in central Europe have disclosed our vulnerability to extreme weather events. Besides climate change as a driver of more frequent and intensifying weather extremes, demographic change and socio-economic development exacerbate severe impacts. International frameworks for disaster risk reduction and climate change adaptation (e.g. SENDAI framework, EU Strategy on adaptation to climate change) acknowledge the critical need for integrating risk governance, communication and operational mechanisms for coping with extreme climate events throughout the entire Disaster Risk Management cycle. DIRECTED aspires to foster disaster-resilient European societies by expanding our capabilities to communicate, utilise and exchange state-of-the-art data, information and knowledge between different actors; boosting the integration, accessibility and interoperability of models; facilitating knowledge sharing; improving dialogue and cooperation encompassing all levels of actors based on enhanced community engagement and developing new governance and risk management strategies using a bottom-up, value-driven co-development approach. Key to supporting interoperability will be the establishment of the DATA-FABRIC, an innovative, governed, cloud platform that enables secure, flexible, discovery and sharing of all structured and unstructured data. Central to DIRECTED are four Real World Labs that co-develop new governance, interoperability and knowledge production frameworks and demonstrate their benefits for enhanced disaster risk governance supported by innovative technical frameworks to access, transform and integrate data and models into customised workflows for creating actionable solutions. The Real World Labs ensure the project continuously and actively involves key stakeholders in the co-development process and address topical problems of multi-hazard risk management and climate change adaptation to maximise impacts.</p>

Keywords:

- Disaster resilience and crisis management
- Communication
- Ensure Communication and alerts
- Protection of citizens (goods and people)
- Web and information systems, database systems, information retrieval and digital libraries, data fusion

Project number: 101073978

Project name: Disaster Resilience for Extreme Climate Events providing interoperable Data, models, communication and governance

Project acronym: DIRECTED

Call: HORIZON-CL3-2021-DRS-01

Topic: HORIZON-CL3-2021-DRS-01-02

Type of action: HORIZON Innovation Actions

Granting authority: European Research Executive Agency

Grant managed through EU Funding & Tenders Portal: Yes (eGrants)

Project starting date: fixed date: 1 October 2022

Project end date: 30 September 2026

Project duration: 48 months

Consortium agreement: Yes

### 2. Participants

**List of participants:**

N°	Role	Short name	Legal name	Ctry	PIC	Total eligible costs (BEN and AE)	Max grant amount
1	COO	TUBS	TECHNISCHE UNIVERSITAET BRAUNSCHWEIG	DE	999861257	747 238.75	747 238.75
2	BEN	PIK	POTSDAM-INSTITUT FUR KLIMAFOLGENFORSCHUNG EV	DE	999464042	408 750.00	408 750.00
3	BEN	DTU	DANMARKS TEKNISKE UNIVERSITET	DK	999990655	523 750.00	523 750.00
4	BEN	GECO	GECOSISTEMA SRL	IT	959248327	558 750.00	391 125.00
5	BEN	IASS	INSTITUTE FOR ADVANCED SUSTAINABILITY STUDIES EV	DE	960542404	415 000.00	415 000.00
6	BEN	UCC	UNIVERSITY COLLEGE CORK - NATIONAL UNIVERSITY OF IRELAND, CORK	IE	999975717	526 250.00	526 250.00
7	BEN	REGIONH	REGION HOVEDSTADEN	DK	999654744	247 500.00	247 500.00
8	BEN	ARSTPC-ER	AGENZIA REGIONALE PER LA SICUREZZATERRITORIALE E LA PROTEZIONE CIVILE	IT	998349803	97 750.00	97 750.00
9	BEN	G&C	GENILLARD & CO GMBH	DE	920168870	203 750.00	142 625.00
10	BEN	IIASA	INTERNATIONALES INSTITUT FUER ANGEWANDTE SYSTEMANALYSE	AT	999452596	258 750.00	258 750.00
11	BEN	EV	ERFTVERBAND	DE	939668974	348 000.00	348 000.00
12	BEN	ZSRT	ZALA KULONLEGES MENTOK ES ONKENTES TUZOLTO EGYSULET	HU	888552981	112 500.00	112 500.00
13	BEN	ARPAE	AGENZIA REGIONALE PER LA PREVENZIONE, L'AMBIENTE E L'ENERGIA DELL'EMILIA-ROMAGNA	IT	999454633	53 750.00	53 750.00
14	BEN	GFZ	HELMHOLTZ ZENTRUM POTSDAM DEUTSCHESGEOFORSCHUNGSZENTRUM GFZ	DE	999994341	330 236.25	330 236.24
15	BEN	52N	52 NORTH SPATIAL INFORMATION RESEARCH GMBH	DE	997237407	451 375.00	451 375.00
16	AP	ETH	EIDGENOESSISCHE TECHNISCHE HOCHSCHULE ZUERICH	CH	999979015	0.00	0.00
17	AP	OASIS	OASIS HUB LIMITED	UK	906361308	0.00	0.00
18	AP	SEI	SEI OXFORD OFFICE LIMITED	UK	998830535	0.00	0.00
<b>Total</b>						5 283 350.00	5 054 599.99

**Coordinator:**

- TECHNISCHE UNIVERSITAET BRAUNSCHWEIG (TUBS)

**3. Grant****Maximum grant amount, total estimated eligible costs and contributions and funding rate:**

Total eligible costs (BEN and AE)	Funding rate (%)	Maximum grant amount (Annex 2)	Maximum grant amount (award decision)
5 283 350.00	100, 70	5 054 599.99	5 054 599.99

**Grant form:** Budget-based**Grant mode:** Action grant**Budget categories/activity types:**

- A. Personnel costs
  - A.1 Employees, A.2 Natural persons under direct contract, A.3 Seconded persons
  - A.4 SME owners and natural person beneficiaries
- B. Subcontracting costs

- C. Purchase costs
  - C.1 Travel and subsistence
  - C.2 Equipment
  - C.3 Other goods, works and services
- D. Other cost categories
  - D.2 Internally invoiced goods and services
- E. Indirect costs

**Cost eligibility options:**

- In-kind contributions eligible costs
- Parental leave
- Project-based supplementary payments
- Average personnel costs (unit cost according to usual cost accounting practices)
- Limitation for subcontracting
- Travel and subsistence:
  - Travel: Actual costs
  - Accommodation: Actual costs
  - Subsistence: Actual costs
- Equipment: depreciation only
- Indirect cost flat-rate: 25% of the eligible direct costs (categories A-D, except volunteers costs, subcontracting costs, financial support to third parties and exempted specific cost categories, if any)
- VAT: Yes
- Other ineligible costs

**Budget flexibility:** Yes (no flexibility cap)

**4. Reporting, payments and recoveries**

**4.1 Continuous reporting** (art 21)

**Deliverables:** see Funding & Tenders Portal Continuous Reporting tool

**4.2 Periodic reporting and payments**

**Reporting and payment schedule** (art 21, 22):

Reporting				Payments		
Reporting periods			Type	Deadline	Type	Deadline (time to pay)
RP No	Month from	Month to				
					Initial prefinancing	30 days from entry into force/10 days before starting date – whichever is the latest

Reporting				Payments		
Reporting periods			Type	Deadline	Type	Deadline (time to pay)
RP No	Month from	Month to				
1	1	16	Periodic report	60 days after end of reporting period	Interim payment	90 days from receiving periodic report
2	17	32	Periodic report	60 days after end of reporting period	Interim payment	90 days from receiving periodic report
3	33	48	Periodic report	60 days after end of reporting period	Final payment	90 days from receiving periodic report

**Prefinancing payments and guarantees:**

Prefinancing payment	
Type	Amount
Prefinancing 1 (initial)	2 695 618.17

**Reporting and payment modalities (art 21, 22):**

Mutual Insurance Mechanism (MIM): Yes

MIM contribution: 5% of the maximum grant amount (252 730.00), retained from the initial prefinancing

Restrictions on distribution of initial prefinancing: The prefinancing may be distributed only if the minimum number of beneficiaries set out in the call conditions (if any) have acceded to the Agreement and only to beneficiaries that have acceded.

Interim payment ceiling (if any): 90% of the maximum grant amount

Exception for revenues: Yes

No-profit rule: Yes

Late payment interest: ECB + 3.5%

Bank account for payments:

DE79250500000001999200

Conversion into euros: Double conversion

Reporting language: Language of the Agreement

**4.3 Certificates (art 24):**

Certificates on the financial statements (CFS):

Conditions:

Schedule: only at final payment, if threshold is reached

Standard threshold (beneficiary-level):

- financial statement: requested EU contribution to costs  $\geq$  EUR 430 000.00

Special threshold for beneficiaries with a systems and process audit(see Article 24): financial statement: requested EU contribution to costs  $\geq$  EUR 725 000.00

#### **4.4 Recoveries** (art 22)

##### **First-line liability for recoveries:**

Beneficiary termination: Beneficiary concerned

Final payment: Each beneficiary for their own debt

After final payment: Beneficiary concerned

##### **Joint and several liability for enforced recoveries (in case of non-payment):**

Individual financial responsibility: Each beneficiary is liable only for its own debts (and those of its affiliated entities, if any)

#### **5. Consequences of non-compliance, applicable law & dispute settlement forum**

##### **Suspension and termination:**

Additional suspension grounds (art 31)

Additional termination grounds (art 32)

##### **Applicable law** (art 43):

Standard applicable law regime: EU law + law of Belgium

##### **Dispute settlement forum** (art 43):

Standard dispute settlement forum:

EU beneficiaries: EU General Court + EU Court of Justice (on appeal)

Non-EU beneficiaries: Courts of Brussels, Belgium (unless an international agreement provides for the enforceability of EU court judgements)

#### **6. Other**

##### **Specific rules (Annex 5):** Yes

##### **Standard time-limits after project end:**

Confidentiality (for X years after final payment): 5

Record-keeping (for X years after final payment): 5 (or 3 for grants of not more than EUR 60 000)

Reviews (up to X years after final payment): 2

Audits (up to X years after final payment): 2

Extension of findings from other grants to this grant (no later than X years after final payment): 2

Impact evaluation (up to X years after final payment): 5 (or 3 for grants of not more than EUR 60 000)

## CHAPTER 1 GENERAL

### **ARTICLE 1 — SUBJECT OF THE AGREEMENT**

This Agreement sets out the rights and obligations and terms and conditions applicable to the grant awarded for the implementation of the action set out in Chapter 2.

### **ARTICLE 2 — DEFINITIONS**

For the purpose of this Agreement, the following definitions apply:

**Actions** — The project which is being funded in the context of this Agreement.

**Grant** — The grant awarded in the context of this Agreement.

**EU grants** — Grants awarded by EU institutions, bodies, offices or agencies (including EU executive agencies, EU regulatory agencies, EDA, joint undertakings, etc.).

**Participants** — Entities participating in the action as beneficiaries, affiliated entities, associated partners, third parties giving in-kind contributions, subcontractors or recipients of financial support to third parties.

**Beneficiaries (BEN)** — The signatories of this Agreement (either directly or through an accession form).

**Affiliated entities (AE)** — Entities affiliated to a beneficiary within the meaning of Article 187 of EU Financial Regulation 2018/1046<sup>4</sup> which participate in the action with similar rights and obligations as the beneficiaries (obligation to implement action tasks and right to charge costs and claim contributions).

**Associated partners (AP)** — Entities which participate in the action, but without the right to charge costs or claim contributions.

**Purchases** — Contracts for goods, works or services needed to carry out the action (e.g. equipment, consumables and supplies) but which are not part of the action tasks (see Annex 1).

**Subcontracting** — Contracts for goods, works or services that are part of the action tasks (see Annex 1).

**In-kind contributions** — In-kind contributions within the meaning of Article 2(36) of EU Financial

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<sup>4</sup> For the definition, see Article 187 Regulation (EU, Euratom) 2018/1046 of the European Parliament and of the Council of 18 July 2018 on the financial rules applicable to the general budget of the Union, amending Regulations (EU) No 1296/2013, (EU) No 1301/2013, (EU) No 1303/2013, (EU) No 1304/2013, (EU) No 1309/2013, (EU) No 1316/2013, (EU) No 223/2014, (EU) No 283/2014, and Decision No 541/2014/EU and repealing Regulation (EU, Euratom) No 966/2012 ('EU Financial Regulation') (OJ L 193, 30.7.2018, p. 1): "**affiliated entities** [are]:

- (a) entities that form a sole beneficiary [(i.e. where an entity is formed of several entities that satisfy the criteria for being awarded a grant, including where the entity is specifically established for the purpose of implementing an action to be financed by a grant)];
- (b) entities that satisfy the eligibility criteria and that do not fall within one of the situations referred to in Article 136(1) and 141(1) and that have a link with the beneficiary, in particular a legal or capital link, which is neither limited to the action nor established for the sole purpose of its implementation".

Regulation 2018/1046, i.e. non-financial resources made available free of charge by third parties.

**Fraud** — Fraud within the meaning of Article 3 of EU Directive 2017/1371<sup>5</sup> and Article 1 of the Convention on the protection of the European Communities' financial interests, drawn up by the Council Act of 26 July 1995<sup>6</sup>, as well as any other wrongful or criminal deception intended to result in financial or personal gain.

**Irregularities** — Any type of breach (regulatory or contractual) which could impact the EU financial interests, including irregularities within the meaning of Article 1(2) of EU Regulation 2988/95<sup>7</sup>.

**Grave professional misconduct** — Any type of unacceptable or improper behaviour in exercising one's profession, especially by employees, including grave professional misconduct within the meaning of Article 136(1)(c) of EU Financial Regulation 2018/1046.

**Applicable EU, international and national law** — Any legal acts or other (binding or non-binding) rules and guidance in the area concerned.

**Portal** — EU Funding & Tenders Portal; electronic portal and exchange system managed by the European Commission and used by itself and other EU institutions, bodies, offices or agencies for the management of their funding programmes (grants, procurements, prizes, etc.).

## **CHAPTER 2 ACTION**

### **ARTICLE 3 — ACTION**

The grant is awarded for the action **101073978 — DIRECTED** ('action'), as described in Annex 1.

### **ARTICLE 4 — DURATION AND STARTING DATE**

The duration and the starting date of the action are set out in the Data Sheet (see Point 1).

## **CHAPTER 3 GRANT**

### **ARTICLE 5 — GRANT**

#### **5.1 Form of grant**

The grant is an action grant<sup>8</sup> which takes the form of a budget-based mixed actual cost grant (i.e. a

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<sup>5</sup> Directive (EU) 2017/1371 of the European Parliament and of the Council of 5 July 2017 on the fight against fraud to the Union's financial interests by means of criminal law (OJ L 198, 28.7.2017, p. 29).

<sup>6</sup> OJ C 316, 27.11.1995, p. 48.

<sup>7</sup> Council Regulation (EC, Euratom) No 2988/95 of 18 December 1995 on the protection of the European Communities financial interests (OJ L 312, 23.12.1995, p. 1).

<sup>8</sup> For the definition, see Article 180(2)(a) EU Financial Regulation 2018/1046: '**action grant**' means an EU grant to finance "an action intended to help achieve a Union policy objective".

grant based on actual costs incurred, but which may also include other forms of funding, such as unit costs or contributions, flat-rate costs or contributions, lump sum costs or contributions or financing not linked to costs).

## 5.2 Maximum grant amount

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

## 5.3 Funding rate

The funding rate for costs is 100% of the eligible costs for beneficiaries that are non-profit legal entities<sup>9</sup> and 70% of the eligible costs for beneficiaries that are profit legal entities.

Contributions are not subject to any funding rate.

## 5.4 Estimated budget, budget categories and forms of funding

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

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

Annex 2 also shows the types of costs and contributions (forms of funding)<sup>10</sup> to be used for each budget category.

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

## 5.5 Budget flexibility

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

However:

- changes to the budget category for volunteers (if used) always require an amendment
- changes to budget categories with lump sums costs or contributions (if used; including financing not linked to costs) always require an amendment
- changes to budget categories with higher funding rates or budget ceilings (if used) always require an amendment
- addition of amounts for subcontracts not provided for in Annex 1 either require an amendment or simplified approval in accordance with Article 6.2

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<sup>9</sup> For the definition, see Article XX of the Horizon Europe Framework Programme and Rules for Participation Regulation (EU) XXX: ‘**non-profit legal entity**’ means a legal entity which by its legal form is non-profit-making or which has a legal or statutory obligation not to distribute profits to its shareholders or individual members.

<sup>10</sup> See Article 125 EU Financial Regulation 2018/1046.



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

## ARTICLE 6 — ELIGIBLE AND INELIGIBLE COSTS AND CONTRIBUTIONS

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

### 6.1 General eligibility conditions

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

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

- (c) for flat-rate costs or contributions (if any):
- (i) they must be declared under one of the budget categories set out in Article 6.2 and Annex 2
  - (ii) the costs or contributions to which the flat-rate is applied must:
    - be eligible
    - relate to the period set out in Article 4 (with the exception of costs or contributions relating to the submission of the final periodic report, which may be incurred afterwards; see Article 21)
- (d) for lump sum costs or contributions (if any):
- (i) they must be declared under one of the budget categories set out in Article 6.2 and Annex 2
  - (ii) the work must be properly implemented by the beneficiary in accordance with Annex 1
  - (iii) the deliverables/outputs must be achieved in the period set out in Article 4 (with the exception of deliverables/outputs relating to the submission of the final periodic report, which may be achieved afterwards; see Article 21)
- (e) for unit, flat-rate or lump sum costs or contributions according to usual cost accounting practices (if any):
- (i) they must fulfil the general eligibility conditions for the type of cost concerned
  - (ii) the cost accounting practices must be applied in a consistent manner, based on objective criteria, regardless of the source of funding
- (f) for financing not linked to costs (if any): the results must be achieved or the conditions must be fulfilled as described in Annex 1.

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

**In-kind contributions** provided by third parties free of charge may be declared as eligible direct costs by the beneficiaries which use them (under the same conditions as if they were their own, provided that they concern only direct costs and that the third parties and their in-kind contributions are set out in Annex 1 (or approved ex post in the periodic report, if their use does not entail changes to the Agreement which would call into question the decision awarding the grant or breach the principle of equal treatment of applicants; ‘simplified approval procedure’).

## 6.2 Specific eligibility conditions for each budget category

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

### Direct costs

## A. Personnel costs

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

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

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

The daily rate must be calculated as:

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

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

The actual time spent on parental leave by a person assigned to the action may be deducted from the 215 days indicated in the above formula.

The total number of day-equivalents declared in EU grants, for a person for a year, cannot be higher than 215, minus time spent on parental leave (if any).

For personnel which receives supplementary payments for work in projects (project-based remuneration), the personnel costs must be calculated at a rate which:

- corresponds to the actual remuneration costs paid by the beneficiary for the time worked by the person in the action over the reporting period
- does not exceed the remuneration costs paid by the beneficiary for work in similar projects funded by national schemes ('national projects reference')
- is defined based on objective criteria allowing to determine the amount to which the person is entitled

and

- reflects the usual practice of the beneficiary to pay consistently bonuses or supplementary payments for work in projects funded by national schemes.

The national projects reference is the remuneration defined in national law, collective labour agreement or written internal rules of the beneficiary applicable to work in projects funded by national schemes.

If there is no such national law, collective labour agreement or written internal rules or if the project-

based remuneration is not based on objective criteria, the national project reference will be the average remuneration of the person in the last full calendar year covered by the reporting period, excluding remuneration paid for work in EU actions.

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

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

and

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

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

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

They must be calculated on the basis of a rate which corresponds to the costs actually incurred for the direct contract or secondment and must not be significantly different from those for personnel performing similar tasks under an employment contract with the beneficiary.

**A.4 The work of SME owners** for the action (i.e. owners of beneficiaries that are small and medium-sized enterprises<sup>11</sup> not receiving a salary) or **natural person beneficiaries** (i.e. beneficiaries that are natural persons not receiving a salary) may be declared as personnel costs, if they fulfil the general eligibility conditions and are calculated as unit costs in accordance with the method set out in Annex 2a.

## **B. Subcontracting costs**

**Subcontracting costs** for the action (including related duties, taxes and charges, such as non-deductible or non-refundable value added tax (VAT)) are eligible, if they are calculated on the basis

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<sup>11</sup> For the definition, see Commission Recommendation 2003/361/EC: micro, small or medium-sized enterprise (SME) are enterprises

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

of the costs actually incurred, fulfil the general eligibility conditions and are awarded using the beneficiary's usual purchasing practices — provided these ensure subcontracts with best value for money (or if appropriate the lowest price) and that there is no conflict of interests (see Article 12).

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

Subcontracting may cover only a limited part of the action.

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

### C. Purchase costs

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

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

#### C.1 Travel and subsistence

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

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

#### C.2 Equipment

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

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

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

### C.3 Other goods, works and services

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

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

### D. Other cost categories

#### D.2 Internally invoiced goods and services

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

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

and

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

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

This cost will not be taken into account for the indirect cost flat-rate.

#### Indirect costs

### E. Indirect costs

**Indirect costs** will be reimbursed at the flat-rate of 25% of the eligible direct costs (categories A-D, except volunteers costs, subcontracting costs, financial support to third parties and exempted specific cost categories, if any).

#### Contributions

Not applicable

### 6.3 Ineligible costs and contributions

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

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

- (i) costs related to return on capital and dividends paid by a beneficiary
  - (ii) debt and debt service charges
  - (iii) provisions for future losses or debts
  - (iv) interest owed
  - (v) currency exchange losses
  - (vi) bank costs charged by the beneficiary's bank for transfers from the granting authority
  - (vii) excessive or reckless expenditure
  - (viii) deductible or refundable VAT (including VAT paid by public bodies acting as public authority)
  - (ix) costs incurred or contributions for activities implemented during grant agreement suspension (see Article 31)
  - (x) in-kind contributions by third parties: not applicable
- (b) costs or contributions declared under other EU grants (or grants awarded by an EU Member State, non-EU country or other body implementing the EU budget), except for the following cases:
- (i) Synergy actions: not applicable
  - (ii) if the action grant is combined with an operating grant<sup>12</sup> running during the same period and the beneficiary can demonstrate that the operating grant does not cover any (direct or indirect) costs of the action grant
- (c) costs or contributions for staff of a national (or regional/local) administration, for activities that are part of the administration's normal activities (i.e. not undertaken only because of the grant)
- (d) costs or contributions (especially travel and subsistence) for staff or representatives of EU institutions, bodies or agencies
- (e) other :
- (i) country restrictions for eligible costs: not applicable
  - (ii) costs or contributions declared specifically ineligible in the call conditions.

## 6.4 Consequences of non-compliance

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

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

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<sup>12</sup> For the definition, see Article 180(2)(b) of EU Financial Regulation 2018/1046: ‘**operating grant**’ means an EU grant to finance “the functioning of a body which has an objective forming part of and supporting an EU policy”.

## **CHAPTER 4 GRANT IMPLEMENTATION**

### **SECTION 1 CONSORTIUM: BENEFICIARIES, AFFILIATED ENTITIES AND OTHER PARTICIPANTS**

#### **ARTICLE 7 — BENEFICIARIES**

The beneficiaries, as signatories of the Agreement, are fully responsible towards the granting authority for implementing it and for complying with all its obligations.

They must implement the Agreement to their best abilities, in good faith and in accordance with all the obligations and terms and conditions it sets out.

They must have the appropriate resources to implement the action and implement the action under their own responsibility and in accordance with Article 11. If they rely on affiliated entities or other participants (see Articles 8 and 9), they retain sole responsibility towards the granting authority and the other beneficiaries.

They are jointly responsible for the *technical* implementation of the action. If one of the beneficiaries fails to implement their part of the action, the other beneficiaries must ensure that this part is implemented by someone else (without being entitled to an increase of the maximum grant amount and subject to an amendment; see Article 39). The *financial* responsibility of each beneficiary in case of recoveries is governed by Article 22.

The beneficiaries (and their action) must remain eligible under the EU programme funding the grant for the entire duration of the action. Costs and contributions will be eligible only as long as the beneficiary and the action are eligible.

The **internal roles and responsibilities** of the beneficiaries are divided as follows:

(a) Each beneficiary must:

- (i) keep information stored in the Portal Participant Register up to date (see Article 19)
- (ii) inform the granting authority (and the other beneficiaries) immediately of any events or circumstances likely to affect significantly or delay the implementation of the action (see Article 19)
- (iii) submit to the coordinator in good time:
  - the prefinancing guarantees (if required; see Article 23)
  - the financial statements and certificates on the financial statements (CFS) (if required; see Articles 21 and 24.2 and Data Sheet, Point 4.3)
  - the contribution to the deliverables and technical reports (see Article 21)
  - any other documents or information required by the granting authority under the Agreement
- (iv) submit via the Portal data and information related to the participation of their affiliated entities.



(b) The coordinator must:

- (i) monitor that the action is implemented properly (see Article 11)
- (ii) act as the intermediary for all communications between the consortium and the granting authority, unless the Agreement or granting authority specifies otherwise, and in particular:
  - submit the prefinancing guarantees to the granting authority (if any)
  - request and review any documents or information required and verify their quality and completeness before passing them on to the granting authority
  - submit the deliverables and reports to the granting authority
  - inform the granting authority about the payments made to the other beneficiaries (report on the distribution of payments; if required, see Articles 22 and 32)
- (iii) distribute the payments received from the granting authority to the other beneficiaries without unjustified delay (see Article 22).

The coordinator may not delegate or subcontract the above-mentioned tasks to any other beneficiary or third party (including affiliated entities).

However, coordinators which are public bodies may delegate the tasks set out in Point (b)(ii) last indent and (iii) above to entities with ‘authorisation to administer’ which they have created or which are controlled by or affiliated to them. In this case, the coordinator retains sole responsibility for the payments and for compliance with the obligations under the Agreement.

Moreover, coordinators which are ‘sole beneficiaries’<sup>13</sup> (or similar, such as European research infrastructure consortia (ERICs)) may delegate the tasks set out in Point (b)(i) to (iii) above to one of their members. The coordinator retains sole responsibility for compliance with the obligations under the Agreement.

The beneficiaries must have **internal arrangements** regarding their operation and co-ordination, to ensure that the action is implemented properly.

If required by the granting authority (see Data Sheet, Point 1), these arrangements must be set out in a written **consortium agreement** between the beneficiaries, covering for instance:

- the internal organisation of the consortium
- the management of access to the Portal
- different distribution keys for the payments and financial responsibilities in case of recoveries (if any)
- additional rules on rights and obligations related to background and results (see Article 16)

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<sup>13</sup> For the definition, see Article 187(2) EU Financial Regulation 2018/1046: “Where several entities satisfy the criteria for being awarded a grant and together form one entity, that entity may be treated as the **sole beneficiary**, including where it is specifically established for the purpose of implementing the action financed by the grant.”

- settlement of internal disputes
- liability, indemnification and confidentiality arrangements between the beneficiaries.

The internal arrangements must not contain any provision contrary to this Agreement.

## ARTICLE 8 — AFFILIATED ENTITIES

Not applicable

## ARTICLE 9 — OTHER PARTICIPANTS INVOLVED IN THE ACTION

### 9.1 Associated partners

The following entities which cooperate with a beneficiary will participate in the action as ‘associated partners’:

- **EIDGENOESSISCHE TECHNISCHE HOCHSCHULE ZUERICH (ETH)**, PIC 999979015
- **OASIS HUB LIMITED (OASIS)**, PIC 906361308
- **SEI OXFORD OFFICE LIMITED (SEI)**, PIC 998830535

Associated partners must implement the action tasks attributed to them in Annex 1 in accordance with Article 11. They may not charge costs or contributions to the action and the costs for their tasks are not eligible.

The tasks must be set out in Annex 1.

The beneficiaries must ensure that their contractual obligations under Articles 11 (proper implementation), 12 (conflict of interests), 13 (confidentiality and security), 14 (ethics), 17.2 (visibility), 18 (specific rules for carrying out action), 19 (information) and 20 (record-keeping) also apply to the associated partners.

The beneficiaries must ensure that the bodies mentioned in Article 25 (e.g. granting authority, OLAF, Court of Auditors (ECA), etc.) can exercise their rights also towards the associated partners.

### 9.2 Third parties giving in-kind contributions to the action

Other third parties may give in-kind contributions to the action (i.e. personnel, equipment, other goods, works and services, etc. which are free-of-charge) if necessary for the implementation.

Third parties giving in-kind contributions do not implement any action tasks. They may not charge costs or contributions to the action, but the costs for the in-kind contributions are eligible and may be charged by the beneficiaries which use them, under the conditions set out in Article 6. The costs will be included in Annex 2 as part of the beneficiaries’ costs.

The third parties and their in-kind contributions should be set out in Annex 1.

The beneficiaries must ensure that the bodies mentioned in Article 25 (e.g. granting authority, OLAF,

Court of Auditors (ECA), etc.) can exercise their rights also towards the third parties giving in-kind contributions.

### 9.3 Subcontractors

Subcontractors may participate in the action, if necessary for the implementation.

Subcontractors must implement their action tasks in accordance with Article 11. The costs for the subcontracted tasks (invoiced price from the subcontractor) are eligible and may be charged by the beneficiaries, under the conditions set out in Article 6. The costs will be included in Annex 2 as part of the beneficiaries' costs.

The beneficiaries must ensure that their contractual obligations under Articles 11 (proper implementation), 12 (conflict of interest), 13 (confidentiality and security), 14 (ethics), 17.2 (visibility), 18 (specific rules for carrying out action), 19 (information) and 20 (record-keeping) also apply to the subcontractors.

The beneficiaries must ensure that the bodies mentioned in Article 25 (e.g. granting authority, OLAF, Court of Auditors (ECA), etc.) can exercise their rights also towards the subcontractors.

### 9.4 Recipients of financial support to third parties

If the action includes providing financial support to third parties (e.g. grants, prizes or similar forms of support), the beneficiaries must ensure that their contractual obligations under Articles 12 (conflict of interest), 13 (confidentiality and security), 14 (ethics), 17.2 (visibility), 18 (specific rules for carrying out action), 19 (information) and 20 (record-keeping) also apply to the third parties receiving the support (recipients).

The beneficiaries must also ensure that the bodies mentioned in Article 25 (e.g. granting authority, OLAF, Court of Auditors (ECA), etc.) can exercise their rights also towards the recipients.

## ARTICLE 10 — PARTICIPANTS WITH SPECIAL STATUS

### 10.1 Non-EU participants

Participants which are established in a non-EU country (if any) undertake to comply with their obligations under the Agreement and:

- to respect general principles (including fundamental rights, values and ethical principles, environmental and labour standards, rules on classified information, intellectual property rights, visibility of funding and protection of personal data)
- for the submission of certificates under Article 24: to use qualified external auditors which are independent and comply with comparable standards as those set out in EU Directive 2006/43/EC<sup>14</sup>
- for the controls under Article 25: to allow for checks, reviews, audits and investigations

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<sup>14</sup> Directive 2006/43/EC of the European Parliament and of the Council of 17 May 2006 on statutory audits of annual accounts and consolidated accounts or similar national regulations (OJ L 157, 9.6.2006, p. 87).

(including on-the-spot checks, visits and inspections) by the bodies mentioned in that Article (e.g. granting authority, OLAF, Court of Auditors (ECA), etc.).

Special rules on dispute settlement apply (see Data Sheet, Point 5).

## 10.2 Participants which are international organisations

Participants which are international organisations (IOs; if any) undertake to comply with their obligations under the Agreement and:

- to respect general principles (including fundamental rights, values and ethical principles, environmental and labour standards, rules on classified information, intellectual property rights, visibility of funding and protection of personal data)
- for the submission of certificates under Article 24: to use either independent public officers or external auditors which comply with comparable standards as those set out in EU Directive 2006/43/EC
- for the controls under Article 25: to allow for the checks, reviews, audits and investigations by the bodies mentioned in that Article, taking into account the specific agreements concluded by them and the EU (if any).

For such participants, nothing in the Agreement will be interpreted as a waiver of their privileges or immunities, as accorded by their constituent documents or international law.

Special rules on applicable law and dispute settlement apply (see Article 43 and Data Sheet, Point 5).

## 10.3 Pillar-assessed participants

Pillar-assessed participants (if any) may rely on their own systems, rules and procedures, in so far as they have been positively assessed and do not call into question the decision awarding the grant or breach the principle of equal treatment of applicants or beneficiaries.

‘Pillar-assessment’ means a review by the European Commission on the systems, rules and procedures which participants use for managing EU grants (in particular internal control system, accounting system, external audits, financing of third parties, rules on recovery and exclusion, information on recipients and protection of personal data; see Article 154 EU Financial Regulation 2018/1046).

Participants with a positive pillar assessment may rely on their own systems, rules and procedures, in particular for:

- record-keeping (Article 20): may be done in accordance with internal standards, rules and procedures
- currency conversion for financial statements (Article 21): may be done in accordance with usual accounting practices
- guarantees (Article 23): for public law bodies, prefinancing guarantees are not needed
- certificates (Article 24):
  - certificates on the financial statements (CFS): may be provided by their regular internal

or external auditors and in accordance with their internal financial regulations and procedures

- certificates on usual accounting practices (CoMUC): are not needed if those practices are covered by an ex-ante assessment

and use the following specific rules, for:

- recoveries (Article 22): in case of financial support to third parties, there will be no recovery if the participant has done everything possible to retrieve the undue amounts from the third party receiving the support (including legal proceedings) and non-recovery is not due to an error or negligence on its part
- checks, reviews, audits and investigations by the EU (Article 25): will be conducted taking into account the rules and procedures specifically agreed between them and the framework agreement (if any)
- impact evaluation (Article 26): will be conducted in accordance with the participant's internal rules and procedures and the framework agreement (if any)
- grant agreement suspension (Article 31): certain costs incurred during grant suspension are eligible (notably, minimum costs necessary for a possible resumption of the action and costs relating to contracts which were entered into before the pre-information letter was received and which could not reasonably be suspended, reallocated or terminated on legal grounds)
- grant agreement termination (Article 32): the final grant amount and final payment will be calculated taking into account also costs relating to contracts due for execution only after termination takes effect, if the contract was entered into before the pre-information letter was received and could not reasonably be terminated on legal grounds
- liability for damages (Article 33.2): the granting authority must be compensated for damage it sustains as a result of the implementation of the action or because the action was not implemented in full compliance with the Agreement only if the damage is due to an infringement of the participant's internal rules and procedures or due to a violation of third parties' rights by the participant or one of its employees or individual for whom the employees are responsible.

Participants whose pillar assessment covers procurement and granting procedures may also do purchases, subcontracting and financial support to third parties (Article 6.2) in accordance with their internal rules and procedures for purchases, subcontracting and financial support.

Participants whose pillar assessment covers data protection rules may rely on their internal standards, rules and procedures for data protection (Article 15).

The participants may however not rely on provisions which would breach the principle of equal treatment of applicants or beneficiaries or call into question the decision awarding the grant, such as in particular:

- eligibility (Article 6)
- consortium roles and set-up (Articles 7-9)

- security and ethics (Articles 13, 14)
- IPR (including background and results, access rights and rights of use), communication, dissemination and visibility (Articles 16 and 17)
- information obligation (Article 19)
- payment, reporting and amendments (Articles 21, 22 and 39)
- rejections, reductions, suspensions and terminations (Articles 27, 28, 29-32)

If the pillar assessment was subject to remedial measures, reliance on the internal systems, rules and procedures is subject to compliance with those remedial measures.

Participants whose assessment has not yet been updated to cover (the new rules on) data protection may rely on their internal systems, rules and procedures, provided that they ensure that personal data is:

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

Participants must inform the coordinator without delay of any changes to the systems, rules and procedures that were part of the pillar assessment. The coordinator must immediately inform the granting authority.

Pillar-assessed participants that have also concluded a framework agreement with the EU, may moreover — under the same conditions as those above (i.e. not call into question the decision awarding the grant or breach the principle of equal treatment of applicants or beneficiaries) — rely on the provisions set out in that framework agreement.

## **SECTION 2 RULES FOR CARRYING OUT THE ACTION**

### **ARTICLE 11 — PROPER IMPLEMENTATION OF THE ACTION**

#### **11.1 Obligation to properly implement the action**

The beneficiaries must implement the action as described in Annex 1 and in compliance with the provisions of the Agreement, the call conditions and all legal obligations under applicable EU, international and national law.

#### **11.2 Consequences of non-compliance**

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

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

## **ARTICLE 12 — CONFLICT OF INTERESTS**

### **12.1 Conflict of interests**

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

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

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

### **12.2 Consequences of non-compliance**

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

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

## **ARTICLE 13 — CONFIDENTIALITY AND SECURITY**

### **13.1 Sensitive information**

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

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

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

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

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

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

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

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

The confidentiality obligations no longer apply if:

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

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

### **13.2 Classified information**

The parties must handle classified information in accordance with the applicable EU, international or national law on classified information (in particular, Decision 2015/444<sup>15</sup> and its implementing rules).

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

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

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

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

### **13.3 Consequences of non-compliance**

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

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

## **ARTICLE 14 — ETHICS AND VALUES**

### **14.1 Ethics**

The action must be carried out in line with the highest ethical standards and the applicable EU, international and national law on ethical principles.

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

### **14.2 Values**

The beneficiaries must commit to and ensure the respect of basic EU values (such as respect for

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<sup>15</sup> Commission Decision 2015/444/EC, Euratom of 13 March 2015 on the security rules for protecting EU classified information (OJ L 72, 17.3.2015, p. 53).



human dignity, freedom, democracy, equality, the rule of law and human rights, including the rights of minorities).

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

### **14.3 Consequences of non-compliance**

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

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

## **ARTICLE 15 — DATA PROTECTION**

### **15.1 Data processing by the granting authority**

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

For grants where the granting authority is the European Commission, an EU regulatory or executive agency, joint undertaking or other EU body, the processing will be subject to Regulation 2018/1725<sup>16</sup>.

### **15.2 Data processing by the beneficiaries**

The beneficiaries must process personal data under the Agreement in compliance with the applicable EU, international and national law on data protection (in particular, Regulation 2016/679<sup>17</sup>).

They must ensure that personal data is:

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

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<sup>16</sup> Regulation (EU) 2018/1725 of the European Parliament and of the Council of 23 October 2018 on the protection of natural persons with regard to the processing of personal data by the Union institutions, bodies, offices and agencies and on the free movement of such data, and repealing Regulation (EC) No 45/2001 and Decision No 1247/2002/EC (OJ L 295, 21.11.2018, p. 39).

<sup>17</sup> Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC ('GDPR') (OJ L 119, 4.5.2016, p. 1).

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

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

### **15.3 Consequences of non-compliance**

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

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

## **ARTICLE 16 — INTELLECTUAL PROPERTY RIGHTS (IPR) — BACKGROUND AND RESULTS — ACCESS RIGHTS AND RIGHTS OF USE**

### **16.1 Background and access rights to background**

The beneficiaries must give each other and the other participants access to the background identified as needed for implementing the action, subject to any specific rules in Annex 5.

‘Background’ means any data, know-how or information — whatever its form or nature (tangible or intangible), including any rights such as intellectual property rights — that is:

- (a) held by the beneficiaries before they acceded to the Agreement and
- (b) needed to implement the action or exploit the results.

If background is subject to rights of a third party, the beneficiary concerned must ensure that it is able to comply with its obligations under the Agreement.

### **16.2 Ownership of results**

The granting authority does not obtain ownership of the results produced under the action.

‘Results’ means any tangible or intangible effect of the action, such as data, know-how or information, whatever its form or nature, whether or not it can be protected, as well as any rights attached to it, including intellectual property rights.

### **16.3 Rights of use of the granting authority on materials, documents and information received for policy, information, communication, dissemination and publicity purposes**

The granting authority has the right to use non-sensitive information relating to the action and materials and documents received from the beneficiaries (notably summaries for publication, deliverables, as well as any other material, such as pictures or audio-visual material, in paper or electronic form) for policy, information, communication, dissemination and publicity purposes — during the action or afterwards.

The right to use the beneficiaries’ materials, documents and information is granted in the form of a royalty-free, non-exclusive and irrevocable licence, which includes the following rights:

- (a) **use for its own purposes** (in particular, making them available to persons working for the granting authority or any other EU service (including institutions, bodies, offices, agencies, etc.) or EU Member State institution or body; copying or reproducing them in whole or in part, in unlimited numbers; and communication through press information services)
- (b) **distribution to the public** (in particular, publication as hard copies and in electronic or digital format, publication on the internet, as a downloadable or non-downloadable file, broadcasting by any channel, public display or presentation, communicating through press information services, or inclusion in widely accessible databases or indexes)
- (c) **editing or redrafting** (including shortening, summarising, inserting other elements (e.g. meta-data, legends, other graphic, visual, audio or text elements), extracting parts (e.g. audio or video files), dividing into parts, use in a compilation)
- (d) **translation**
- (e) **storage** in paper, electronic or other form
- (f) **archiving**, in line with applicable document-management rules
- (g) the right to authorise **third parties** to act on its behalf or sub-license to third parties the modes of use set out in Points (b), (c), (d) and (f), if needed for the information, communication and publicity activity of the granting authority
- (h) **processing**, analysing, aggregating the materials, documents and information received and **producing derivative works**.

The rights of use are granted for the whole duration of the industrial or intellectual property rights concerned.

If materials or documents are subject to moral rights or third party rights (including intellectual property rights or rights of natural persons on their image and voice), the beneficiaries must ensure that they comply with their obligations under this Agreement (in particular, by obtaining the necessary licences and authorisations from the rights holders concerned).

Where applicable, the granting authority will insert the following information:

“© – [year] – [name of the copyright owner]. All rights reserved. Licensed to the [name of granting authority] under conditions.”

#### 16.4 Specific rules on IPR, results and background

Specific rules regarding intellectual property rights, results and background (if any) are set out in Annex 5.

#### 16.5 Consequences of non-compliance

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

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

## ARTICLE 17 — COMMUNICATION, DISSEMINATION AND VISIBILITY

### 17.1 Communication — Dissemination — Promoting the action

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

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

### 17.2 Visibility — European flag and funding statement

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



Funded by the  
European Union



Co-funded by the  
European Union



Funded by the  
European Union



Co-funded by the  
European Union

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

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

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

For the purposes of their obligations under this Article, the beneficiaries may use the emblem without first obtaining approval from the granting authority. This does not, however, give them the right to

exclusive use. Moreover, they may not appropriate the emblem or any similar trademark or logo, either by registration or by any other means.

### **17.3 Quality of information — Disclaimer**

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

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

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

### **17.4 Specific communication, dissemination and visibility rules**

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

### **17.5 Consequences of non-compliance**

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

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

## **ARTICLE 18 — SPECIFIC RULES FOR CARRYING OUT THE ACTION**

### **18.1 Specific rules for carrying out the action**

Specific rules for implementing the action (if any) are set out in Annex 5.

### **18.2 Consequences of non-compliance**

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

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

## **SECTION 3 GRANT ADMINISTRATION**

### **ARTICLE 19 — GENERAL INFORMATION OBLIGATIONS**

#### **19.1 Information requests**

The beneficiaries must provide — during the action or afterwards and in accordance with Article 7 — any information requested in order to verify eligibility of the costs or contributions declared, proper implementation of the action and compliance with the other obligations under the Agreement.

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

## 19.2 Participant Register data updates

The beneficiaries must keep — at all times, during the action or afterwards — their information stored in the Portal Participant Register up to date, in particular, their name, address, legal representatives, legal form and organisation type.

## 19.3 Information about events and circumstances which impact the action

The beneficiaries must immediately inform the granting authority (and the other beneficiaries) of any of the following:

- (a) **events** which are likely to affect or delay the implementation of the action or affect the EU's financial interests, in particular:
  - (i) changes in their legal, financial, technical, organisational or ownership situation (including changes linked to one of the exclusion grounds listed in the declaration of honour signed before grant signature)
  - (ii) linked action information: not applicable
- (b) **circumstances** affecting:
  - (i) the decision to award the grant or
  - (ii) compliance with requirements under the Agreement.

## 19.4 Consequences of non-compliance

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

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

## ARTICLE 20 — RECORD-KEEPING

### 20.1 Keeping records and supporting documents

The beneficiaries must — at least until the time-limit set out in the Data Sheet (see Point 6) — keep records and other supporting documents to prove the proper implementation of the action in line with the accepted standards in the respective field (if any).

In addition, the beneficiaries must — for the same period — keep the following to justify the amounts declared:

- (a) for actual costs: adequate records and supporting documents to prove the costs declared (such as contracts, subcontracts, invoices and accounting records); in addition, the beneficiaries' usual accounting and internal control procedures must enable direct reconciliation between the amounts declared, the amounts recorded in their accounts and the amounts stated in the supporting documents
- (b) for flat-rate costs and contributions (if any): adequate records and supporting documents to prove the eligibility of the costs or contributions to which the flat-rate is applied

- (c) for the following simplified costs and contributions: the beneficiaries do not need to keep specific records on the actual costs incurred, but must keep:
- (i) for unit costs and contributions (if any): adequate records and supporting documents to prove the number of units declared
  - (ii) for lump sum costs and contributions (if any): adequate records and supporting documents to prove proper implementation of the work as described in Annex 1
  - (iii) for financing not linked to costs (if any): adequate records and supporting documents to prove the achievement of the results or the fulfilment of the conditions as described in Annex 1
- (d) for unit, flat-rate and lump sum costs and contributions according to usual cost accounting practices (if any): the beneficiaries must keep any adequate records and supporting documents to prove that their cost accounting practices have been applied in a consistent manner, based on objective criteria, regardless of the source of funding, and that they comply with the eligibility conditions set out in Articles 6.1 and 6.2.

Moreover, the following is needed for specific budget categories:

- (e) for personnel costs: time worked for the beneficiary under the action must be supported by declarations signed monthly by the person and their supervisor, unless another reliable time-record system is in place; the granting authority may accept alternative evidence supporting the time worked for the action declared, if it considers that it offers an adequate level of assurance
- (f) additional record-keeping rules: not applicable

The records and supporting documents must be made available upon request (see Article 19) or in the context of checks, reviews, audits or investigations (see Article 25).

If there are on-going checks, reviews, audits, investigations, litigation or other pursuits of claims under the Agreement (including the extension of findings; see Article 25), the beneficiaries must keep these records and other supporting documentation until the end of these procedures.

The beneficiaries must keep the original documents. Digital and digitalised documents are considered originals if they are authorised by the applicable national law. The granting authority may accept non-original documents if they offer a comparable level of assurance.

## **20.2 Consequences of non-compliance**

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

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

## **ARTICLE 21 — REPORTING**

### **21.1 Continuous reporting**

The beneficiaries must continuously report on the progress of the action (e.g. **deliverables, milestones, outputs/outcomes, critical risks, indicators**, etc; if any), in the Portal Continuous Reporting tool and in accordance with the timing and conditions it sets out (as agreed with the granting authority).

Standardised deliverables (e.g. progress reports not linked to payments, reports on cumulative expenditure, special reports, etc; if any) must be submitted using the templates published on the Portal.

## 21.2 Periodic reporting: Technical reports and financial statements

In addition, the beneficiaries must provide reports to request payments, in accordance with the schedule and modalities set out in the Data Sheet (see Point 4.2):

- for additional prefinancings (if any): an **additional prefinancing report**
- for interim payments (if any) and the final payment: a **periodic report**.

The prefinancing and periodic reports include a technical and financial part.

The technical part includes an overview of the action implementation. It must be prepared using the template available in the Portal Periodic Reporting tool.

The financial part of the additional prefinancing report includes a statement on the use of the previous prefinancing payment.

The financial part of the periodic report includes:

- the financial statements (individual and consolidated; for all beneficiaries/affiliated entities)
- the explanation on the use of resources (or detailed cost reporting table, if required)
- the certificates on the financial statements (CFS) (if required; see Article 24.2 and Data Sheet, Point 4.3).

The **financial statements** must detail the eligible costs and contributions for each budget category and, for the final payment, also the revenues for the action (see Articles 6 and 22).

All eligible costs and contributions incurred should be declared, even if they exceed the amounts indicated in the estimated budget (see Annex 2). Amounts that are not declared in the individual financial statements will not be taken into account by the granting authority.

By signing the financial statements (directly in the Portal Periodic Reporting tool), the beneficiaries confirm that:

- the information provided is complete, reliable and true
- the costs and contributions declared are eligible (see Article 6)
- the costs and contributions can be substantiated by adequate records and supporting documents (see Article 20) that will be produced upon request (see Article 19) or in the context of checks, reviews, audits and investigations (see Article 25)
- for the final periodic report: all the revenues have been declared (if required; see Article 22).



Beneficiaries will have to submit also the financial statements of their affiliated entities (if any). In case of recoveries (see Article 22), beneficiaries will be held responsible also for the financial statements of their affiliated entities.

### **21.3 Currency for financial statements and conversion into euros**

The financial statements must be drafted in euro.

Beneficiaries with general accounts established in a currency other than the euro must convert the costs recorded in their accounts into euro, at the average of the daily exchange rates published in the C series of the *Official Journal of the European Union* (ECB website), calculated over the corresponding reporting period.

If no daily euro exchange rate is published in the *Official Journal* for the currency in question, they must be converted at the average of the monthly accounting exchange rates published on the European Commission website (InforEuro), calculated over the corresponding reporting period.

Beneficiaries with general accounts in euro must convert costs incurred in another currency into euro according to their usual accounting practices.

### **21.4 Reporting language**

The reporting must be in the language of the Agreement, unless otherwise agreed with the granting authority (see Data Sheet, Point 4.2).

### **21.5 Consequences of non-compliance**

If a report submitted does not comply with this Article, the granting authority may suspend the payment deadline (see Article 29) and apply other measures described in Chapter 5.

If the coordinator breaches its reporting obligations, the granting authority may terminate the grant or the coordinator's participation (see Article 32) or apply other measures described in Chapter 5.

## **ARTICLE 22 — PAYMENTS AND RECOVERIES — CALCULATION OF AMOUNTS DUE**

### **22.1 Payments and payment arrangements**

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

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

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

The cost of payment transfers will be borne as follows:

- the granting authority bears the cost of transfers charged by its bank
- the beneficiary bears the cost of transfers charged by its bank

- the party causing a repetition of a transfer bears all costs of the repeated transfer.

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

## 22.2 Recoveries

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

Each beneficiary's financial responsibility in case of recovery is in principle limited to their own debt and undue amounts of their affiliated entities.

In case of enforced recoveries (see Article 22.4), affiliated entities will be held liable for repaying debts of their beneficiaries, if required by the granting authority (see Data Sheet, Point 4.4).

## 22.3 Amounts due

### 22.3.1 Prefinancing payments

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

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

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

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

The contribution to the Mutual Insurance Mechanism will be retained from the prefinancing payments (at the rate and in accordance with the modalities set out in the Data Sheet, see Point 4.2) and transferred to the Mechanism.

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

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

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

### 22.3.2 Amount due at beneficiary termination — Recovery

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

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

## Step 1 — Calculation of the total accepted EU contribution

### Step 1 — Calculation of the total accepted EU contribution

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

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

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

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

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

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

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

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

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

If payment is not made to the coordinator by the date specified in the confirmation letter, the granting authority may call on the Mutual Insurance Mechanism to intervene, if continuation of the action is guaranteed and the conditions set out in the rules governing the Mechanism are met.

In this case, it will send a **beneficiary recovery letter**, together with a **debit note** with the terms and date for payment.

The debit note for the beneficiary will include the amount calculated for the affiliated entities which also had to end their participation (if any).

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

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

### **22.3.3 Interim payments**

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

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

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

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

Step 1 — Calculation of the total accepted EU contribution

Step 2 — Limit to the interim payment ceiling

#### Step 1 — Calculation of the total accepted EU contribution

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

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

#### Step 2 — Limit to the interim payment ceiling

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

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

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

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

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

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

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

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

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

Step 1 — Calculation of the total accepted EU contribution

Step 2 — Limit to the maximum grant amount

Step 3 — Reduction due to the no-profit rule

#### Step 1 — Calculation of the total accepted EU contribution

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

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

#### Step 2 — Limit to the maximum grant amount

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

#### Step 3 — Reduction due to the no-profit rule

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

‘Revenue’ is all income generated by the action, during its duration (see Article 4), for beneficiaries that are profit legal entities (— with the exception of income generated by the exploitation of results, which are not considered as revenues).

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

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

$$\left. \begin{array}{l} \{\text{final grant amount} \\ \text{minus} \\ \{\text{prefinancing and interim payments made (if any)}\} \end{array} \right\}$$

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

The amount retained for the Mutual Insurance Mechanism (see above) will be released and **paid** to the coordinator (in accordance with the rules governing the Mechanism).

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

For grants where the granting authority is the European Commission or an EU executive agency,

offsetting may also be done against amounts owed to other Commission services or executive agencies.

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

If — despite the release of the Mutual Insurance Mechanism contribution — the balance is **negative**, it will be **recovered** in accordance with the following procedure:

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

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

If no observations are submitted (or the granting authority decides to pursue recovery despite the observations it has received) and the coordinator has submitted the report on the distribution of payments, it will calculate the **share of the debt per beneficiary**, by:

(a) identifying the beneficiaries for which the amount calculated as follows is negative:

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

$$\left. \begin{array}{l} \text{multiplied by} \\ \text{final grant amount for the action} \end{array} \right\},$$

$$\text{minus}$$

$$\left\{ \text{prefinancing and interim payments received by the beneficiary (if any)} \right\}$$

and

(b) dividing the debt:

$$\left\{ \begin{array}{l} \text{amount calculated according to point (a) for the beneficiary concerned} \\ \text{divided by} \\ \text{the sum of the amounts calculated according to point (a) for all the beneficiaries identified according to} \\ \text{point (a)} \end{array} \right.$$

$$\left. \begin{array}{l} \text{multiplied by} \\ \text{the amount to be recovered} \end{array} \right\}.$$

and confirm the amount to be recovered from each beneficiary concerned (**confirmation letter**), together with **debit notes** with the terms and date for payment.

The debit notes for beneficiaries will include the amounts calculated for their affiliated entities (if any).

If the coordinator has not submitted the report on the distribution of payments, the granting authority will **recover** the full amount from the coordinator (**confirmation letter** and **debit note** with the terms and date for payment).

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

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

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

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

Step 1 — Calculation of the revised total accepted EU contribution

#### Step 1 — Calculation of the revised total accepted EU contribution

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

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

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

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

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

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

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

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

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

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

## 22.4 Enforced recovery

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

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

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

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

- (b) financial guarantee(s): not applicable
- (c) joint and several liability of beneficiaries: not applicable
- (d) by holding affiliated entities jointly and severally liable (if any, see Data Sheet, Point 4.4)
- (e) by taking legal action (see Article 43) or, provided that the granting authority is the European Commission or an EU executive agency, by adopting an enforceable decision under Article 299 of the Treaty on the Functioning of the EU (TFEU) and Article 100(2) of EU Financial Regulation 2018/1046.

If the Mutual Insurance Mechanism was called on by the granting authority to intervene, recovery will be continued in the name of the Mutual Insurance Mechanism. If two debit notes were sent, the second one (in the name of the Mutual Insurance Mechanism) will be considered to replace the first one (in the name of the granting authority). Where the MIM intervened, offsetting, enforceable decisions or any other of the above-mentioned forms of enforced recovery may be used mutatis mutandis.

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

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

Bank charges incurred in the recovery process will be borne by the beneficiary, unless Directive 2015/2366<sup>18</sup> applies.

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

## 22.5 Consequences of non-compliance

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<sup>18</sup> Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC (OJ L 337, 23.12.2015, p. 35).



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

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

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

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

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

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

**22.5.2** If the coordinator breaches any of its obligations under this Article, the grant may be reduced (see Article 29) and the grant or the coordinator may be terminated (see Article 32).

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

## ARTICLE 23 — GUARANTEES

Not applicable

## ARTICLE 24 — CERTIFICATES

### 24.1 Operational verification report (OVR)

Not applicable

### 24.2 Certificate on the financial statements (CFS)

If required by the granting authority (see Data Sheet, Point 4.3), the beneficiaries must provide certificates on their financial statements (CFS), in accordance with the schedule, threshold and conditions set out in the Data Sheet.

The coordinator must submit them as part of the periodic report (see Article 21).

The certificates must be drawn up using the template published on the Portal, cover the costs declared on the basis of actual costs and costs according to usual cost accounting practices (if any), and fulfil the following conditions:

- (a) be provided by a qualified approved external auditor which is independent and complies with Directive 2006/43/EC<sup>19</sup> (or for public bodies: by a competent independent public officer)
- (b) the verification must be carried out according to the highest professional standards to ensure that the financial statements comply with the provisions under the Agreement and that the costs declared are eligible.

The certificates will not affect the granting authority's right to carry out its own checks, reviews or audits, nor preclude the European Court of Auditors (ECA), the European Public Prosecutor's Office (EPPO) or the European Anti-Fraud Office (OLAF) from using their prerogatives for audits and investigations under the Agreement (see Article 25).

If the costs (or a part of them) were already audited by the granting authority, these costs do not need to be covered by the certificate and will not be counted for calculating the threshold (if any).

### 24.3 Certificate on the compliance of usual cost accounting practices (CoMUC)

Not applicable

### 24.4 Systems and process audit (SPA)

Beneficiaries which:

- use unit, flat rate or lump sum costs or contributions according to documented (i.e. formally approved and in writing) usual costs accounting practices (if any) or
- have formalised documentation on the systems and processes for calculating their costs and contributions (i.e. formally approved and in writing), have participated in at least 150 actions under Horizon 2020 or the Euratom Research and Training Programme (2014-2018 or 2019-2020) and participate in at least 3 ongoing actions under Horizon Europe or the Euratom Research and Training Programme (2021-2025 or 2026-2027)

may apply to the granting authority for a systems and process audit (SPA).

This audit will be carried out as follows:

- Step 1 – Application by the beneficiary.
- Step 2 – If the application is accepted, the granting authority will carry out the systems and process audit, complemented by an audit of transactions (on a sample of the beneficiary's Horizon Europe or the Euratom Research and Training Programme financial statements).
- Step 3 – The audit result will take the form of a risk assessment classification for the beneficiary: low, medium or high.

Low-risk beneficiaries will benefit from less (or less in-depth) ex-post audits (see Article 25) and a higher threshold for submitting certificates on the financial statements (CFS; see Articles 21 and 24.2 and Data Sheet, Point 4.3).

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<sup>19</sup> Directive 2006/43/EC of the European Parliament and of the Council of 17 May 2006 on statutory audits of annual accounts and consolidated accounts or similar national regulations (OJ L 157, 9.6.2006, p. 87).

## 24.5 Consequences of non-compliance

If a beneficiary does not submit a certificate on the financial statements (CFS) or the certificate is rejected, the accepted EU contribution to costs will be capped to reflect the CFS threshold.

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

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

### 25.1 Granting authority checks, reviews and audits

#### 25.1.1 Internal checks

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

#### 25.1.2 Project reviews

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

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

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

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

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

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

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

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

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

Project reviews (including project review reports) will be in the language of the Agreement.

### 25.1.3 Audits

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

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

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

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

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

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

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

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

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

Audits (including audit reports) will be in the language of the Agreement.

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

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

## 25.3 Access to records for assessing simplified forms of funding

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

## 25.4 OLAF, EPPO and ECA audits and investigations

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

- the European Anti-Fraud Office (OLAF) under Regulations No 883/2013<sup>20</sup> and No 2185/96<sup>21</sup>
- the European Public Prosecutor's Office (EPPO) under Regulation 2017/1939
- the European Court of Auditors (ECA) under Article 287 of the Treaty on the Functioning of the EU (TFEU) and Article 257 of EU Financial Regulation 2018/1046.

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

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

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

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

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

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

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

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

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

### **25.5.2 Extension from other grants**

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

- (a) the beneficiary concerned is found, in other EU grants awarded under similar conditions, to have committed systemic or recurrent errors, irregularities, fraud or breach of obligations that have a material impact on this grant and

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<sup>20</sup> Regulation (EU, Euratom) No 883/2013 of the European Parliament and of the Council of 11 September 2013 concerning investigations conducted by the European Anti-Fraud Office (OLAF) and repealing Regulation (EC) No 1073/1999 of the European Parliament and of the Council and Council Regulation (Euratom) No 1074/1999 (OJ L 248, 18/09/2013, p. 1).

<sup>21</sup> Council Regulation (Euratom, EC) No 2185/1996 of 11 November 1996 concerning on-the-spot checks and inspections carried out by the Commission in order to protect the European Communities' financial interests against fraud and other irregularities (OJ L 292, 15/11/1996, p. 2).

- (b) those findings are formally notified to the beneficiary concerned — together with the list of grants affected by the findings — within the time-limit for audits set out in the Data Sheet (see Point 6).

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

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

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

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

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

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

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

## 25.6 Consequences of non-compliance

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

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

## ARTICLE 26 — IMPACT EVALUATIONS

### 26.1 Impact evaluation

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

Such evaluations may be started during implementation of the action and until the time-limit set out

in the Data Sheet (see Point 6). They will be formally notified to the coordinator or beneficiaries and will be considered to start on the date of the notification.

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

The coordinator or beneficiaries must provide any information relevant to evaluate the impact of the action, including information in electronic format.

## **26.2 Consequences of non-compliance**

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

# **CHAPTER 5 CONSEQUENCES OF NON-COMPLIANCE**

## **SECTION 1 REJECTIONS AND GRANT REDUCTION**

### **ARTICLE 27 — REJECTION OF COSTS AND CONTRIBUTIONS**

#### **27.1 Conditions**

The granting authority will — at beneficiary termination, interim payment, final payment or afterwards — reject any costs or contributions which are ineligible (see Article 6), in particular following checks, reviews, audits or investigations (see Article 25).

The rejection may also be based on the extension of findings from other grants to this grant (see Article 25).

Ineligible costs or contributions will be rejected.

#### **27.2 Procedure**

If the rejection does not lead to a recovery, the granting authority will formally notify the coordinator or beneficiary concerned of the rejection, the amounts and the reasons why. The coordinator or beneficiary concerned may — within 30 days of receiving notification — submit observations if it disagrees with the rejection (payment review procedure).

If the rejection leads to a recovery, the granting authority will follow the contradictory procedure with pre-information letter set out in Article 22.

#### **27.3 Effects**

If the granting authority rejects costs or contributions, it will deduct them from the costs or contributions declared and then calculate the amount due (and, if needed, make a recovery; see Article 22).

### **ARTICLE 28 — GRANT REDUCTION**

#### **28.1 Conditions**

The granting authority may — at beneficiary termination, final payment or afterwards — reduce the grant for a beneficiary, if:

- (a) the beneficiary (or a person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed:
  - (i) substantial errors, irregularities or fraud or
  - (ii) serious breach of obligations under this Agreement or during its award (including improper implementation of the action, non-compliance with the call conditions, submission of false information, failure to provide required information, breach of ethics or security rules (if applicable), etc.), or
- (b) the beneficiary (or a person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed — in other EU grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant (see Article 25).

The amount of the reduction will be calculated for each beneficiary concerned and proportionate to the seriousness and the duration of the errors, irregularities or fraud or breach of obligations, by applying an individual reduction rate to their accepted EU contribution.

## **28.2 Procedure**

If the grant reduction does not lead to a recovery, the granting authority will formally notify the coordinator or beneficiary concerned of the reduction, the amount to be reduced and the reasons why. The coordinator or beneficiary concerned may — within 30 days of receiving notification — submit observations if it disagrees with the reduction (payment review procedure).

If the grant reduction leads to a recovery, the granting authority will follow the contradictory procedure with pre-information letter set out in Article 22.

## **28.3 Effects**

If the granting authority reduces the grant, it will deduct the reduction and then calculate the amount due (and, if needed, make a recovery; see Article 22).

## **SECTION 2 SUSPENSION AND TERMINATION**

### **ARTICLE 29 — PAYMENT DEADLINE SUSPENSION**

#### **29.1 Conditions**

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

- (a) the required report (see Article 21) has not been submitted or is not complete or additional information is needed
- (b) there are doubts about the amount to be paid (e.g. ongoing audit extension procedure, queries



about eligibility, need for a grant reduction, etc.) and additional checks, reviews, audits or investigations are necessary, or

- (c) there are other issues affecting the EU financial interests.

## 29.2 Procedure

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

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

If the conditions for suspending the payment deadline are no longer met, the suspension will be **lifted** — and the remaining time to pay (see Data Sheet, Point 4.2) will resume.

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

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

## ARTICLE 30 — PAYMENT SUSPENSION

### 30.1 Conditions

The granting authority may — at any moment — suspend payments, in whole or in part for one or more beneficiaries, if:

- (a) a beneficiary (or a person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed or is suspected of having committed:
  - (i) substantial errors, irregularities or fraud or
  - (ii) serious breach of obligations under this Agreement or during its award (including improper implementation of the action, non-compliance with the call conditions, submission of false information, failure to provide required information, breach of ethics or security rules (if applicable), etc.), or
- (b) a beneficiary (or a person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed — in other EU grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant.

If payments are suspended for one or more beneficiaries, the granting authority will make partial payment(s) for the part(s) not suspended. If suspension concerns the final payment, the payment (or recovery) of the remaining amount after suspension is lifted will be considered to be the payment that closes the action.

### 30.2 Procedure

Before suspending payments, the granting authority will send a **pre-information letter** to the beneficiary concerned:

- formally notifying the intention to suspend payments and the reasons why and
- requesting observations within 30 days of receiving notification.

If the granting authority does not receive observations or decides to pursue the procedure despite the observations it has received, it will confirm the suspension (**confirmation letter**). Otherwise, it will formally notify that the procedure is discontinued.

At the end of the suspension procedure, the granting authority will also inform the coordinator.

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

If the conditions for resuming payments are met, the suspension will be **lifted**. The granting authority will formally notify the beneficiary concerned (and the coordinator) and set the suspension end date.

During the suspension, no prefinancing will be paid to the beneficiaries concerned. For interim payments, the periodic reports for all reporting periods except the last one (see Article 21) must not contain any financial statements from the beneficiary concerned (or its affiliated entities). The coordinator must include them in the next periodic report after the suspension is lifted or — if suspension is not lifted before the end of the action — in the last periodic report.

## ARTICLE 31 — GRANT AGREEMENT SUSPENSION

### 31.1 Consortium-requested GA suspension

#### 31.1.1 Conditions and procedure

The beneficiaries may request the suspension of the grant or any part of it, if exceptional circumstances — in particular *force majeure* (see Article 35) — make implementation impossible or excessively difficult.

The coordinator must submit a request for **amendment** (see Article 39), with:

- the reasons why
- the date the suspension takes effect; this date may be before the date of the submission of the amendment request and
- the expected date of resumption.

The suspension will **take effect** on the day specified in the amendment.

Once circumstances allow for implementation to resume, the coordinator must immediately request another **amendment** of the Agreement to set the suspension end date, the resumption date (one day after suspension end date), extend the duration and make other changes necessary to adapt the action to the new situation (see Article 39) — unless the grant has been terminated (see Article 32). The suspension will be **lifted** with effect from the suspension end date set out in the amendment. This date may be before the date of the submission of the amendment request.

During the suspension, no prefinancing will be paid. Costs incurred or contributions for activities implemented during grant suspension are not eligible (see Article 6.3).

## 31.2 EU-initiated GA suspension

### 31.2.1 Conditions

The granting authority may suspend the grant or any part of it, if:

- (a) a beneficiary (or a person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed or is suspected of having committed:
  - (i) substantial errors, irregularities or fraud or
  - (ii) serious breach of obligations under this Agreement or during its award (including improper implementation of the action, non-compliance with the call conditions, submission of false information, failure to provide required information, breach of ethics or security rules (if applicable), etc.), or
- (b) a beneficiary (or a person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed — in other EU grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant
- (c) other:
  - (i) linked action issues: not applicable
  - (ii) the action has lost its scientific or technological relevance, for EIC Accelerator actions: the action has lost its economic relevance, for challenge-based EIC Pathfinder actions and Horizon Europe Missions: the action has lost its relevance as part of the Portfolio for which it has been initially selected

### 31.2.2 Procedure

Before suspending the grant, the granting authority will send a **pre-information letter** to the coordinator:

- formally notifying the intention to suspend the grant and the reasons why and
- requesting observations within 30 days of receiving notification.

If the granting authority does not receive observations or decides to pursue the procedure despite the observations it has received, it will confirm the suspension (**confirmation letter**). Otherwise, it will formally notify that the procedure is discontinued.

The suspension will **take effect** the day after the confirmation notification is sent (or on a later date specified in the notification).

Once the conditions for resuming implementation of the action are met, the granting authority will formally notify the coordinator a **lifting of suspension letter**, in which it will set the suspension end date and invite the coordinator to request an amendment of the Agreement to set the resumption

date (one day after suspension end date), extend the duration and make other changes necessary to adapt the action to the new situation (see Article 39) — unless the grant has been terminated (see Article 32). The suspension will be **lifted** with effect from the suspension end date set out in the lifting of suspension letter. This date may be before the date on which the letter is sent.

During the suspension, no prefinancing will be paid. Costs incurred or contributions for activities implemented during suspension are not eligible (see Article 6.3).

The beneficiaries may not claim damages due to suspension by the granting authority (see Article 33).

Grant suspension does not affect the granting authority's right to terminate the grant or a beneficiary (see Article 32) or reduce the grant (see Article 28).

## **ARTICLE 32 — GRANT AGREEMENT OR BENEFICIARY TERMINATION**

### **32.1 Consortium-requested GA termination**

#### **32.1.1 Conditions and procedure**

The beneficiaries may request the termination of the grant.

The coordinator must submit a request for **amendment** (see Article 39), with:

- the reasons why
- the date the consortium ends work on the action ('end of work date') and
- the date the termination takes effect ('termination date'); this date must be after the date of the submission of the amendment request.

The termination will **take effect** on the termination date specified in the amendment.

If no reasons are given or if the granting authority considers the reasons do not justify termination, it may consider the grant terminated improperly.

#### **32.1.2 Effects**

The coordinator must — within 60 days from when termination takes effect — submit a **periodic report** (for the open reporting period until termination).

The granting authority will calculate the final grant amount and final payment on the basis of the report submitted and taking into account the costs incurred and contributions for activities implemented before the end of work date (see Article 22). Costs relating to contracts due for execution only after the end of work are not eligible.

If the granting authority does not receive the report within the deadline, only costs and contributions which are included in an approved periodic report will be taken into account (no costs/contributions if no periodic report was ever approved).

Improper termination may lead to a grant reduction (see Article 28).

After termination, the beneficiaries' obligations (in particular Articles 13 (confidentiality and security), 16 (IPR), 17 (communication, dissemination and visibility), 21 (reporting), 25 (checks,

reviews, audits and investigations), 26 (impact evaluation), 27 (rejections), 28 (grant reduction) and 42 (assignment of claims)) continue to apply.

## 32.2 Consortium-requested beneficiary termination

### 32.2.1 Conditions and procedure

The coordinator may request the termination of the participation of one or more beneficiaries, on request of the beneficiary concerned or on behalf of the other beneficiaries.

The coordinator must submit a request for **amendment** (see Article 39), with:

- the reasons why
- the opinion of the beneficiary concerned (or proof that this opinion has been requested in writing)
- the date the beneficiary ends work on the action ('end of work date')
- the date the termination takes effect ('termination date'); this date must be after the date of the submission of the amendment request.

If the termination concerns the coordinator and is done without its agreement, the amendment request must be submitted by another beneficiary (acting on behalf of the consortium).

The termination will **take effect** on the termination date specified in the amendment.

If no information is given or if the granting authority considers that the reasons do not justify termination, it may consider the beneficiary to have been terminated improperly.

### 32.2.2 Effects

The coordinator must — within 60 days from when termination takes effect — submit:

- (i) a **report on the distribution of payments** to the beneficiary concerned
- (ii) a **termination report** from the beneficiary concerned, for the open reporting period until termination, containing an overview of the progress of the work, the financial statement, the explanation on the use of resources, and, if applicable, the certificate on the financial statement (CFS; see Articles 21 and 24.2 and Data Sheet, Point 4.3)
- (iii) a second **request for amendment** (see Article 39) with other amendments needed (e.g. reallocation of the tasks and the estimated budget of the terminated beneficiary; addition of a new beneficiary to replace the terminated beneficiary; change of coordinator, etc.).

The granting authority will calculate the amount due to the beneficiary on the basis of the report submitted and taking into account the costs incurred and contributions for activities implemented before the end of work date (see Article 22). Costs relating to contracts due for execution only after the end of work are not eligible.

The information in the termination report must also be included in the periodic report for the next reporting period (see Article 21).

If the granting authority does not receive the termination report within the deadline, only costs and contributions which are included in an approved periodic report will be taken into account (no costs/contributions if no periodic report was ever approved).

If the granting authority does not receive the report on the distribution of payments within the deadline, it will consider that:

- the coordinator did not distribute any payment to the beneficiary concerned and that
- the beneficiary concerned must not repay any amount to the coordinator.

If the second request for amendment is accepted by the granting authority, the Agreement is **amended** to introduce the necessary changes (see Article 39).

If the second request for amendment is rejected by the granting authority (because it calls into question the decision awarding the grant or breaches the principle of equal treatment of applicants), the grant may be terminated (see Article 32).

Improper termination may lead to a reduction of the grant (see Article 31) or grant termination (see Article 32).

After termination, the concerned beneficiary's obligations (in particular Articles 13 (confidentiality and security), 16 (IPR), 17 (communication, dissemination and visibility), 21 (reporting), 25 (checks, reviews, audits and investigations), 26 (impact evaluation), 27 (rejections), 28 (grant reduction) and 42 (assignment of claims)) continue to apply.

### **32.3 EU-initiated GA or beneficiary termination**

#### **32.3.1 Conditions**

The granting authority may terminate the grant or the participation of one or more beneficiaries, if:

- (a) one or more beneficiaries do not accede to the Agreement (see Article 40)
- (b) a change to the action or the legal, financial, technical, organisational or ownership situation of a beneficiary is likely to substantially affect the implementation of the action or calls into question the decision to award the grant (including changes linked to one of the exclusion grounds listed in the declaration of honour)
- (c) following termination of one or more beneficiaries, the necessary changes to the Agreement (and their impact on the action) would call into question the decision awarding the grant or breach the principle of equal treatment of applicants
- (d) implementation of the action has become impossible or the changes necessary for its continuation would call into question the decision awarding the grant or breach the principle of equal treatment of applicants
- (e) a beneficiary (or person with unlimited liability for its debts) is subject to bankruptcy proceedings or similar (including insolvency, winding-up, administration by a liquidator or court, arrangement with creditors, suspension of business activities, etc.)

- (f) a beneficiary (or person with unlimited liability for its debts) is in breach of social security or tax obligations
- (g) a beneficiary (or person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has been found guilty of grave professional misconduct
- (h) a beneficiary (or person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed fraud, corruption, or is involved in a criminal organisation, money laundering, terrorism-related crimes (including terrorism financing), child labour or human trafficking
- (i) a beneficiary (or person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) was created under a different jurisdiction with the intent to circumvent fiscal, social or other legal obligations in the country of origin (or created another entity with this purpose)
- (j) a beneficiary (or person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed:
  - (i) substantial errors, irregularities or fraud or
  - (ii) serious breach of obligations under this Agreement or during its award (including improper implementation of the action, non-compliance with the call conditions, submission of false information, failure to provide required information, breach of ethics or security rules (if applicable), etc.)
- (k) a beneficiary (or person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed — in other EU grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant (extension of findings from other grants to this grant; see Article 25)
- (l) despite a specific request by the granting authority, a beneficiary does not request — through the coordinator — an amendment to the Agreement to end the participation of one of its affiliated entities or associated partners that is in one of the situations under points (d), (f), (e), (g), (h), (i) or (j) and to reallocate its tasks, or
- (m) other:
  - (i) linked action issues: not applicable
  - (ii) the action has lost its scientific or technological relevance, for EIC Accelerator actions: the action has lost its economic relevance, for challenge-based EIC Pathfinder actions and Horizon Europe Missions: the action has lost its relevance as part of the Portfolio for which it has been initially selected

### 32.3.2 Procedure

Before terminating the grant or participation of one or more beneficiaries, the granting authority will send a **pre-information letter** to the coordinator or beneficiary concerned:

- formally notifying the intention to terminate and the reasons why and
- requesting observations within 30 days of receiving notification.

If the granting authority does not receive observations or decides to pursue the procedure despite the observations it has received, it will confirm the termination and the date it will take effect (**confirmation letter**). Otherwise, it will formally notify that the procedure is discontinued.

For beneficiary terminations, the granting authority will — at the end of the procedure — also inform the coordinator.

The termination will **take effect** the day after the confirmation notification is sent (or on a later date specified in the notification; ‘termination date’).

### 32.3.3 Effects

#### (a) for **GA termination**:

The coordinator must — within 60 days from when termination takes effect — submit a **periodic report** (for the last open reporting period until termination).

The granting authority will calculate the final grant amount and final payment on the basis of the report submitted and taking into account the costs incurred and contributions for activities implemented before termination takes effect (see Article 22). Costs relating to contracts due for execution only after termination are not eligible.

If the grant is terminated for breach of the obligation to submit reports, the coordinator may not submit any report after termination.

If the granting authority does not receive the report within the deadline, only costs and contributions which are included in an approved periodic report will be taken into account (no costs/contributions if no periodic report was ever approved).

Termination does not affect the granting authority’s right to reduce the grant (see Article 28) or to impose administrative sanctions (see Article 34).

The beneficiaries may not claim damages due to termination by the granting authority (see Article 33).

After termination, the beneficiaries’ obligations (in particular Articles 13 (confidentiality and security), 16 (IPR), 17 (communication, dissemination and visibility), 21 (reporting), 25 (checks, reviews, audits and investigations), 26 (impact evaluation), 27 (rejections), 28 (grant reduction) and 42 (assignment of claims)) continue to apply.

#### (b) for **beneficiary termination**:

The coordinator must — within 60 days from when termination takes effect — submit:

- (i) a **report on the distribution of payments** to the beneficiary concerned
- (ii) a **termination report** from the beneficiary concerned, for the open reporting period until termination, containing an overview of the progress of the work, the financial



statement, the explanation on the use of resources, and, if applicable, the certificate on the financial statement (CFS; see Articles 21 and 24.2 and Data Sheet, Point 4.3)

- (iii) a **request for amendment** (see Article 39) with any amendments needed (e.g. reallocation of the tasks and the estimated budget of the terminated beneficiary; addition of a new beneficiary to replace the terminated beneficiary; change of coordinator, etc.).

The granting authority will calculate the amount due to the beneficiary on the basis of the report submitted and taking into account the costs incurred and contributions for activities implemented before termination takes effect (see Article 22). Costs relating to contracts due for execution only after termination are not eligible.

The information in the termination report must also be included in the periodic report for the next reporting period (see Article 21).

If the granting authority does not receive the termination report within the deadline, only costs and contributions included in an approved periodic report will be taken into account (no costs/contributions if no periodic report was ever approved).

If the granting authority does not receive the report on the distribution of payments within the deadline, it will consider that:

- the coordinator did not distribute any payment to the beneficiary concerned and that
- the beneficiary concerned must not repay any amount to the coordinator.

If the request for amendment is accepted by the granting authority, the Agreement is **amended** to introduce the necessary changes (see Article 39).

If the request for amendment is rejected by the granting authority (because it calls into question the decision awarding the grant or breaches the principle of equal treatment of applicants), the grant may be terminated (see Article 32).

After termination, the concerned beneficiary's obligations (in particular Articles 13 (confidentiality and security), 16 (IPR), 17 (communication, dissemination and visibility), 21 (reporting), 25 (checks, reviews, audits and investigations), 26 (impact evaluation), 27 (rejections), 28 (grant reduction) and 42 (assignment of claims)) continue to apply.

## **SECTION 3 OTHER CONSEQUENCES: DAMAGES AND ADMINISTRATIVE SANCTIONS**

### **ARTICLE 33 — DAMAGES**

#### **33.1 Liability of the granting authority**

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

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

### **33.2 Liability of the beneficiaries**

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

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

## **ARTICLE 34 — ADMINISTRATIVE SANCTIONS AND OTHER MEASURES**

Nothing in this Agreement may be construed as preventing the adoption of administrative sanctions (i.e. exclusion from EU award procedures and/or financial penalties) or other public law measures, in addition or as an alternative to the contractual measures provided under this Agreement (see, for instance, Articles 135 to 145 EU Financial Regulation 2018/1046 and Articles 4 and 7 of Regulation 2988/95<sup>22</sup>).

## **SECTION 4 FORCE MAJEURE**

### **ARTICLE 35 — FORCE MAJEURE**

A party prevented by force majeure from fulfilling its obligations under the Agreement cannot be considered in breach of them.

‘Force majeure’ means any situation or event that:

- prevents either party from fulfilling their obligations under the Agreement,
- was unforeseeable, exceptional situation and beyond the parties’ control,
- was not due to error or negligence on their part (or on the part of other participants involved in the action), and
- proves to be inevitable in spite of exercising all due diligence.

Any situation constituting force majeure must be formally notified to the other party without delay, stating the nature, likely duration and foreseeable effects.

The parties must immediately take all the necessary steps to limit any damage due to force majeure and do their best to resume implementation of the action as soon as possible.

## **CHAPTER 6 FINAL PROVISIONS**

### **ARTICLE 36 — COMMUNICATION BETWEEN THE PARTIES**

#### **36.1 Forms and means of communication — Electronic management**

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<sup>22</sup> Council Regulation (EC, Euratom) No 2988/95 of 18 December 1995 on the protection of the European Communities financial interests (OJ L 312, 23.12.1995, p. 1).

EU grants are managed fully electronically through the EU Funding & Tenders Portal ('Portal').

All communications must be made electronically through the Portal, in accordance with the Portal Terms and Conditions and using the forms and templates provided there (except if explicitly instructed otherwise by the granting authority).

Communications must be made in writing and clearly identify the grant agreement (project number and acronym).

Communications must be made by persons authorised according to the Portal Terms and Conditions. For naming the authorised persons, each beneficiary must have designated — before the signature of this Agreement — a 'legal entity appointed representative (LEAR)'. The role and tasks of the LEAR are stipulated in their appointment letter (see Portal Terms and Conditions).

If the electronic exchange system is temporarily unavailable, instructions will be given on the Portal.

### **36.2 Date of communication**

The sending date for communications made through the Portal will be the date and time of sending, as indicated by the time logs.

The receiving date for communications made through the Portal will be the date and time the communication is accessed, as indicated by the time logs. Formal notifications that have not been accessed within 10 days after sending, will be considered to have been accessed (see Portal Terms and Conditions).

If a communication is exceptionally made on paper (by e-mail or postal service), general principles apply (i.e. date of sending/receipt). Formal notifications by registered post with proof of delivery will be considered to have been received either on the delivery date registered by the postal service or the deadline for collection at the post office.

If the electronic exchange system is temporarily unavailable, the sending party cannot be considered in breach of its obligation to send a communication within a specified deadline.

### **36.3 Addresses for communication**

The Portal can be accessed via the Europa website.

The address for paper communications to the granting authority (if exceptionally allowed) is the official mailing address indicated on its website.

For beneficiaries, it is the legal address specified in the Portal Participant Register.

## **ARTICLE 37 — INTERPRETATION OF THE AGREEMENT**

The provisions in the Data Sheet take precedence over the rest of the Terms and Conditions of the Agreement.

Annex 5 takes precedence over the Terms and Conditions; the Terms and Conditions take precedence over the Annexes other than Annex 5.

Annex 2 takes precedence over Annex 1.

## ARTICLE 38 — CALCULATION OF PERIODS AND DEADLINES

In accordance with Regulation No 1182/71<sup>23</sup>, periods expressed in days, months or years are calculated from the moment the triggering event occurs.

The day during which that event occurs is not considered as falling within the period.

‘Days’ means calendar days, not working days.

## ARTICLE 39 — AMENDMENTS

### 39.1 Conditions

The Agreement may be amended, unless the amendment entails changes to the Agreement which would call into question the decision awarding the grant or breach the principle of equal treatment of applicants.

Amendments may be requested by any of the parties.

### 39.2 Procedure

The party requesting an amendment must submit a request for amendment signed directly in the Portal Amendment tool.

The coordinator submits and receives requests for amendment on behalf of the beneficiaries (see Annex 3). If a change of coordinator is requested without its agreement, the submission must be done by another beneficiary (acting on behalf of the other beneficiaries).

The request for amendment must include:

- the reasons why
- the appropriate supporting documents and
- for a change of coordinator without its agreement: the opinion of the coordinator (or proof that this opinion has been requested in writing).

The granting authority may request additional information.

If the party receiving the request agrees, it must sign the amendment in the tool within 45 days of receiving notification (or any additional information the granting authority has requested). If it does not agree, it must formally notify its disagreement within the same deadline. The deadline may be extended, if necessary for the assessment of the request. If no notification is received within the deadline, the request is considered to have been rejected.

An amendment **enters into force** on the day of the signature of the receiving party.

An amendment **takes effect** on the date of entry into force or other date specified in the amendment.

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<sup>23</sup> Regulation (EEC, Euratom) No 1182/71 of the Council of 3 June 1971 determining the rules applicable to periods, dates and time-limits (OJ L 124, 8/6/1971, p. 1).

## **ARTICLE 40 — ACCESSION AND ADDITION OF NEW BENEFICIARIES**

### **40.1 Accession of the beneficiaries mentioned in the Preamble**

The beneficiaries which are not coordinator must accede to the grant by signing the accession form (see Annex 3) directly in the Portal Grant Preparation tool, within 30 days after the entry into force of the Agreement (see Article 44).

They will assume the rights and obligations under the Agreement with effect from the date of its entry into force (see Article 44).

If a beneficiary does not accede to the grant within the above deadline, the coordinator must — within 30 days — request an amendment (see Article 39) to terminate the beneficiary and make any changes necessary to ensure proper implementation of the action. This does not affect the granting authority's right to terminate the grant (see Article 32).

### **40.2 Addition of new beneficiaries**

In justified cases, the beneficiaries may request the addition of a new beneficiary.

For this purpose, the coordinator must submit a request for amendment in accordance with Article 39. It must include an accession form (see Annex 3) signed by the new beneficiary directly in the Portal Amendment tool.

New beneficiaries will assume the rights and obligations under the Agreement with effect from the date of their accession specified in the accession form (see Annex 3).

Additions are also possible in mono-beneficiary grants.

## **ARTICLE 41 — TRANSFER OF THE AGREEMENT**

In justified cases, the beneficiary of a mono-beneficiary grant may request the transfer of the grant to a new beneficiary, provided that this would not call into question the decision awarding the grant or breach the principle of equal treatment of applicants.

The beneficiary must submit a request for **amendment** (see Article 39), with

- the reasons why
- the accession form (see Annex 3) signed by the new beneficiary directly in the Portal Amendment tool and
- additional supporting documents (if required by the granting authority).

The new beneficiary will assume the rights and obligations under the Agreement with effect from the date of accession specified in the accession form (see Annex 3).

## **ARTICLE 42 — ASSIGNMENTS OF CLAIMS FOR PAYMENT AGAINST THE GRANTING AUTHORITY**

The beneficiaries may not assign any of their claims for payment against the granting authority to

any third party, except if expressly approved in writing by the granting authority on the basis of a reasoned, written request by the coordinator (on behalf of the beneficiary concerned).

If the granting authority has not accepted the assignment or if the terms of it are not observed, the assignment will have no effect on it.

In no circumstances will an assignment release the beneficiaries from their obligations towards the granting authority.

## **ARTICLE 43 — APPLICABLE LAW AND SETTLEMENT OF DISPUTES**

### **43.1 Applicable law**

The Agreement is governed by the applicable EU law, supplemented if necessary by the law of Belgium.

Special rules may apply for beneficiaries which are international organisations (if any; see Data Sheet, Point 5).

### **43.2 Dispute settlement**

If a dispute concerns the interpretation, application or validity of the Agreement, the parties must bring action before the EU General Court — or, on appeal, the EU Court of Justice — under Article 272 of the Treaty on the Functioning of the EU (TFEU).

For non-EU beneficiaries (if any), such disputes must be brought before the courts of Brussels, Belgium — unless an international agreement provides for the enforceability of EU court judgements.

For beneficiaries with arbitration as special dispute settlement forum (if any; see Data Sheet, Point 5), the dispute will — in the absence of an amicable settlement — be settled in accordance with the Rules for Arbitration published on the Portal.

If a dispute concerns administrative sanctions, offsetting or an enforceable decision under Article 299 TFEU (see Articles 22 and 34), the beneficiaries must bring action before the General Court — or, on appeal, the Court of Justice — under Article 263 TFEU.

For grants where the granting authority is an EU executive agency (see Preamble), actions against offsetting and enforceable decisions must be brought against the European Commission (not against the granting authority; see also Article 22).

## **ARTICLE 44 — ENTRY INTO FORCE**

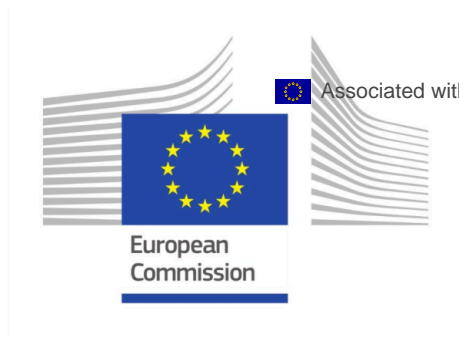
The Agreement will enter into force on the day of signature by the granting authority or the coordinator, depending on which is later.



## SIGNATURES

For the coordinator

For the granting authority



## **ANNEX 1**



# **Horizon Europe (HORIZON)**

## **Description of the action (DoA)**

**Part A**

**Part B**



## DESCRIPTION OF THE ACTION (PART A)

### COVER PAGE

Part A of the Description of the Action (DoA) must be completed directly on the Portal Grant Preparation screens.

<b>PROJECT</b>	
<i>Grant Preparation (General Information screen) — Enter the info.</i>	
<b>Project number:</b>	101073978
<b>Project name:</b>	Disaster Resilience for Extreme Climate Events providing interoperable Data, models, communication and governance
<b>Project acronym:</b>	DIRECTED
<b>Call:</b>	HORIZON-CL3-2021-DRS-01
<b>Topic:</b>	HORIZON-CL3-2021-DRS-01-02
<b>Type of action:</b>	HORIZON-IA
<b>Service:</b>	REA/C/02
<b>Project starting date:</b>	fixed date: 1 October 2022
<b>Project duration:</b>	48 months

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Project reviews .....	38

## PROJECT SUMMARY

### Project summary

*Grant Preparation (General Information screen) — Provide an overall description of your project (including context and overall objectives, planned activities and main achievements, and expected results and impacts (on target groups, change procedures, capacities, innovation etc)). This summary should give readers a clear idea of what your project is about.*

*Use the project summary from your proposal.*

The recent droughts in central Europe and unprecedented floods in central Europe have disclosed our vulnerability to extreme weather events. Besides climate change as a driver of more frequent and intensifying weather extremes, demographic change and socio-economic development exacerbate severe impacts. International frameworks for disaster risk reduction and climate change adaptation (e.g. SENDAI framework, EU Strategy on adaptation to climate change) acknowledge the critical need for integrating risk governance, communication and operational mechanisms for coping with extreme climate events throughout the entire Disaster Risk Management cycle. DIRECTED aspires to foster disaster-resilient European societies by expanding our capabilities to communicate, utilise and exchange state-of-the-art data, information and knowledge between different actors; boosting the integration, accessibility and interoperability of models; facilitating knowledge sharing; improving dialogue and cooperation encompassing all levels of actors based on enhanced community engagement and developing new governance and risk management strategies using a bottom-up, value-driven co-development approach. Key to supporting interoperability will be the establishment of the DATA-FABRIC, an innovative, governed, cloud platform that enables secure, flexible, discovery and sharing of all structured and unstructured data. Central to DIRECTED are four Real World Labs that co-develop new governance, interoperability and knowledge production frameworks and demonstrate their benefits for enhanced disaster risk governance supported by innovative technical frameworks to access, transform and integrate data and models into customised workflows for creating actionable solutions. The Real World Labs ensure the project continuously and actively involves key stakeholders in the co-development process and address topical problems of multi-hazard risk management and climate change adaptation to maximise impacts.

## LIST OF PARTICIPANTS

### PARTICIPANTS

*Grant Preparation (Beneficiaries screen) — Enter the info.*

Number	Role	Short name	Legal name	Country	PIC
1	COO	TUBS	TECHNISCHE UNIVERSITAET BRAUNSCHWEIG	DE	999861257
2	BEN	PIK	POTSDAM-INSTITUT FUR KLIMAFOLGENFORSCHUNG EV	DE	999464042
3	BEN	DTU	DANMARKS TEKNISKE UNIVERSITET	DK	999990655
4	BEN	GECO	GECOSISTEMA SRL	IT	959248327
5	BEN	IASS	INSTITUTE FOR ADVANCED SUSTAINABILITY STUDIES EV	DE	960542404
6	BEN	UCC	UNIVERSITY COLLEGE CORK - NATIONAL UNIVERSITY OF IRELAND, CORK	IE	999975717
7	BEN	REGIONH	REGION HOVEDSTADEN	DK	999654744
8	BEN	ARSTPC-ER	AGENZIA REGIONALE PER LA SICUREZZATERRITORIALE E LA PROTEZIONE CIVILE	IT	998349803
9	BEN	G&C	GENILLARD & CO GMBH	DE	920168870

<b>PARTICIPANTS</b>					
<i>Grant Preparation (Beneficiaries screen) — Enter the info.</i>					
<b>Number</b>	<b>Role</b>	<b>Short name</b>	<b>Legal name</b>	<b>Country</b>	<b>PIC</b>
10	BEN	IIASA	INTERNATIONALES INSTITUT FUER ANGEWANDTE SYSTEMANALYSE	AT	999452596
11	BEN	EV	ERFTVERBAND	DE	939668974
12	BEN	ZSRT	ZALA KULONLEGES MENTOK ES ONKENTES TUZOLTO EGYSULET	HU	888552981
13	BEN	ARPAE	AGENZIA REGIONALE PER LA PREVENZIONE, L'AMBIENTE E L'ENERGIA DELL'EMILIA-ROMAGNA	IT	999454633
14	BEN	GFZ	HELMHOLTZ ZENTRUM POTSDAM DEUTSCHESGEOFORSCHUNGSZENTRUM GFZ	DE	999994341
15	BEN	52N	52 NORTH SPATIAL INFORMATION RESEARCH GMBH	DE	997237407
16	AP	ETH	EIDGENOESSISCHE TECHNISCHE HOCHSCHULE ZUERICH	CH	999979015
17	AP	OASIS	OASIS HUB LIMITED	UK	906361308
18	AP	SEI	SEI OXFORD OFFICE LIMITED	UK	998830535

## LIST OF WORK PACKAGES

<b>Work packages</b>						
<i>Grant Preparation (Work Packages screen) — Enter the info.</i>						
<b>Work Package No</b>	<b>Work Package name</b>	<b>Lead Beneficiary</b>	<b>Effort (Person-Months)</b>	<b>Start Month</b>	<b>End Month</b>	<b>Deliverables</b>
WP1	Real World Labs (RWL)	4 - GECO	204.00	1	48	D1.1 – RWL description and set-up D1.2 – Capacity development strategy for Training of Trainers on implementing transdisciplinary knowledge co-production processes in the RWL D1.3 – Case studies of DRR/ CCA processes to date - forensic examination of real world process and events management D1.4 – Outcomes from RWL in multi-risk governance
WP2	Data and Model Interoperability	14 - GFZ	118.00	1	48	D2.1 – Compendium on data standards for interoperability in DRR and CCA D2.2 – Enhanced interoperability of tools available to users through software repository and documentation D2.3 – Interoperability demonstration factsheets (description and illustration of workflow implementations in RWL as best practice examples)
WP3	Governance	5 - IASS	95.00	1	48	D3.1 – RISK-TANDEM Framework D3.2 – Updated RISK-TANDEM Framework for governance processes and interoperability D3.3 – Policy brief on risk governance in the context of DRR and CCA D3.4 – Guidance on good practices regarding interoperability of governance

<b>Work packages</b>						
<i>Grant Preparation (Work Packages screen) — Enter the info.</i>						
<b>Work Package No</b>	<b>Work Package name</b>	<b>Lead Beneficiary</b>	<b>Effort (Person-Months)</b>	<b>Start Month</b>	<b>End Month</b>	<b>Deliverables</b>
						mechanisms and recommendations for institutionalising project outcomes and the interoperable platform into existing systems
WP4	Supporting information interoperability through transdisciplinary knowledge co-production processes	18 - SEI	72.00	1	48	D4.1 – Capacity development modules for ToT workshops in designing transdisciplinary knowledge co-production processes D4.2 – Framework for distilling assumptions in different modelling approaches with recommendations for replicating this approach D4.3 – Updated (tested & refined) TANDEM cycle for transdisciplinary knowledge co-production processes and information interoperability
WP5	Data fabric	15 - 52N	55.00	1	48	D5.1 – High Level Design Document - Data Fabric D5.2 – Low Level Design Document Data Fabric D5.3 – Data Protection Impact Assessment D5.4 – Implementation documentation (e.g. planning, test/acceptance, training, user guides) D5.5 – Data Fabric Service Platform including configured RWL Interoperability Use Cases. D5.6 – Change Control documents D5.7 – User training by role (UCC) link to WP6 eLearning platform

<b>Work packages</b>						
<i>Grant Preparation (Work Packages screen) — Enter the info.</i>						
<b>Work Package No</b>	<b>Work Package name</b>	<b>Lead Beneficiary</b>	<b>Effort (Person-Months)</b>	<b>Start Month</b>	<b>End Month</b>	<b>Deliverables</b>
WP6	Communications, dissemination, exploitation and Impact	17 - OASIS	82.00	1	48	D6.1 – Communications Strategy D6.2 – Communications report 1 D6.3 – Gaps and Opportunities assessment D6.4 – eLearning portal D6.5 – Business development plan D6.6 – Communications report 2 D6.7 – Communications report 3 D6.8 – Communications report 4 D6.9 – Legacy document on the capacity/ skills for risk and adaptation management
WP7	Management and Coordination	1 - TUBS	35.00	1	48	D7.1 – Consortium Agreement including IPR, Grant Agreement signed D7.2 – Project working plan with risk management and mitigation D7.3 – Data management plan D7.4 – Mid-term report, covering months 1 - 16 D7.5 – Mid-term report, covering months 17-32 D7.6 – Final report covering full project D7.7 – Project legacy documented and implemented
WP8	Ethics requirements	1 - TUBS	0.00	1	48	D8.1 – OEI - Requirement No. 1 D8.2 – OEI - Requirement No. 2 D8.3 – OEI - Requirement No. 3 D8.4 – OEI - Requirement No. 4 D8.5 – OEI - Requirement No. 5

## Work package WP1 – Real World Labs (RWL)

<b>Work Package Number</b>	WP1	<b>Lead Beneficiary</b>	4. GECO
<b>Work Package Name</b>	Real World Labs (RWL)		
<b>Start Month</b>	1	<b>End Month</b>	48

Objectives
<ul style="list-style-type: none"> <li>Establish and manage the four RWLs across Europe, inside a coherent RISK-TANDEM framework delineated in WP3. <ul style="list-style-type: none"> <li>Facilitate implementation of multi-level risk governance for DRM + DRR + CCA strategies (contributing to interoperable multi-risk models and tools development (WP2), engaging actors, spotting requirements, needs, barriers in current governance practices, modelling capabilities and gaps)</li> <li>Organize demonstration, training and discussion around real case histories of each RWL, showcasing knowledge co-production and trans-disciplinary co-production in connection with WP4.</li> <li>Build lasting real-world partnerships and collaboration between involved actors</li> </ul> </li> </ul>

Description
<p>The Real World Labs (RWL) catalyse efforts and partnerships to generate new knowledge and knowledge sharing inside the project, creating a collaborative learning and innovative environment, involving relevant actors in the DRM + DRR + CCA cycle. The activities will include periodical lab-specific interactions, and joint activities between RWL at least once a year.</p> <p>Task 1.1 Setting up and making operational the Real World Laboratories (RWL) (M1-M10) (lead: GECO, co-lead: G&amp;C, contributors: ALL)</p> <p>This task will involve the management of the Real World Labs, each one led by a responsible practice partner; GECO will coordinate WP1 to ensure coherence among RWL and connections with other WPs. We will initially frame RWL and stakeholders (already onboard and new ones to involve) based on relevant information (such as type of hazard, geographical area, role and interests along the hazard governance chain) inside the refined RISK-TANDEM Framework from WP3, (T3.1-3.2) and populate the multi-stakeholder platform by involving actors through formal and informal agreements. The lab activities will be carried out both individually and during joint cross-cutting RWL activities supported by WP4 (T4.4). This will facilitate the effective stakeholder involvement and co-production processes; each RWL responsible partner will be in charge of running RWL activities and following the co-production cycle defined and revised ( T1.2,T4.5) after the initial RWL setup phase is completed.</p> <p>Task 1.2 RWL Co-production process (M1-M45) (lead: SEI, co-lead: UCC, contributors: 52N, RWL resp. partners)</p> <p>Training of trainers will be conducted on how to implement the TANDEM trans-disciplinary knowledge co-production cycle in the RWL to allow for deeper knowledge co-production processes between developers of data and models, governance actors, and stakeholders. This will take place in conjunction with Tasks 4.1-4.4. The cycle for co-production will be defined and periodically reviewed during the project implementation (Task 4.5) with context-specific refinements made where needed to address the needs of the RWL and that of those developing transformative tools (WP2), governance mechanisms (WP3), and for design of the data fabric (WP5)</p> <p>Task 1.3 Evaluation and Outcomes/Impact monitoring of the RWL (M8-M48) (lead: IASS, co-lead: G&amp;C, contributors: OASIS, UCC, IIASA, RWL resp. partners)</p> <p>This task will evaluate the RISK-TANDEM framework's performance in the RWLs. The task will be carried out in parallel to T3.3. To that aim, we will evaluate the effectiveness of the governance mechanism in strengthening multi-stakeholder engagement, facilitating interoperability, and stimulating knowledge exchange to integrate DRR and CCA planning and operations also recurring to forensic examination of real world processes and event management. For each RWL, an outline will be designed detailing the inputs, activities, outputs, outcomes and impacts for systematic monitoring and evaluation of the project impacts for each RWL. The impact assessment will be done through a range of methods such as quantitative and qualitative assessment on KPIs, storytelling, documenting evidence of improved policy and practice.</p>

## Work package WP2 – Data and Model Interoperability

<b>Work Package Number</b>	WP2	<b>Lead Beneficiary</b>	14. GFZ
<b>Work Package Name</b>	Data and Model Interoperability		

<b>Start Month</b>	1	<b>End Month</b>	48
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### Objectives

- Stocktaking of standards for the interoperability of data and models, identifying gaps and requirements to exchange information between different phases of DRM cycle and across hazards and integrating quantitative and qualitative indicators
  - Making exemplary existing tools more interoperable by improving the data integration capacities and the combination of the outputs in a meaningful way to provide extended functionality for decision support
  - Informing and supporting integrated multi-hazard DRM and CCA planning in RWLs and co-develop solutions in RWLs

### Description

The concrete output products will be a compendium of standards for data and model interoperability, enhanced tools for DRM and CAA, and the demonstration of multi-hazard risk assessment and climate change adaptation including worst-case scenarios in RWLs.

Task 2.1 Stocktaking for interoperability - a compendium (M0-M24) (lead: GECO, co-lead: 52N, contributors: GFZ, DTU, PIK, ETH, SEI, OASIS)

Goal: This task aims to set up the scene of the available interoperable standards that can exchange data and information among any combination of models, databases and analytical and visualization tools.

Methods: The stocktaking activities will i) follow the principles and recommendations promoted by European Interoperability Framework (EIF) and the EU eGovernment Action Plan 2016–2020, ii) analyse the available interoperable standards certified and recognized by international organisations such as Open Geospatial Consortium OGC and EU initiatives such as INSPIRE, iii) evaluate the replicability of available good practices, such as UNEP Preview, Copernicus, DesInventar Sendai, EU's DRMKC Risk Data Hub, EFAS, GLOFAS, Danube Reference Data and Services Infrastructure, EM-DAT, IdroGEO.

The available standards will be ranked through a multi-criteria assessment based on the FAIR framework in order to identify a list of potentially reusable interoperability patterns -also known as interoperability best practices - suitable for DRR and CCA. Particular attention will be devoted to those interoperability standards allowing the development of web cloud based applications able to integrate multiple data, models and visualization tools in DRR and CCA, and to those helping to close existing gaps in spatio-temporal scales, multi-hazard, multi risks assessment.

The compendium of selected data standards will inform the design and technical structure of the DATA FABRIC (WP5) and help establish a baseline of TRLs for single tools to be used and made interoperable.

Task 2.2 Making tools interoperable (M13-M36) (lead: DTU, co-lead: ETH, contributors: PIK, GFZ, SEI, GECO, EV)

Develop and demonstrate for a set of DRM cycle tools how data and knowledge from other tools can be included into their respective workflows. The Digital Twin Solution for flood risk intelligence SaferPLaces (GFZ, GECO) and the Seamless forecasting tool (PIK) will update their input/output data streams based on the recommendations from the T2.1 and WP1 (RWL). The probabilistic risk assessment tool CLIMADA (ETH) will implement a multi-criteria decision to include information from other sources. The high-resolution adaptation and economics tool (DTU), and CLIMADA (ETH) will align their damage-cost models for consistent up/down scaling in calibration. The Connectivity Hub and the Tandem Framework (SEI) will develop a more open-source taxonomy based on outcomes from T2.1 and WP1 (RWL). The hydro numeric urban flood RIMurban (GFZ) models will be extended to use remote sensing data and VGI for enhanced near-real-time inundation mapping and rapid flood impact estimation. OASIS-CAIMAN citizen app will be made interoperable tools including PIK forecasting and Geco tools – improving the existing functionality of the damage and loss information collected by the App.

Task 2.3 Multi-hazard modelling for integrated DRM and CCA: Demonstration in RWLs (M24-M48) (lead: GFZ, co-lead: PIK, SEI, contributors: DTU, GECO, EV, IASS, UCC, G&C)

Goal: This task works to evaluate and assess alternative strategies of DRM and CCA strategies developed in the RWLs using a suite of interoperable impact and risk models. The outcomes will underpin the discussion in the RWLs with quantitative data and help to identify comprehensive solutions.

Methods: This task is embedded in the bottom-up co-production approach of the RWLs (WP1 Task 1.2). The RWLs will define workflows for specific tasks and problems to be addressed in the particular RWL settings. To give an example, a workflow could consist of creating worst-case scenarios of extreme rainfall or drought events for stress-testing the system under future climate conditions and assessing the risks using a suitable set of interoperable models (Task 2.2). Further analytics will explore the effects of risk reduction strategies and adaptation options using cost-benefit analysis, economics of climate adaptation, and/or multi criteria decision modules (cf. Task 2.2).



## Work package WP3 – Governance

<b>Work Package Number</b>	WP3	<b>Lead Beneficiary</b>	5. IASS
<b>Work Package Name</b>	Governance		
<b>Start Month</b>	1	<b>End Month</b>	48

### Objectives

- Developing an innovative and integrated risk governance framework for DRR and CCA (RISK-TANDEM framework)
  - Applying and testing the RISK-TANDEM framework empirically in Real World Labs (RWL) to facilitate the co-development and sustained application of risk models and tools via the interoperable platform
  - Publishing and sharing of tested and improved RISK-TANDEM framework that supports coherent and integrated DRR and CCA planning and decision-making processes and builds long-term governance capacity for information and knowledge integration
  - Identifying a tailored governance mechanism based on RISK-TANDEM's application to guide and sustain the knowledge exchange between targeted users beyond the project and enable co-ownership with targeted users

### Description

To improve governance interoperability, WP3 will provide an innovative and empirically tested risk governance framework that facilitates the application of risk models to support DRR and CCA planning and decision-making processes and build long-term governance capacity for information and knowledge integration.

Task 3.1 Framework development (M1-M16) (lead: IASS, co-lead: SEI, contributors: IIASA, UCC)

This task aims to integrate current state-of-the-art governance approaches for improved knowledge integration by means of co-creative approaches towards user and stakeholder engagement and increased accountability. This involves merging the International Risk Governance Council's Risk Governance Framework with the Tandem framework developed by SEI, the risk layering approach put forth by IIASA, and scoping alignment with other governance frameworks for DRR and CCA planning and decision-making processes, such as the SHIELD model from the EPRESSO project.

Task 3.2 Applying a merged framework (RISK-TANDEM) to Real-World Labs (M12-M36) (lead: IASS, co-lead: UCC, contributors: IIASA, SEI, GFZ, PIK, DTU, GECO, OASIS, 52N, G&C)

This task will apply the RISK-TANDEM framework with RWL, tool and data fabric developers to improve risk management strategies.

First, we will assess the status quo of risk governance in the RWLs against the backdrop of RISK-TANDEM. The framework application will identify the existing challenges for risk governance and decision-making regarding DRR and CCA by means of a disaster forensics approach in Copenhagen and Capital Region, the Danube region, the Emilia Romagna and the Rhine-Erft region. We will examine existing governance arrangements in each RWL with regards to, e.g., actor networks (governments and public authorities, corporations, civil society and private actors, both horizontally and vertically), multi-level governance and accountability arrangements (institutional, legal, financial), policy coherence, knowledge integration amongst relevant actors (e.g. experts, decisionmakers, stakeholder, affected citizens, first responders) and performance of risk assessment models that are already in place.

Second, we will identify cross-cutting issues and synthesise key enablers and barriers for integrated DRR at different levels, for multiple hazards/risks and for different actors and objectives. The results of the forensic approach will be used to refine and update the RISK-TANDEM framework.

Third, we will develop hypotheses for improving future governance based on evidence from the RWLs. This will include identifying existing and on-going CCA and DRR decision-making, planning and operational processes for different actors (e.g. emergency planners, city planners, community volunteers), and pinpoint entry points and priority challenges for the project's risk models and tools (e.g. Saferplaces, CLIMADA, OASIS) as well as outputs such as a functional draft HLD for the DATA-FABRIC, encompassing interoperability around governance mechanism/s, to influence long-term governance capacity for information and knowledge integration.

Based on insights, recommendations will be developed for a tailored governance mechanism to guide and sustain the knowledge exchange between targeted stakeholders and users post-project and enable co-ownership with targeted users. In addition to literature review, this will involve stakeholder and user interviews as well as multi-stakeholder workshops. Outcomes will include a draft high-level dataflow (to feed into WP5), including associated workflows, schemas and access control protocols, that implement the recommended mechanism/s. The task will be completed in close collaboration with T1.3, T2.3, T3.1, T4.1 and WP5.

Task 3.3 Evaluating RISK-TANDEM and Lessons Learnt (M33-M48) (lead: IASS, co-lead: UCC, contributors: SEI, IIASA)

This task will evaluate the updated RISK-TANDEM framework’s performance in the RWLs. First, we will test the hypotheses developed in T3.2 and where possible apply recommendations for improving governance in the RWLs. To that aim, we will evaluate the effectiveness of the governance mechanism in strengthening multi-stakeholder engagement, facilitating interoperability, and stimulating knowledge exchange to integrate DRR and CCA planning and operations.

Second, we will update and improve the RISK-TANDEM framework based on empirical evidence generated in RWLs by means of interviews and multi-stakeholder workshops. Based on these insights we will generate guidelines for applying the selected governance mechanisms in other contexts as well as policy recommendations and suggestions for improved risk governance regarding DRR and CCA (e.g. adapting legal mechanisms, improving accountability, aligning financial arrangements). Furthermore, we will produce guidance on good practices regarding interoperability of governance mechanisms and recommendations for institutionalising project outcomes into existing systems. The task will be completed in close collaboration with WP1, WP4 and WP5.

### Work package WP4 – Supporting information interoperability through transdisciplinary knowledge co-production processes

<b>Work Package Number</b>	WP4	<b>Lead Beneficiary</b>	18. SEI
<b>Work Package Name</b>	Supporting information interoperability through transdisciplinary knowledge co-production processes		
<b>Start Month</b>	1	<b>End Month</b>	48

<b>Objectives</b>
<ul style="list-style-type: none"> <li>• Iterative application of Tandem knowledge co-production cycle with RWL, tool and data fabric developers to improve information interoperability and risk management strategies.             <ul style="list-style-type: none"> <li>• Identify, distil and unpack the barriers and enablers to applying transdisciplinary co-productive learning processes to support the co-creation of transformative tools and a data fabric, incorporating needs from across the project.</li> <li>• Assess the replicability of transdisciplinary co-productive learning processes within RWL for co-designing and implementing tools and supporting the data fabric.</li> <li>• Support cross-real world lab learning, capacity development and knowledge exchange by translating insights and lessons learned to scale up and sustain transdisciplinary co-production processes for improved risk management strategies.</li> <li>• Refine the Tandem knowledge co-production cycle to improve information interoperability based on learning from the RWL.</li> </ul> </li> </ul>

<b>Description</b>
<p>To improve information interoperability, WP4 will develop and apply transdisciplinary knowledge co-production and learning processes in the RWL providing insights for developing transformative tools (WP2), governance mechanisms (WP3), a data fabric (WP5) and improved risk management strategies, using a bottom-up, value-driven co-development approach.</p> <p>Task 4.1 Apply the Tandem knowledge co-production cycle to the RWL (M6-M45) (lead: SEI, co-lead: GECO, contributors: IASS, UCC, GFZ, PIK, DTU, IIASA)</p> <p>Whilst WP3 will enhance the governance elements of the Tandem framework, this task will iteratively apply Tandem to the RWL with a focus on knowledge co-production processes. The identification of stakeholders (T1.1) will be followed with the co-design of transdisciplinary knowledge co-production processes with RWL (T1.2) to understand their needs. This will provide insights for developing transformative tools (WP2), governance mechanisms (WP3), and a data fabric (WP5) to increase interoperability for improved disaster risk management.</p> <p>Task 4.2 RWL comparison and assessment of needs through learning, capacity development and knowledge exchange (M9-M36) (lead: SEI, co-lead: 52N, contributors: IASS, GECO, UCC, GFZ, PIK, DTU, IIASA, GC)</p> <p>This task will identify cross-cutting issues and synthesise key enablers and barriers for integrated DRM at different levels, for multiple hazards/risks and for different actors/objectives to assess the replicability of this approach for increasing disaster resilience work flows, building on periodic reporting in RWL (WP1). The transdisciplinary knowledge co-production process in itself increases the capacity of stakeholders involved (including modellers) in the iterative and long-term engagements and these needs will be supported through capacity development workshops in parallel with T1.2.</p>

Task 4.3 Distil relevant climate and non-climate information for the tools and data fabric (M12-M42) (lead: SEI, co-lead: 52N, contributors: GECO, IASS, GECO, UCC, GFZ, PIK, DTU, IIASA)  
 In connection with T1.3, this task will enable discussions around trade-offs and assumptions in the different models being used, and how to refine or adapt such assumptions. Ongoing feedback will allow iterative development of the models, which will increase the transparency of the model’s assumptions, and enable participants to reflect on the accuracy of different outputs. Transdisciplinary dialogue on this can reveal important underlying drivers of vulnerability which undermine disaster resilience. Such insights will help understand dataflows that span (and enable) varied models, applications/toolkits and the framework itself. In turn, this will influence outcomes that improve information interoperability and its manifestation through the data fabric to improve disaster planning, recovery and response.

Task 4.4: Updating and improving the Tandem knowledge co-production cycle based on empirical evidence generated in RWL (M6-M48) (lead: SEI, co-lead: 52N, contributors: IASS, IASS, GECO, UCC, GFZ, PIK, DTU, IIASA)  
 The Tandem knowledge co-production cycle will be iteratively improved and refined in conjunction with WP3, based on empirical evidence from applying and testing the framework in the RWL (T1.2, T4.1). Periodic reporting from the RWL will identify different conditions of applicability (multiple hazards/risks) for improving interoperability in a range of decision contexts, and further refine the existing Tandem interactive tool ([www.weADAPT.org/tandem](http://www.weADAPT.org/tandem)) to enable it to be applied in other regions.

### Work package WP5 – Data fabric

<b>Work Package Number</b>	WP5	<b>Lead Beneficiary</b>	15. 52N
<b>Work Package Name</b>	Data fabric		
<b>Start Month</b>	1	<b>End Month</b>	48

**Objectives**

Provide the infrastructure to demonstrate the impact of DRR & CCA interoperability: (i) increased sharing, availability and aggregation of data across the EU allowing innovative solutions for increased resilience and more effective disaster warning and response; (ii) the ability to respond rapidly to the availability of new data sources, new patterns of data usage and the changing nature of risk; and (iii) implementation of the risk-governance framework (WP3), promoting wider dissemination of CCA research/analysis and accountability at a provincial/federal scale for DRR.

- Develop a reference architecture for the data infrastructure, services and capabilities (together termed the “DATA-FABRIC”) required to achieve the vision of Interoperability for DRR and CCA.
- Configure an operational prototype of the data fabric, capable of spanning the data landscapes (data production & consumption) of each RWL participant.
- Establish the source data connections and configure the workflows required to demonstrate the RWL Use Cases (WP1).

**Description**

WP5 will develop the high-level architectural definition for the data fabric implementation required to support DRR and CCA Interoperability (WP2), data standards (WP2) and governance (WP3) requirements. It will undertake the configuration of a prototype covering the Use Cases defined within the RWLs (WP1) together with the associated transdisciplinary knowledge co-production processes (WP4).

Task 5.1 Stocktaking of the Current Data Context (M1-M21) (lead: 52N, co-lead: GECO, contributors: OASIS, UCC, IIASA, RWL resp. partners)  
 Goal: Establish the process, technical and data details of each organisation that will be connecting to the data fabric as a participant in the RWL (WP1).  
 Method: For each of the Research, Local & Regional Authorities and Practitioners participating in the prototype, document the solution landscape applicable to DRR and CCA related work covering data consumed; data produced; data standards (refer WP2); data governance; systems used; data interfaces; process interfaces; operational description - functions, timing, outputs, objectives; key business and technical representative(s) with understanding of objectives, usage details, systems, data and technical capability.  
 Consult prior work, similar initiatives and interoperability tools used to leverage best practice, align and research. For example the Sendai Framework, FP7, H2020, priorities of the Green Deal and the IFAFRI Capability Gaps. Alignment of value with other current initiatives will also be investigated such as the work of the GRII1.

<p><b>Task 5.2 Define the project interoperability Use Cases (M1-M24) (lead: 52N, co-lead: GECO, contributors: GFZ, UCC, IIASA, SEI, RWL resp. partners)</b></p> <p><b>Goal:</b> Select a set of Use Cases that will be showcased in the prototype DRR and CCA interoperability platform. To document each Use Case with sufficient detail to enable the DATA-FABRIC architecture and design to be completed to a standard that supports the Use Case fully.</p> <p><b>Method:</b> Coordinate with RWLs (WP1) to define a set of Use Cases to demonstrate Interoperability (WP2), Governance (WP3) and the value of transdisciplinary knowledge co-production processes (WP4) in the prototype data fabric. Use Cases will be selected based on the impact that they will demonstrate with regards to (i) the value of interoperability, and (ii) the suitability of data fabric architecture framework developed (including the agility and the flexibility to scale as the scope of DRR and CCA opportunities mature beyond the end of the project. Prepare Solution Architecture for the selected Use Cases covering Use Case goals, processes, required components, interfaces, data flows, data standards, acceptance criteria and responsibilities.</p> <p><b>Task 5.3 Define the Reference Architecture for the DATA-FABRIC (M22-M24) (lead: 52N, co-lead: GECO, contributors: GFZ, ETH)</b></p> <p><b>Goal:</b> Define the Reference Architecture for the DIRECTED DATA-FABRIC. Refer to the Description above for the data challenges that the DATA-FABRIC will address.</p> <p><b>Method:</b> Draft a Reference Architecture for the DATA-FABRIC incorporating Data Mesh, Virtualisation and any other innovations necessary to fulfil the data ecosystem demands of real time and long term analytics in a complex transboundary environment comprising scientific, governance, policy and social areas and requiring inter-sectoral cooperation. The architecture will cover: (i) data management layer (fabric, mesh, components); (ii) data and workflow interfaces; (iii) functional tools and services requirements; and (iv) non-functional requirements.</p> <p><b>Task 5.4 Design, build, configure and commission the prototype DATA-FABRIC (M22-M36) (lead: 52N, co-lead: GECO, contributors: OASIS, SEI)</b></p> <p><b>Goal:</b> Deliver a service platform that fulfils the technical requirements of data sharing and interoperability defined in the RWL Use Cases.</p> <p>Achieve a compelling working example of each Use Case with high impact insights being exposed through the aggregation of data across inter-dependent organisations in the region.</p> <p><b>Method:</b> Undertake the design, build and implementation of the prototype DATA-FABRIC and associated tools, components and Data Mesh capabilities. Major process milestones: (i) develop technical architecture; (ii) incorporate data implementation project processes, tasks, stages and responsibilities into the overall project plan; (iii) source components, services and infrastructure as required; (iv) build and configure the data fabric; (v) undertake testing, training (WP1) &amp; acceptance; and (vi) configure Use Cases.</p> <p><b>Task 5.5 Improvements &amp; refinements with operation (M37-M48) (lead: 52N, co-lead: GECO, contributors: OASIS, SEI)</b></p> <p><b>Goal:</b> Continuously improve the data fabric, upon RWL use, to more closely match governance and analytics mechanisms sought to be adopted</p> <p><b>Method:</b> Continued operation of the data fabric in the final year will allow for RWL users and strategists to propose/drive/inform improvements and refinements. These will be documented as updates to HLD, LLD, user documentation and then configuration altered, in periodic (monthly or less frequent) updates to the operational system.</p>
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## Work package WP6 – Communications, dissemination, exploitation and Impact

<b>Work Package Number</b>	WP6	<b>Lead Beneficiary</b>	17. OASIS
<b>Work Package Name</b>	Communications, dissemination, exploitation and Impact		
<b>Start Month</b>	1	<b>End Month</b>	48

<b>Objectives</b>
<p>To develop appropriate communication, dissemination, learning, education, training and exploitation for all stakeholders linked to aims for integrating risk assessment, risk governance and management, climate adaptation planning, communication and operational tools and systems for coping with extreme climate events. Objectives are:</p> <ul style="list-style-type: none"> <li>• Expanding capabilities to communicate, utilize and exchange state-of-the-art data, information and knowledge between actors.</li> <li>• Boosting the integration, accessibility and interoperability of models to actors.</li> <li>• Facilitating an enhanced community engagement and developing new governance and risk management strategies using a bottom-up, value-driven co-development approach.</li> </ul>

- Developing routes to market scaling via business plan development for the public and private sector

### Description

WP6 will establish the DIRECTED communication, dissemination and exploitation programme through cooperation across all work packages. We will develop capacity and modalities to optimise and integrate co-developed new governance, interoperable systems, knowledge production frameworks and data fabric architectures and demonstrate the benefits of enhanced disaster risk governance.

Task 6.1 Develop a communication strategy for the directed project and thereafter communication updates for relevant reporting cycles (M1-4) (Lead: OASIS)

Task 6.2 Deliver a full communication programme (M3-48) (Lead OASIS). This task will develop communication processes including use of social media, blogs, website development, events, workshops, conferences, research papers, webinar series, media packs, policy briefs and meetings with policy-makers.

Task 6.3. Identify current institutional capacity for integrated multi-hazard risk and climate change adaptation (M2-9) (Lead GFZ)

This task will define “Impact Pathway(s)” for high potential Key Exploitable Results (KERs) identified in WP2, WP3, WP4, WP5 and WP6 itself using inputs from T3.3 and D3.4. In partnership with the RWLs, end-users will be identified, and a custom knowledge transfer plan (KTP) will be developed (message, medium, channel, impact measurement) per KER to maximise change of uptake/application. Involvement across all actor groups through the RWLs will ensure that stakeholders are continuously and actively involved in the co-development process and address topical problems of multi-hazard risk management and climate change adaptation to maximise impacts. The KTP will determine the institutional capacity that currently exists for knowledge transfer by conducting an assessment of existing training and education opportunities, and benchmarking them against other programmes in Europe that support multi-hazard risk management and climate change adaptation.

Task 6.4. Develop programmes to support integrated responses to multi-hazard risk and climate change adaptation (M10-45) (Lead UCC)

This task covers development of programmes that marry governance frameworks (WP3 and 4) that can be supported by innovative technical frameworks (WP2 and 5) to access, transform and integrate data and models into customized workflows for creating actionable solutions. Programmes would target vocational long-life training to support the Real World Labs, student support materials and provide support and help build risk and adaptation solutions, especially those identified by Real World Labs. In order to perpetuate learning programmes, a co-designed and co-developed “Training of Trainers” programme will be developed through a dedicated Workshop with trainers, and curriculum developed in response to needs, so that capability beyond the DIRECTED project is ensured. Workshops delivered both in-person and online will be highly participatory and practical, focusing on techniques, tools and tips of training management, with participants themselves designing, delivering and critiquing methods. A suitable e-learning portal will be identified during the project to deposit and make available all training materials produced; this will increase the ability to deliver 21st century learning and training opportunities.

Task 6.5. Pilot tracking of KTT Implementation and application of integrated governance and technical tools (M30-45) (Lead UCC)

This task will monitor and evaluate the application of dissemination and exploitation activities to enable and promote the enabling ecosystem within the bounds of the RWLs to utilise the technological tools within an appropriate regulatory and economic perspective. T6.5 will examine how capacity/skills and related evolving pathways in development of governance and technological frameworks can better address the challenges of integrated responses to risk and adaptation management. The task will be a cross-cutting task focused on integrating insights from all WPs to frame the capacity/skill needs for a transformative change to achieve the project objectives.

Task 6.6 Exploitation - Business planning with public and private sector for scaling outputs (M36-M48) (Lead Oasis)

A business development plan will be developed to cover new data, interoperable analytical tools and the potential exploitation of the data fabric/ mesh. The potential of the tools and systems will be examined in both the public sector and the private sector e.g. discussion around the best way to scale the use of tools developed and made interoperable in the project.

## Work package WP7 – Management and Coordination

<b>Work Package Number</b>	WP7	<b>Lead Beneficiary</b>	1. TUBS
<b>Work Package Name</b>	Management and Coordination		
<b>Start Month</b>	1	<b>End Month</b>	48

**Objectives**

- successful, effective and efficient management of the project, communication between partners, with the EC and the External Innovation Advisory Board, risk and conflict management
  - set-up and maintenance of the detailed working plan, monitoring and control of timely completion of tasks, milestones and deliverables, and delivery of expected outcomes including quality control
  - ensure sustainability, exploitation and legacy beyond the project lifetime

The project management team consists of the project coordinator (PC), project manager (PM), project steering committee (PSC) and the Management support team (MST). An external Innovation Advisory Board (EIAV) will be installed to give advice for scientific, technological and practicality of project outcomes.

**Description**

WP7 will implement the project governance structure to ensure a high-impact project through a streamlined coordination, with timely submission of deliverables, accurate financial and risk management, reliable quality control and exploiting synergies between different WPs.

Task 7.1 Project Coordination and administration (M1-M48) (lead: GFZ, contributors: WP leads: OASIS, GECO, IASS, SEI, UCC, 52N)

This task deals with the formal responsibilities of project coordination. The PC will act as the sole interface between the DIRECTED and the EC officials allocated to the project and will be responsible for collecting and submitting the cost statements, deliverables and project reports (technical and financial). It encompasses: i) ensuring that project contractual obligations are met, ii) co-ordination at consortium level of participant contractual obligations and collective responsibilities, iii) communication between the consortium and the EC, iv) communication between consortium members, v) submission of project deliverables and financial and periodic reports to EC, vi) implementation of any contractual changes.

The day-to-day administration of the project will be undertaken by the PC and PM supported by MST. The responsibilities and tasks will be detailed in the CA and will comprise administration of EC financial contribution and its distribution to project participants, maintenance of CA and GA, and ensuring transparency and logging of project correspondence and ensuring prompt response. (D7.1)

Task 7.2 Project implementation, work planning, monitoring, reporting and quality control (M1-M48) (lead: GFZ, contributors: OASIS, GECO, IASS, SEI, UCC, 52N)

This task works to establish a transparent overview of project activities and their progress as a basis for risk management and mitigation, monitoring project progress against the work plan and achievement of the project objectives. A detailed working plan will be set-up including risk management and mitigation using cloud-based project and task management for teams (e.g. Nextcloud deck), monitored and updated by the PSC to supervise the execution and progress of the project (D7.2). The PSC will meet on a regular basis at least twice a year. All partner meetings will be held every six months to review the progress of the work and plan the next steps. Data and information exchange will be implemented within the EUDAT services for trusted and secure data and information management.

Reporting will be done according to EU guidelines and the requirements and timeline specified in the GA (D7.4, 7.5). Internal intermediate reporting by WP leads to the PC and PSC will be done at least annually. Progress of the project against the working plan be checked and updated during PSC meetings at least twice a year.

A review procedure for deliverables and milestone reports will be implemented including: draft release of deliverables by WP lead, two-week review period for commenting by project partners, two-week amendment period, and two-week for approval by PSC.

Task 7.3 Data management, exploitation and impacts beyond project lifetime (M1-M48) (lead: GFZ, contributors: OASIS, IASS, SEI, UCC, 52N, GECO)

This task will ensure that all data collected and produced in DIRECTED will follow FAIR principles. Data will be made available in accordance with EC's open science policy using EUDAT services where possible. Partners' IPR will be considered as needed and detailed in the CA as well as possibilities for exploiting project outcomes along pathways to impact. A data management plan (DMP) based on the EC's template will be implemented which will describe the data management life cycle for the project data to be collected, processed or generated and the measures to curate, store, protect and give access to them. Annual reviews of the DMP will reflect the project progress and developments. (D7.3)

This task also works to provide for the maintenance of the project outreach platforms, outputs, accessibility of the project's reports via major (EU) portals (e.g. weADAPT, OASIS-HUB, et. ), further support for the dissemination of the products, and proper management of the IPR beyond the lifespan of the project (D7.6). The strategy will be designed based on the contributions of WP6 and other relevant WPs and reviewed by the EIAB.

## Work package WP8 – Ethics requirements

<b>Work Package Number</b>	WP8	<b>Lead Beneficiary</b>	1. TUBS
<b>Work Package Name</b>	Ethics requirements		
<b>Start Month</b>	1	<b>End Month</b>	48

<b>Objectives</b>
The objective is to ensure compliance with the 'ethics requirements' set out in this work package.


<b>Description</b>
This work package sets out the 'ethics requirements' that the project must comply with.

## STAFF EFFORT

<b>Staff effort per participant</b>									
<i>Grant Preparation (Work packages - Effort screen) — Enter the info.</i>									
<b>Participant</b>	<b>WP1</b>	<b>WP2</b>	<b>WP3</b>	<b>WP4</b>	<b>WP5</b>	<b>WP6</b>	<b>WP7</b>	<b>WP8</b>	<b>Total Person-Months</b>
1 - TUBS	10.00	6.00	4.00	4.00	4.00	6.00	22.00		56.00
2 - PIK	14.00	12.00	2.00	2.00	4.00	4.00			38.00
3 - DTU	16.00	18.00	2.00	2.00	4.00	4.00			46.00
4 - GECO	24.00	16.00	2.00	6.00	16.00	6.00	2.00		72.00
5 - IASS	8.00	6.00	24.00	8.00	2.00	2.00	2.00		52.00
6 - UCC	12.00	2.00	24.00	8.00		12.00	2.00		60.00
7 - REGIONH	20.00					4.00			24.00
8 - ARSTPC-ER	10.00					4.00			14.00
9 - G&C	14.00	1.00	1.00	1.00		3.00			20.00
10 - IIASA	4.00		18.00	2.00		2.00			26.00
11 - EV	20.00	6.00		6.00		4.00			36.00
12 - ZSRT	11.00	2.00	2.00	2.00	1.00	2.00			20.00
13 - ARPAAE	6.00					4.00			10.00
14 - GFZ	8.00	18.00	2.00	2.00	2.00	2.00	2.00		36.00
15 - 52N	4.00	5.00	2.00	5.00	22.00	1.00	1.00		40.00
16 - ETH	6.00	18.00							24.00
17 - OASIS	5.00	2.00				20.00	2.00		29.00
18 - SEI	12.00	6.00	12.00	24.00		2.00	2.00		58.00
<b>Total Person-Months</b>	204.00	118.00	95.00	72.00	55.00	82.00	35.00	0.00	661.00



## LIST OF DELIVERABLES

<b>Deliverables</b>						
<i>Grant Preparation (Deliverables screen) — Enter the info.</i>						
<i>The labels used mean:</i>						
<i>Public — fully open ( automatically posted online)</i>						
<i>Sensitive — limited under the conditions of the Grant Agreement</i>						
<i>EU classified —RESTREINT-UE/EU-RESTRICTED, CONFIDENTIEL-UE/EU-CONFIDENTIAL, SECRET-UE/EU-SECRET under Decision <a href="#">2015/444</a></i>						
<b>Deliverable No</b>	<b>Deliverable Name</b>	<b>Work Package No</b>	<b>Lead Beneficiary</b>	<b>Type</b>	<b>Dissemination Level</b>	<b>Due Date (month)</b>
D1.1	RWL description and set-up	WP1	4 - GECO	R — Document, report	PU - Public	10
D1.2	Capacity development strategy for Training of Trainers on implementing transdisciplinary knowledge co-production processes in the RWL	WP1	18 - SEI	R — Document, report	PU - Public	12
D1.3	Case studies of DRR/ CCA processes to date - forensic examination of real world process and events management	WP1	17 - OASIS	R — Document, report	PU - Public	24
D1.4	Outcomes from RWL in multi-risk governance	WP1	5 - IASS	R — Document, report	PU - Public	45
D2.1	Compendium on data standards for interoperability in DRR and CCA	WP2	4 - GECO	R — Document, report	PU - Public	24
D2.2	Enhanced interoperability of tools available to users through software repository and documentation	WP2	3 - DTU	OTHER	PU - Public	36
D2.3	Interoperability demonstration factsheets (description and illustration of workflow implementations in RWL as best practice examples)	WP2	14 - GFZ	R — Document, report	PU - Public	46

<b>Deliverables</b>						
<i>Grant Preparation (Deliverables screen) — Enter the info.</i>						
<i>The labels used mean:</i>						
<i>Public — fully open (⚠ automatically posted online)</i>						
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<i>EU classified —RESTREINT-UE/EU-RESTRICTED, CONFIDENTIEL-UE/EU-CONFIDENTIAL, SECRET-UE/EU-SECRET under Decision <a href="#">2015/444</a></i>						
<b>Deliverable No</b>	<b>Deliverable Name</b>	<b>Work Package No</b>	<b>Lead Beneficiary</b>	<b>Type</b>	<b>Dissemination Level</b>	<b>Due Date (month)</b>
D3.1	RISK-TANDEM Framework	WP3	5 - IASS	R — Document, report	PU - Public	16
D3.2	Updated RISK-TANDEM Framework for governance processes and interoperability	WP3	5 - IASS	R — Document, report	PU - Public	36
D3.3	Policy brief on risk governance in the context of DRR and CCA	WP3	5 - IASS	R — Document, report	PU - Public	42
D3.4	Guidance on good practices regarding interoperability of governance mechanisms and recommendations for institutionalising project outcomes and the interoperable platform into existing systems	WP3	5 - IASS	R — Document, report	PU - Public	48
D4.1	Capacity development modules for ToT workshops in designing transdisciplinary knowledge co-production processes	WP4	18 - SEI	DEC —Websites, patent filings, videos, etc	PU - Public	36
D4.2	Framework for distilling assumptions in different modelling approaches with recommendations for replicating this approach	WP4	18 - SEI	R — Document, report	PU - Public	42
D4.3	Updated (tested & refined) TANDEM cycle for transdisciplinary knowledge co-production processes and information interoperability	WP4	18 - SEI	DEC —Websites, patent filings, videos, etc	PU - Public	48

<b>Deliverables</b>						
<i>Grant Preparation (Deliverables screen) — Enter the info.</i>						
<i>The labels used mean:</i>						
<i>Public — fully open (⚠ automatically posted online)</i>						
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<i>EU classified —RESTREINT-UE/EU-RESTRICTED, CONFIDENTIEL-UE/EU-CONFIDENTIAL, SECRET-UE/EU-SECRET under Decision <a href="#">2015/444</a></i>						
<b>Deliverable No</b>	<b>Deliverable Name</b>	<b>Work Package No</b>	<b>Lead Beneficiary</b>	<b>Type</b>	<b>Dissemination Level</b>	<b>Due Date (month)</b>
D5.1	High Level Design Document - Data Fabric	WP5	15 - 52N	R — Document, report	PU - Public	21
D5.2	Low Level Design Document Data Fabric	WP5	15 - 52N	R — Document, report	PU - Public	24
D5.3	Data Protection Impact Assessment	WP5	15 - 52N	R — Document, report	PU - Public	24
D5.4	Implementation documentation (e.g. planning, test/acceptance, training, user guides)	WP5	15 - 52N	R — Document, report	PU - Public	24
D5.5	Data Fabric Service Platform including configured RWL Interoperability Use Cases.	WP5	15 - 52N	OTHER	PU - Public	36
D5.6	Change Control documents	WP5	15 - 52N	R — Document, report	PU - Public	48
D5.7	User training by role (UCC) link to WP6 eLearning platform	WP5	15 - 52N	R — Document, report	PU - Public	30
D6.1	Communications Strategy	WP6	17 - OASIS	R — Document, report	PU - Public	4
D6.2	Communications report 1	WP6	17 - OASIS	R — Document, report	PU - Public	12
D6.3	Gaps and Opportunities assessment	WP6	1 - TUBS	R — Document, report	PU - Public	9
D6.4	eLearning portal	WP6	6 - UCC	OTHER	PU - Public	45
D6.5	Business development plan	WP6	17 - OASIS	R — Document, report	PU - Public	48
D6.6	Communications report 2	WP6	17 - OASIS	R — Document, report	PU - Public	24
D6.7	Communications report 3	WP6	17 - OASIS	R — Document, report	PU - Public	36

<b>Deliverables</b>						
<i>Grant Preparation (Deliverables screen) — Enter the info.</i>						
<i>The labels used mean:</i>						
<i>Public — fully open (⚠ automatically posted online)</i>						
<i>Sensitive — limited under the conditions of the Grant Agreement</i>						
<i>EU classified —RESTREINT-UE/EU-RESTRICTED, CONFIDENTIEL-UE/EU-CONFIDENTIAL, SECRET-UE/EU-SECRET under Decision <a href="#">2015/444</a></i>						
<b>Deliverable No</b>	<b>Deliverable Name</b>	<b>Work Package No</b>	<b>Lead Beneficiary</b>	<b>Type</b>	<b>Dissemination Level</b>	<b>Due Date (month)</b>
D6.8	Communications report 4	WP6	17 - OASIS	R — Document, report	PU - Public	48
D6.9	Legacy document on the capacity/skills for risk and adaptation management	WP6	6 - UCC	R — Document, report	PU - Public	36
D7.1	Consortium Agreement including IPR, Grant Agreement signed	WP7	1 - TUBS	R — Document, report	SEN - Sensitive	1
D7.2	Project working plan with risk management and mitigation	WP7	1 - TUBS	R — Document, report	SEN - Sensitive	3
D7.3	Data management plan	WP7	1 - TUBS	DMP — Data Management Plan	PU - Public	5
D7.4	Mid-term report, covering months 1 - 16	WP7	1 - TUBS	R — Document, report	PU - Public	16
D7.5	Mid-term report, covering months 17-32	WP7	1 - TUBS	R — Document, report	PU - Public	32
D7.6	Final report covering full project	WP7	1 - TUBS	R — Document, report	PU - Public	48
D7.7	Project legacy documented and implemented	WP7	1 - TUBS	R — Document, report	PU - Public	48
D8.1	OEI - Requirement No. 1	WP8	1 - TUBS	ETHICS	SEN - Sensitive	3
D8.2	OEI - Requirement No. 2	WP8	1 - TUBS	ETHICS	SEN - Sensitive	12
D8.3	OEI - Requirement No. 3	WP8	1 - TUBS	ETHICS	SEN - Sensitive	24
D8.4	OEI - Requirement No. 4	WP8	1 - TUBS	ETHICS	SEN - Sensitive	36
D8.5	OEI - Requirement No. 5	WP8	1 - TUBS	ETHICS	SEN - Sensitive	3

**Deliverable D1.1 – RWL description and set-up**

<b>Deliverable Number</b>	D1.1	<b>Lead Beneficiary</b>	4. GECCO
<b>Deliverable Name</b>	RWL description and set-up		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	10	<b>Work Package No</b>	WP1

<b>Description</b>
Report on Real-World-Labs stakeholder landscape CCA&DRR challenges and set-up process

**Deliverable D1.2 – Capacity development strategy for Training of Trainers on implementing transdisciplinary knowledge co-production processes in the RWL**

<b>Deliverable Number</b>	D1.2	<b>Lead Beneficiary</b>	18. SEI
<b>Deliverable Name</b>	Capacity development strategy for Training of Trainers on implementing transdisciplinary knowledge co-production processes in the RWL		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	12	<b>Work Package No</b>	WP1

<b>Description</b>
Guidance on implementing transdisciplinary knowledge co-production processes in the RWL based on the Tandem framework.

**Deliverable D1.3 – Case studies of DRR/ CCA processes to date - forensic examination of real world process and events management**

<b>Deliverable Number</b>	D1.3	<b>Lead Beneficiary</b>	17. OASIS
<b>Deliverable Name</b>	Case studies of DRR/ CCA processes to date - forensic examination of real world process and events management		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	24	<b>Work Package No</b>	WP1

<b>Description</b>
Report on case studies of DRR/ CCA processes to date and forensic examination of real world process and events management.

**Deliverable D1.4 – Outcomes from RWL in multi-risk governance**

<b>Deliverable Number</b>	D1.4	<b>Lead Beneficiary</b>	5. IASS
<b>Deliverable Name</b>	Outcomes from RWL in multi-risk governance		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	45	<b>Work Package No</b>	WP1

Description	
Summary reports for each RWL about the inputs, activities, outputs, outcomes and impacts for evaluation of the project impacts.	

### Deliverable D2.1 – Compendium on data standards for interoperability in DRR and CCA

<b>Deliverable Number</b>	D2.1	<b>Lead Beneficiary</b>	4. GECCO
<b>Deliverable Name</b>	Compendium on data standards for interoperability in DRR and CCA		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	24	<b>Work Package No</b>	WP2

Description	
The Deliverable will develop a compendium of standards for the exchange of data and information among any combination of models, databases and analytical and visualization tools for the DRR and CCA domain.	

### Deliverable D2.2 – Enhanced interoperability of tools available to users through software repository and documentation

<b>Deliverable Number</b>	D2.2	<b>Lead Beneficiary</b>	3. DTU
<b>Deliverable Name</b>	Enhanced interoperability of tools available to users through software repository and documentation		
<b>Type</b>	OTHER	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	36	<b>Work Package No</b>	WP2

Description	
Extended and improved software tools (codes), implementing improved interoperability and demonstration, with scientific and technical documentation/user guidelines, made available via open-source repositories (e.g. Github) or published in open access journals	

### Deliverable D2.3 – Interoperability demonstration factsheets (description and illustration of workflow implementations in RWL as best practice examples)

<b>Deliverable Number</b>	D2.3	<b>Lead Beneficiary</b>	14. GFZ
<b>Deliverable Name</b>	Interoperability demonstration factsheets (description and illustration of workflow implementations in RWL as best practice examples)		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	46	<b>Work Package No</b>	WP2

Description	
Reports on workflows for interoperability in Real World Labs as best practice examples (one report per RWL).	

**Deliverable D3.1 – RISK-TANDEM Framework**

<b>Deliverable Number</b>	D3.1	<b>Lead Beneficiary</b>	5. IASS
<b>Deliverable Name</b>	RISK-TANDEM Framework		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	16	<b>Work Package No</b>	WP3

<b>Description</b>
Conceptual development of a state-of-the-art risk governance approach for improved knowledge integration.

**Deliverable D3.2 – Updated RISK-TANDEM Framework for governance processes and interoperability**

<b>Deliverable Number</b>	D3.2	<b>Lead Beneficiary</b>	5. IASS
<b>Deliverable Name</b>	Updated RISK-TANDEM Framework for governance processes and interoperability		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	36	<b>Work Package No</b>	WP3

<b>Description</b>
Report on an updated RISK-TANDEM framework based on lessons learnt from the existing and on-going CCA and DRR decision-making processes in the RWLs.

**Deliverable D3.3 – Policy brief on risk governance in the context of DRR and CCA**

<b>Deliverable Number</b>	D3.3	<b>Lead Beneficiary</b>	5. IASS
<b>Deliverable Name</b>	Policy brief on risk governance in the context of DRR and CCA		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	42	<b>Work Package No</b>	WP3

<b>Description</b>
Policy brief document on risk governance in the context of DRR and CCA

**Deliverable D3.4 – Guidance on good practices regarding interoperability of governance mechanisms and recommendations for institutionalising project outcomes and the interoperable platform into existing systems**

<b>Deliverable Number</b>	D3.4	<b>Lead Beneficiary</b>	5. IASS
<b>Deliverable Name</b>	Guidance on good practices regarding interoperability of governance mechanisms and recommendations for institutionalising project outcomes and the interoperable platform into existing systems		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	48	<b>Work Package No</b>	WP3

Description	
Recommendations for tailored governance mechanisms to guide and sustain the knowledge exchange.	

### Deliverable D4.1 – Capacity development modules for ToT workshops in designing transdisciplinary knowledge co-production processes

<b>Deliverable Number</b>	D4.1	<b>Lead Beneficiary</b>	18. SEI
<b>Deliverable Name</b>	Capacity development modules for ToT workshops in designing transdisciplinary knowledge co-production processes		
<b>Type</b>	DEC —Websites, patent filings, videos, etc	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	36	<b>Work Package No</b>	WP4

Description	
Interactive online capacity development modules on applying the Tandem framework in the RWL.	

### Deliverable D4.2 – Framework for distilling assumptions in different modelling approaches with recommendations for replicating this approach

<b>Deliverable Number</b>	D4.2	<b>Lead Beneficiary</b>	18. SEI
<b>Deliverable Name</b>	Framework for distilling assumptions in different modelling approaches with recommendations for replicating this approach		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	42	<b>Work Package No</b>	WP4

Description	
A report describing an approach to explore trade-offs and assumptions in the different models used, and how to refine or adapt such assumptions to be more context-based.	

### Deliverable D4.3 – Updated (tested & refined) TANDEM cycle for transdisciplinary knowledge co-production processes and information interoperability

<b>Deliverable Number</b>	D4.3	<b>Lead Beneficiary</b>	18. SEI
<b>Deliverable Name</b>	Updated (tested & refined) TANDEM cycle for transdisciplinary knowledge co-production processes and information interoperability		
<b>Type</b>	DEC —Websites, patent filings, videos, etc	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	48	<b>Work Package No</b>	WP4

Description	
Updated version of the existing Tandem interactive tool ( <a href="http://www.weADAPT.org/tandem">www.weADAPT.org/tandem</a> ) based on evidence from the RWL, to enable it to be applied in other regions.	



**Deliverable D5.1 – High Level Design Document - Data Fabric**

<b>Deliverable Number</b>	D5.1	<b>Lead Beneficiary</b>	15. 52N
<b>Deliverable Name</b>	High Level Design Document - Data Fabric		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	21	<b>Work Package No</b>	WP5

<b>Description</b>
Take stock of the technical and data details of organisations that will contributing to or taking out from the data fabric layer.

**Deliverable D5.2 – Low Level Design Document Data Fabric**

<b>Deliverable Number</b>	D5.2	<b>Lead Beneficiary</b>	15. 52N
<b>Deliverable Name</b>	Low Level Design Document Data Fabric		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	24	<b>Work Package No</b>	WP5

<b>Description</b>
Develop an architectural definition of how 52N's data fabric software can be configured to support DRR and CCA interoperability incorporating data standards and governance developed elsewhere in the project and design, a prototype using a subset of the project universe.

**Deliverable D5.3 – Data Protection Impact Assessment**

<b>Deliverable Number</b>	D5.3	<b>Lead Beneficiary</b>	15. 52N
<b>Deliverable Name</b>	Data Protection Impact Assessment		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	24	<b>Work Package No</b>	WP5

<b>Description</b>
Articulate the implications of GDPR compliance on the various forms of data input, output and storage. Design appropriate combination of scanning, penetration testing, firewall provision, endpoint security, privilege and identity assurance.
Link different access / user regimes to privilege and user indentity.

**Deliverable D5.4 – Implementation documentation (e.g. planning, test/acceptance, training, user guides)**

<b>Deliverable Number</b>	D5.4	<b>Lead Beneficiary</b>	15. 52N
<b>Deliverable Name</b>	Implementation documentation (e.g. planning, test/acceptance, training, user guides)		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	24	<b>Work Package No</b>	WP5

Description			
Create and document an appropriate testing regime. Create chapter headings and where appropriate content for training and user manual			

### Deliverable D5.5 – Data Fabric Service Platform including configured RWL Interoperability Use Cases.

<b>Deliverable Number</b>	D5.5	<b>Lead Beneficiary</b>	15. 52N
<b>Deliverable Name</b>	Data Fabric Service Platform including configured RWL Interoperability Use Cases.		
<b>Type</b>	OTHER	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	36	<b>Work Package No</b>	WP5

Description			
Build a platform to conform with the high and low level design workstream outputs to support DRR and CCA interoperability incorporating data standards and governance developed elsewhere in the project and design.			

### Deliverable D5.6 – Change Control documents

<b>Deliverable Number</b>	D5.6	<b>Lead Beneficiary</b>	15. 52N
<b>Deliverable Name</b>	Change Control documents		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	48	<b>Work Package No</b>	WP5

Description			
This work stream will set out the communication process around changes to inputs, outputs and systems operation. It will follow a standard process.			
Define change			
Submit and review request to team			
Create response to request			
Decision and Approval			

### Deliverable D5.7 – User training by role (UCC) link to WP6 eLearning platform

<b>Deliverable Number</b>	D5.7	<b>Lead Beneficiary</b>	15. 52N
<b>Deliverable Name</b>	User training by role (UCC) link to WP6 eLearning platform		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	30	<b>Work Package No</b>	WP5

Description			
Create appropriate guides for different stakeholders accessing the system to dovetail with different access rights			

### Deliverable D6.1 – Communications Strategy

<b>Deliverable Number</b>	D6.1	<b>Lead Beneficiary</b>	17. OASIS
<b>Deliverable Name</b>	Communications Strategy		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	4	<b>Work Package No</b>	WP6

<b>Description</b>
Report on the communication strategy for the project.

### Deliverable D6.2 – Communications report 1

<b>Deliverable Number</b>	D6.2	<b>Lead Beneficiary</b>	17. OASIS
<b>Deliverable Name</b>	Communications report 1		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	12	<b>Work Package No</b>	WP6

<b>Description</b>
Document of the communication report for the first year of the project.

### Deliverable D6.3 – Gaps and Opportunities assessment

<b>Deliverable Number</b>	D6.3	<b>Lead Beneficiary</b>	1. TUBS
<b>Deliverable Name</b>	Gaps and Opportunities assessment		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	9	<b>Work Package No</b>	WP6

<b>Description</b>
Report on impact Pathways for high potential Key Exploitable Results of the project.

### Deliverable D6.4 – eLearning portal

<b>Deliverable Number</b>	D6.4	<b>Lead Beneficiary</b>	6. UCC
<b>Deliverable Name</b>	eLearning portal		
<b>Type</b>	OTHER	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	45	<b>Work Package No</b>	WP6

<b>Description</b>
An on-line repository containing all the learning materials co-designed and developed with stakeholders for the Training of Trainers” programme to be hosted on an established, appropriate website.

### Deliverable D6.5 – Business development plan

<b>Deliverable Number</b>	D6.5	<b>Lead Beneficiary</b>	17. OASIS
<b>Deliverable Name</b>	Business development plan		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	48	<b>Work Package No</b>	WP6

Description	
<p>A business development plan will be developed to cover new data, interoperable analytical tools and the exploitation of the data fabric/ mesh. The potential of the tools and systems will be examined in both the public sector and the private sector, e.g. discussion around the best way to scale the use of tools further developed and made interoperable in the project.</p> <p>The plans will include:</p> <ul style="list-style-type: none"> <li>• Business model canvas for the identification of the market ecosystem (this may be in the public or private sectors)</li> <li>• Competition analysis</li> <li>• Identify any patent/ protection needs of products</li> <li>• Identify audiences/ end user markets</li> <li>• Pricing potential for identified audiences</li> <li>• Delivery mechanism (e.g. SaaS, external platform, licenses, subscription etc.)</li> <li>• Continuity of tools (remain in-house, development or exploitation by external partners)</li> <li>• Go-to-market planning (if appropriate)</li> </ul>	

### Deliverable D6.6 – Communications report 2

<b>Deliverable Number</b>	D6.6	<b>Lead Beneficiary</b>	17. OASIS
<b>Deliverable Name</b>	Communications report 2		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	24	<b>Work Package No</b>	WP6

Description	
Document of the communication report for the second year of the project.	

### Deliverable D6.7 – Communications report 3

<b>Deliverable Number</b>	D6.7	<b>Lead Beneficiary</b>	17. OASIS
<b>Deliverable Name</b>	Communications report 3		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	36	<b>Work Package No</b>	WP6

Description	
Document of the communication report for the third year of the project.	

**Deliverable D6.8 – Communications report 4**

<b>Deliverable Number</b>	D6.8	<b>Lead Beneficiary</b>	17. OASIS
<b>Deliverable Name</b>	Communications report 4		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	48	<b>Work Package No</b>	WP6

<b>Description</b>
Document of the communication report for the fourth and final year of the project.

**Deliverable D6.9 – Legacy document on the capacity/skills for risk and adaptation management**

<b>Deliverable Number</b>	D6.9	<b>Lead Beneficiary</b>	6. UCC
<b>Deliverable Name</b>	Legacy document on the capacity/skills for risk and adaptation management		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	36	<b>Work Package No</b>	WP6

<b>Description</b>
This report will contain a set of recommendations on how capacity / skills and related evolving pathways in the development of governance and technological frameworks can better address the challenges of integrated responses to risk and adaptation management.

**Deliverable D7.1 – Consortium Agreement including IPR, Grant Agreement signed**

<b>Deliverable Number</b>	D7.1	<b>Lead Beneficiary</b>	1. TUBS
<b>Deliverable Name</b>	Consortium Agreement including IPR, Grant Agreement signed		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	SEN - Sensitive
<b>Due Date (month)</b>	1	<b>Work Package No</b>	WP7

<b>Description</b>
Document of the Consortium Agreement signed by all beneficiary and associated partners

**Deliverable D7.2 – Project working plan with risk management and mitigation**

<b>Deliverable Number</b>	D7.2	<b>Lead Beneficiary</b>	1. TUBS
<b>Deliverable Name</b>	Project working plan with risk management and mitigation		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	SEN - Sensitive
<b>Due Date (month)</b>	3	<b>Work Package No</b>	WP7

<b>Description</b>
Document of the project working plan risk management and mitigation set-up

**Deliverable D7.3 – Data management plan**

<b>Deliverable Number</b>	D7.3	<b>Lead Beneficiary</b>	1. TUBS
<b>Deliverable Name</b>	Data management plan		
<b>Type</b>	DMP — Data Management Plan	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	5	<b>Work Package No</b>	WP7

<b>Description</b>
Document of the Data Management Plan

**Deliverable D7.4 – Mid-term report, covering months 1 - 16**

<b>Deliverable Number</b>	D7.4	<b>Lead Beneficiary</b>	1. TUBS
<b>Deliverable Name</b>	Mid-term report, covering months 1 - 16		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	16	<b>Work Package No</b>	WP7

<b>Description</b>
Document of the mid-term report from the first reporting phase.

**Deliverable D7.5 – Mid-term report, covering months 17-32**

<b>Deliverable Number</b>	D7.5	<b>Lead Beneficiary</b>	1. TUBS
<b>Deliverable Name</b>	Mid-term report, covering months 17-32		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	32	<b>Work Package No</b>	WP7

<b>Description</b>
Document of the mid-term report from the second reporting phase.

**Deliverable D7.6 – Final report covering full project**

<b>Deliverable Number</b>	D7.6	<b>Lead Beneficiary</b>	1. TUBS
<b>Deliverable Name</b>	Final report covering full project		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	48	<b>Work Package No</b>	WP7

<b>Description</b>
Document of the mid-term report from the final reporting phase.

**Deliverable D7.7 – Project legacy documented and implemented**

<b>Deliverable Number</b>	D7.7	<b>Lead Beneficiary</b>	1. TUBS
<b>Deliverable Name</b>	Project legacy documented and implemented		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	48	<b>Work Package No</b>	WP7

<b>Description</b>
Document describing the maintenance of the project's outputs accessibility and support for the dissemination of the products, and proper management of the IPR beyond the lifespan of the project

**Deliverable D8.1 – OEI - Requirement No. 1**

<b>Deliverable Number</b>	D8.1	<b>Lead Beneficiary</b>	1. TUBS
<b>Deliverable Name</b>	OEI - Requirement No. 1		
<b>Type</b>	ETHICS	<b>Dissemination Level</b>	SEN - Sensitive
<b>Due Date (month)</b>	3	<b>Work Package No</b>	WP8

<b>Description</b>
An independent Ethics Advisor with expertise in AI and ML to monitor the ethical concerns related to this project must be appointed. The applicant is invited to send the CV of the suggested Ethics Advisor and discuss their appointment with the Project Officer as soon as possible.

**Deliverable D8.2 – OEI - Requirement No. 2**

<b>Deliverable Number</b>	D8.2	<b>Lead Beneficiary</b>	1. TUBS
<b>Deliverable Name</b>	OEI - Requirement No. 2		
<b>Type</b>	ETHICS	<b>Dissemination Level</b>	SEN - Sensitive
<b>Due Date (month)</b>	12	<b>Work Package No</b>	WP8

<b>Description</b>
Periodic reports from the Ethics Advisor must be provided at month 12.

**Deliverable D8.3 – OEI - Requirement No. 3**

<b>Deliverable Number</b>	D8.3	<b>Lead Beneficiary</b>	1. TUBS
<b>Deliverable Name</b>	OEI - Requirement No. 3		
<b>Type</b>	ETHICS	<b>Dissemination Level</b>	SEN - Sensitive
<b>Due Date (month)</b>	24	<b>Work Package No</b>	WP8

<b>Description</b>
Periodic reports from the Ethics Advisor must be provided at month 24.

**Deliverable D8.4 – OEI - Requirement No. 4**

<b>Deliverable Number</b>	D8.4	<b>Lead Beneficiary</b>	1. TUBS
<b>Deliverable Name</b>	OEI - Requirement No. 4		
<b>Type</b>	ETHICS	<b>Dissemination Level</b>	SEN - Sensitive
<b>Due Date (month)</b>	36	<b>Work Package No</b>	WP8

<b>Description</b>
Periodic reports from the Ethics Advisor must be provided at month 36.

**Deliverable D8.5 – OEI - Requirement No. 5**

<b>Deliverable Number</b>	D8.5	<b>Lead Beneficiary</b>	1. TUBS
<b>Deliverable Name</b>	OEI - Requirement No. 5		
<b>Type</b>	ETHICS	<b>Dissemination Level</b>	SEN - Sensitive
<b>Due Date (month)</b>	3	<b>Work Package No</b>	WP8

<b>Description</b>
Periodic reports from the Ethics Advisor must be provided at month 3.



## LIST OF MILESTONES

<b>Milestones</b>					
<i>Grant Preparation (Milestones screen) — Enter the info.</i>					
<b>Milestone No</b>	<b>Milestone Name</b>	<b>Work Package No</b>	<b>Lead Beneficiary</b>	<b>Means of Verification</b>	<b>Due Date (month)</b>
1	RWL framing and actors involved	WP1	4-GECO	RWL and meeting calendar definition, multi stakeholders list available	10
2	RWL operative and stakeholders involved	WP1	4-GECO	Stakeholders Agreements signed	8
3	Periodic report #1 on outcomes of the RWL co-production process	WP1	-	Report	12
4	Periodic report #2 on outcomes of the RWL co-production process	WP1	-	Report	23
5	Periodic report #3 on outcomes of the RWL co-production process	WP1	-	Report	36
6	Periodic report #4 on outcomes of the RWL co-production process	WP1	-	Report	46
7	Evaluating the impact/ lessons learnt from the application of the governance mechanisms in RWL	WP1	5-IASS	Report	48
8	Multi-criteria assessment based on the FAIR framework ready for evaluation	WP2	4-GECO	Report	18
9	At least two manuscripts on the update of two tools submitted	WP2	3-DTU	proof of submission	30
10	nteroperability demonstration factsheets ready for evaluation	WP2	14-GFZ	Report	36
11	RISK-TANDEM Framework	WP3	5-IASS	Report	15
12	Scoping consultation with RWL and mapping of context	WP3	5-IASS	Meeting minutes	13

<b>Milestones</b>					
<i>Grant Preparation (Milestones screen) — Enter the info.</i>					
<b>Milestone No</b>	<b>Milestone Name</b>	<b>Work Package No</b>	<b>Lead Beneficiary</b>	<b>Means of Verification</b>	<b>Due Date (month)</b>
13	Engaging with stakeholders in RWL in a co-productive mode	WP3	5-IASS	Documentation of co-production activities	30
14	Updated (proved and tested) RISK-TANDEM Framework	WP3	5-IASS	Report	41
15	TANDEM transdisciplinary knowledge co-production framework refined and iteratively applied step 1	WP4	-	Report	15
16	TANDEM transdisciplinary knowledge co-production framework refined and iteratively applied step 2	WP4	-	Report	25
17	TANDEM transdisciplinary knowledge co-production framework refined and iteratively applied step 3	WP4	-	Report	35
18	TANDEM transdisciplinary knowledge co-production framework refined and iteratively applied step 4	WP4	-	Report	45
19	Scoping consultation with RWL and mapping of capacity development needs begins	WP4	-	Meeting minutes	9
20	Updated (proved and tested) TANDEM knowledge co-production cycle	WP4	-	Report	41
21	DATA-FABRIC High Level Design complete	WP5	15-52N	HLD-DF published	21
22	DATA-FABRIC Low Level Design complete	WP5	15-52N	LLD-DF published	24
23	DATA-FABRIC commissioned	WP5	15-52N	DATA-FABRIC Acceptance Test Report published	27

<b>Milestones</b>					
<i>Grant Preparation (Milestones screen) — Enter the info.</i>					
<b>Milestone No</b>	<b>Milestone Name</b>	<b>Work Package No</b>	<b>Lead Beneficiary</b>	<b>Means of Verification</b>	<b>Due Date (month)</b>
24	RWL Use Cases configured	WP5	15-52N	RWL Use Case Acceptance Test Report published	36
25	Upgrades in DATA-FABRIC and related operational processes	WP5	15-52N	Change Control documents	48
26	Communications Strategy completed	WP6	-	Report	4
27	eLearning portal completed	WP6	6-UCC	Report	45
28	Business Development Plan completed	WP7	-	Report	48
29	Data and risk management plans drafted	WP7	1-TUBS	Report	2
30	Mid-term project reports drafted and reviewed period 1	WP7	1-TUBS	Report	14
31	Mid-term project reports drafted and reviewed period 2	WP7	1-TUBS	Report	30
32	Final roject reports drafted and reviewed	WP7	1-TUBS	Report	46

## LIST OF CRITICAL RISKS

<b>Critical risks &amp; risk management strategy</b>			
<i>Grant Preparation (Critical Risks screen) — Enter the info.</i>			
<b>Risk number</b>	<b>Description</b>	<b>Work Package No(s)</b>	<b>Proposed Mitigation Measures</b>
1	Limited participation and commitment to RWLs	WP1	We closely collaborate with many organisations, networks and associations which are critically important for the project. RWLs build on extensive previous co-operations and

<b>Critical risks &amp; risk management strategy</b>			
<i>Grant Preparation (Critical Risks screen) — Enter the info.</i>			
<b>Risk number</b>	<b>Description</b>	<b>Work Package No(s)</b>	<b>Proposed Mitigation Measures</b>
	(WP1) by practice partners and other stakeholders (low/high)		trusted relationships. The quality and level of engagement will be continuously monitored and assessed by RWL managers who will also ensure that a wide range of partners are activated and engaged (mitigated)
2	Difficulty to address stakeholders' needs in RWLs (High / Low)	WP1	The project design foresees this – WP4 along with the dissemination activities and the management structure is in fact constructed to mitigate this and potentially draw lessons from it (mitigated).
3	Lack of accessibility of data/tools for development and demonstration	WP2, WP5, WP4, WP3	The project consortium team already has screened for the availability of methods, data and tools when writing this proposal. Concepts, methods, models and tools envisaged to exemplify interoperability or to be further developed in RWLs are developed/owned by project partners (mitigated).
4	COVID19 or other pandemics may prevent physical events (or prohibit travel by some attendees). (Med. / Low)	WP2, WP5, WP4, WP1, WP7, WP3, WP6	Social distancing requirements may persist in the future. In preparing physical events, we will strictly follow the regulations of the country involved, and guidelines of the host institution. We will ensure remote access to attendees who are unable to attend physically and will have a backup plan so that events can be switched to remote if necessary. (mitigated).
5	Personnel involved not able to fulfil task / staff changes or more efforts needed to complete the task, higher costs (Low / High)	WP2, WP5, WP4, WP1, WP7, WP3, WP6	The key staff was selected for their expertise. Nevertheless, the consortium includes other expert staff who could take over key roles. Science WPs have co-lead who can manage WP during absence of WP Leaders. All participants are experienced in multi-year projects and have their own strategies in place to mitigate risks of staff change. All tasks have been budgeted in a balanced and responsible manner. Use of resources will be monitored against work progress and overspending avoided (mitigated).
6	Dissemination, Communication, Exploitation does not reach target groups	WP6	All possible channels including social media will be used, partners have well established networks (mitigated)
7	Coordination and internal communications fail	WP7	All partners have been cooperating in other consortium projects and will support the project coordinator in case of problems
8	Conflicts & mismatched expectations across the consortium and practice partners, IPR conflict (low/low)	WP2, WP5, WP4, WP1, WP3	Clear expectations will be established from the beginning, incl. terms of references and governance rules of the project activities. IPR will be defined in CA and will be closely monitored throughout the project by WP7 (mitigated)

<b>Critical risks &amp; risk management strategy</b>			
<i>Grant Preparation (Critical Risks screen) — Enter the info.</i>			
<b>Risk number</b>	<b>Description</b>	<b>Work Package No(s)</b>	<b>Proposed Mitigation Measures</b>
9	DATA-FABRIC security incident or outage results in delays and increased costs	WP2, WP5, WP4, WP1, WP7, WP3, WP6	All systems have redundancy and data backup capabilities for recovery following an outage or a disaster. For the duration of DIRECTED, the level of business continuity provided will be established based on the business needs and cost. For ongoing usage beyond the DIRECTED project, business continuity will be documented in an SLA (Service Level Agreement).

## PROJECT REVIEWS

<b>Project Reviews</b>			
<i>Grant Preparation (Reviews screen) — Enter the info.</i>			
<b>Review No</b>	<b>Timing (month)</b>	<b>Location</b>	<b>Comments</b>
RV1	16		
RV2	32		
RV3	48		

## Description of Action Part B

HISTORY OF CHANGES		
VERSION	PUBLICATION DATE	CHANGE
1.0	14.04.2022	Initial version DoA.
2.0	10.05.2022	Details added regarding sub-contracting in section 3.1 Details added regarding independent ethics advisor in section 4 Adjustments to reflect change of coordinator from GFZ to TUBS and GFZ as a beneficiary partner (sections 1.2.8 and 3.2 and Table 3.1g)
2.1	27.05.2022	Explanation for sub-contracting from partner 2/PIK added to table 3.g  Explanations regarding purchase costs for partners 9/REGIONH, 10/ARSTPC-R, 11/G&C and 14/QOMPLX added to Table 3.1h Budget mentioned in section '3.1.3 Resources to be committed' aligned with information in Annex 2  New sub-section '3.2.1 Role and budget of Associated Partners' added including a table for the budget of Associated Partners OASIS, SEI, QOMPLX and ETH. Paragraph on "Other countries and international organisations" in section 3.2 removed  Explicit indication added to section 3.1 that Article 6.2.B and 9.3 of the GA and its principles are applicable and respected during the selection of the subcontractor (i.a. best value for money, no conflict of interest) and also in table 3.1g  History of changes Table moved to the beginning of this document
2.2	31.05.2022	Details added about associated partners in section 3.2.1
2.3	14.06.2022	Associated partners SEI and QOMPLX removed from table 3.1g and included in sub-section 3.2.1 Associated partner QOMPLX removed from table 3.1h and included in sub-section 3.2.1 Numbering of partners updated and rectified in tables 3.1g,h Resources to be committed (section 3.1.3) updated according to new situation with UK consortium members as associated partners
2.4	21.06.2022	Section 4 'ethics' adjusted to explain ethics assessment. Section 5 'Security' added
3	6.7.2022	Subcontracting tasks for TUBS identified (table 3.1g) Modifications to replace partner QOMPLX with new partner 52N updating partner numbers
3.1	14.7.2022	Budget numbers updated in section 3.1.3

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## DIRECTED: DISASTER RESILIENCE FOR EXTREME CLIMATE EVENTS PROVIDING INTEROPERABLE DATA, MODELS, COMMUNICATION AND GOVERNANCE

### 1. Excellence

In July 2021, the low-pressure system Bernd smashed several rainfall records and caused catastrophic flooding and havoc in several European countries, particularly in Germany and Belgium, with estimated losses exceeding EUR 10 billion and over 200 lives lost. Only a few weeks later, temperatures around the Mediterranean Sea rose above 40 degrees Celsius and forest fires devastated extended areas. In the North of the Greek island Euboea, already charred landscapes without trees and other vegetation to hold water and soils suffered unexpected extreme precipitation, triggering floods and landslides, causing severe damages to local settlements and infrastructures. In all three cases and many others, the impacts of recent extreme climate events on local communities have gone beyond what has been previously observed. They clearly illustrate critical need for new paradigms that integrate risk assessment, governance, communication and operational mechanisms for coping with extreme climate events throughout the *entire* Disaster Risk Management (DRM) cycle, i.e. from early warning systems (EWS) to long-term climate change adaptation (CCA) strategies. This particularly pertains to interoperability in terms of data availability, information sharing, deploying risk models, as well as coordination and communication between the many different actors. For example, in the 2021 European floods, risk managers, first and second responders, and local communities were in many places unaware of the information provided by the European Flood Awareness System (EFAS) - particularly the flash flood forecasts (ERIC) and nowcasts (ERICHA) products - and unprepared to respond to such an event effectively despite robust climate risk and adaptation information being accessible.

It is uncontested that extreme weather events like forest fires, droughts, floods, heat waves and storms are becoming more frequent and more intense, and that due to climate change we are increasingly likely to experience unprecedented impacts without substantial climate adaptation actions<sup>1,2</sup>. This includes compound extremes<sup>3</sup> and cascades of events, which are generally not accounted for by current Disaster Risk Reduction (DRR). While contemporary management of risk from natural hazards tends to focus on individual events, particular geographic areas, and disturbances to specific sectors, it is increasingly evident that risk governance, DRR and DRM urgently need to also consider cascading hazards<sup>4</sup> and multi-risk cases. In addition, weak coordination between the scientific and technical communities, sector stakeholders, and policymakers combined with gaps in inter-organisational co-operation, addressing different phases of the DRM cycle and CCA separately, hinder comprehensive responses and sustainable climate and disaster resilient solutions.

Research aligned with the Sendai Framework for Disaster Risk Reduction<sup>5</sup>, the UN Sustainable Development Goals<sup>6</sup>, the European Green Deal<sup>7</sup>, and the EU Adaptation Strategy<sup>8</sup> have recently provided critical new insights, data, tools, frameworks, methods and even networks for advancing the state of CCA and DRM in Europe and globally. Most of these outcomes have been in terms of technical innovations, including climate and emergency management services, whereas innovations in terms of novel governance and integrated DRR strategies to promote multi-risk thinking and harvest the synergies between CCA and DRM, models for engaging relevant contributors and stakeholders at all levels, and within the social and behavioural sciences have been scarce.

With “DIRECTED” we aspire to foster disaster-resilient European societies through interoperable data, models, communication and governance by: (i) expanding our capabilities to communicate, utilize and exchange state-of-the-art data, information and knowledge between the different actors in the DRM cycle, (ii) boosting the integration, accessibility and interoperability of data, models and tools supporting CCA and DRM: from early

1 IPCC. 2021. ‘Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change’. IPCC AR 6. Cambridge University Press.

2 Kreienkamp, Frank, and et al. 2021. ‘Rapid Attribution of Heavy Rainfall Events Leading to the Severe Flooding in Western Europe during July 2021’. WWA.

3 Zscheischler, J. et al. 2018. ‘Future Climate Risk from Compound Events’. *Nature Climate Change* 8 (6): 469–77. <https://doi.org/10.1038/s41558-018-0156-3>.

4 AghaKouchak, A., et al.: How do natural hazards cascade to cause disasters?, 561, 458–460, <https://doi.org/10.1038/d41586-018-06783-6>, 2018.

5 UNISDR. 2015. ‘Sendai Framework for Disaster Risk Reduction 2015–2030’. United Nations International Strategy for Disaster Reduction. <https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030>.

6 Transforming Our World: The 2030 Agenda for Sustainable Development’. 2015. A/RES/70/1. Geneva: United Nations. <https://sustainabledevelopment.un.org>.

7 European Commission. 2019. ‘The European Green Deal, COM/2019/640

8 European Commission. 2021. ‘Forging a Climate-Resilient Europe - the New EU Strategy on Adaptation to Climate Change’. COM.



warning systems through communication and climate change risk assessment tools, (iii) facilitating knowledge sharing, improved dialogue and cooperation encompassing actors at all governance levels based on enhanced community engagement and development of new governance and risk management strategies using a bottom-up, value-driven co-development approach and multi-criteria decision making.

**Box 1: Mission statements**

*In accordance with the Scope of the call, our DIRECTED Mission is to*

**overcome silos** between technical and political authorities of all levels, including organisations, sectors and disciplines by improving dialogues and communication among DRR and CCA actors and by promoting the exchange and integration of information and knowledge

**leverage synergies**, combine efforts and reduce the fragmentation within DRR and CCA domains, including addressing multi-level governance and different spatial and temporal scales

**promote multi-risk thinking** by means of a novel transdisciplinary multi-risk governance framework related to climate extremes (RISK-TANDEM) aimed at assessing, evaluating, managing and communicating multi-hazard, multi-risk issues in close collaboration with engaged stakeholders, practitioners and concerned citizens

**build capacity and lasting real-world partnerships** and collaboration between involved actors that will last beyond the project

**exploit the power of open data and open science**, improving capabilities (e.g. using a *flexible Data Fabric architecture*) to make use of scattered information for more effective decisions, including knowledge and tools developed within past, present and future research and innovation initiatives.

**1.1 Objectives and ambition**

To achieve the above-mentioned vision and mission (Box 1), we propose a four-year project with the following **specific objectives** and *main outputs* (see also Section 2):

**(SO1) Create an overview of current knowledge, policies, tools, best practices and key actors, their interoperability, and how they influence decisions on DRR and CCA.** *We will analyse the current framing of the DRM cycle and CCA decision-making at relevant levels, including the current roles (and gaps) of state-of-the-art data, models and tools; different decision-making priorities; and the associated legal and ethical rules of operation (e.g. privacy and protection of personal data). We will also collate experiences and data from four “real-world laboratories” (RWLs) involving synergies, conflicts and trade-offs between DRM and CCA using, e.g. “forensic analysis” techniques; and use relevant SSH methods for revealing essential enablers and barriers to multi-risk governance frameworks and multi-risk thinking. [WP1,WP2, WP3].*

**(SO2) Advance the interoperability of data, models and tools.** *Based on the above-mentioned overview, we will outline new paradigms, towards robust and actionable decision-support for integrated risk reduction and improved adaptation to extreme climate events that (a) facilitate the integration of outputs within and across DRM and CCA workflows in a meaningful way to provide extended functionality for sound decision support; (b) promote the use of existing data sets, models and tools through enhanced interoperability, i.e. seamless exchange of information between models and consistent use of knowledge and data across all phases of the DRM cycle using open standards; (c) consider multi-hazards (e.g. forest fires, drought, floods, heatwaves and storms) AND their potential compoundedness. To demonstrate these new paradigms in real-life cases, a number of existing tools developed within EU and national projects will be enhanced for interoperability, including the SaferPlaces Digital Twin Solution for flood risk intelligence, the PIK seamless forecasting tool, the CLIMADA probabilistic risk assessment tool, the DCAM high-resolution damage cost assessment and adaptation model, and the Oasis-CAIMAN citizen app for disaster damage and loss recording and sharing [WP2].*

**(SO3) Co-develop a new multi-level integrated risk governance framework for the coherent integration between DRR and CCA policies and the Sustainable Development Goals (SDGs).** *Considering relevant actors at multi-levels, e.g. policy-makers, first and second responders, local communities and other key stakeholders, we will develop an innovative and integrative DRR and CCA risk-governance framework (RISK-TANDEM) for identifying tailored governance mechanisms by merging the International Risk Governance Council’s Risk Governance Framework with SEI’s TANDEM framework, the IIASA risk layering approach, and scope its alignment with other governance frameworks for DRR and CCA planning and decision-making processes. [WP3].*

**(SO4) Demonstrate the potential of transdisciplinary and multi-stakeholder co-production as a means to unpack enablers and barriers for developing transformative tools and improved risk management strategies.** *We will iteratively apply the TANDEM framework within RWLs (WP1), as means of identifying, distilling and unravelling new insights to support the co-creation of transformative tools (WP2), the data fabric (WP5) and risk*

*governance mechanisms (WP3). Enhanced community engagement in the RWLs will facilitate better knowledge sharing, improved dialogue, integration and cooperation that encompasses actors at all levels, and ultimately strengthens synergies and coherence among them. [WP4].*

**(SO5) Leverage innovative digital architectures using data-fabric and data-mesh techniques to support integrated multi-hazard DRR and CCA workflows.** *We will provision and demonstrate an innovative digital architecture, using data fabric and mesh techniques. This will provide the ability to join data from diverse sources, transform and aggregate datasets and model results, integrate processes and allow new data analytics insights. Customized workflows for multi-hazard, multi-risk DRR and CCA tasks support process transparency, reproducible results and increasing accountability of actors within a structured risk-governance framework. The resulting outcome will be the breaking down of technical barriers between stakeholders, and improved cooperation and exchange of data and information for operational, research and strategic purposes. Measurable results: (i) DATA-FABRIC configured to demonstrate the DIRECTED RWL use cases; (ii) A DATA-FABRIC architecture that is open and flexible allowing rapid expansion and evolution as required by diverse uses [WP5].*

**(SO6) Demonstrate the feasibility for integrated cross-sectoral and transdisciplinary coordination of the DRM cycle (from prevention, preparedness, to response, and recovery) in the framework of real-life case scenarios based on interoperable tools (SO2) and multi-level risk governance frameworks (SO3).** *Based on simulations, experiments and demonstration carried out in our four RWLs (involving first and second responders and multi-level actors: policy-makers, technical and scientific communities, citizens, the private sector [e.g. insurance] and other key local stakeholders) and using the quantitative and qualitative (SSH) innovations produced within DIRECTED, new governance strategies and robust decision-support methodologies for integrated risk reduction and improved adaptation to climate extreme events will be proposed and co-assessed. This will include the potential benefits of enhanced communication, utilization and exchange of state-of-the-art data, information and knowledge between the different actors in the DRM cycle, and of improved cost-benefit and cost-effectiveness analyses of investments in prevention and regulatory risk-reduction strategies for protecting people and nature in vulnerable areas. [WP1 with contributions from all WPs].*

**(SO7) Strengthen DRR and resilience-building in the RWLs (and beyond).** *Based on the results of (SO1) - (SO6), we will enable improved access to open, interoperable, and actionable solutions for integrated DRR and CCA, e.g. through dissemination of climate risk information; increasing capability to use state-of-the-art digital tools and geospatial information technology and facilitating training and access to state-of-the-art disaster risk modelling, relevant data and decision-support tools for the RWLs; providing guidance on methodologies and standards for DRM, climate risk assessment and governance; and capacity-building and training, e.g. among first and second responders from the RWLs in conjunction with ZARA special rescue team and others. For each RWL, we will pursue tailored pathways for establishing lasting partnerships, community engagement, dialogues and collaboration. Thus, we will optimize the project’s impact on DRR and CCA practices for efficiently reducing the vulnerability to extreme - and unprecedented - climate events. We will also look at the long-term scaling dynamics of tools and systems to ensure uptake and sustainability of the outputs [WP6, 1].*

1.1.1 Relation to the expected outcomes of HORIZON-CL3-2021-DRS-01

Expected outcomes	DIRECTED response
Improved dialogue and cooperation among scientific and technical communities, stakeholders, policy-makers and local communities [...]	<b>(SO3)</b> The RISK-TANDEM framework ( <b>WP3, WP4</b> ) will enable new and improved ways of facilitating transdisciplinary, science-based dialogues and risk governance in the field of extreme climate and associated events.
Enhanced community engagement for prevention, preparedness, response, recovery and learning to extreme climate events [...]	<b>(SO4)</b> RWLs ( <b>WP1</b> ) are designed to facilitate community engagement and build lasting collaboration and partnerships among DRR and CCA actors within, between and beyond the RWLs ( <b>WP4</b> ), exemplary for replication ( <b>WP6</b> ).
Strengthening of disaster risk reduction and resilience building through innovative use of media means [...]	<b>(SO2, SO5)</b> DIRECTED will deliver new and interoperable digital solutions ( <b>WP5</b> ) and tools ( <b>WP2</b> ) to enhance the capability to create actionable intelligence based on the innovative use of state-of-the-art data from scattered sources for DRR, exemplified through, e.g. the Oasis CAIMAN app.
Overview of existing knowledge, tools	<b>(SO1, SO2)</b> Generic platforms for knowledge and data sharing

<p>and development of new tools [...] for early warning, response and resilience / adaptation to be demonstrated in the framework of real-case scenarios designed for training addressed to first and second responders, [...]</p>	<p>(<b>WP5</b>) will be developed based on analyses of existing knowledge and tools; based on the lessons learned several existing state-of-the-art tools covering the full DRM cycle are further enhanced according to a novel set of interoperability principles (<b>WP2</b>); these will be demonstrated and serve as focal points for training and exploitation within the RWLs (<b>WP1, WP6</b>).</p>
<p>Based on the demonstrations, development of new governance strategies and robust decision-support methodologies for integrated risk reduction and improved adaptation to climate extreme events.</p>	<p>(<b>SO3, SO6</b>) DIRECTED is specifically designed to ‘direct’ and co-develop new governance strategies and robust decision-support methodologies for integrated DRR (<b>WP3, WP4</b>), their real-life adoption in the RWLs (<b>WP1</b>) and to facilitate their uptake and exploitation at broader levels (<b>WP6</b>).</p>
<p>Improved understanding of enablers and barriers to multi-risk governance frameworks and multi-risk thinking, by involving interdisciplinary teams in different fields, particularly the social and behavioural sciences.</p>	<p>(<b>SO4</b>) DIRECTED proposes a deep transdisciplinary approach, encompassing qualitative and quantitative methods in which SSH disciplines play a crucial role for understanding, e.g. the roles of enablers and barriers for multi-risk governance (<b>WP3</b>) and the involvement a wide range of science-society stakeholders and multiple knowledge types (<b>WP4</b>). For this aim, our highly interdisciplinary consortium comprises scientific experts from different fields, local and regional authorities, practitioners and key private sector actors.</p>
<p>Cost-benefit or cost-effectiveness analyses of investment and regulatory strategies to protect people and nature in vulnerable areas.</p>	<p>(<b>SO6</b>) Such analyses will be carried out in each of the RWLs (<b>WP1</b>) using enhanced versions of e.g. the CLIMADA and DCAM assessment models (<b>WP2</b>).</p>

### 1.1.2 Ambition

As indicated by our vision, mission statements (see Box 1), and the associated specific objectives (see Section 1.1) DIRECTED is a highly ambitious project, which aims to significantly contribute to making Europe a “Disaster-Resilient Society”. In addition to this Destination, the proposed innovations are designed to respond to the findings of the gap analyses outlined in the Sendai Framework (Priorities 1 and 2) and IFAFRI Common Capability Gap analysis reports (Gaps 4&9). This ensures that the collaborative work we undertake is highly relevant to the various user communities involved in DRR and/ or CCA. The need for integrated multi-risk and multi-level approaches to DRR and CCA and the associated policy and governance domains, e.g., to harvest synergies, resolve conflicts and reduce fragmentation, is well documented, e.g.<sup>9</sup>. DIRECTED aims to pave the way for new collaborative paradigms that goes beyond the current state-of-the-art. Whereas technical solutions have so far been favoured as means of protecting people and property from catastrophic weather events, unprecedented extreme climate events have recently demonstrated that such solutions may no longer be enough. On this background, DIRECTED will deliver a number of key innovations to advance state-of-the-art approaches to risk governance, and to facilitate improved DRM and CCA, utilizing new digital technologies and models through the introduction of a generic data fabric/ mesh approach that allows multiple sources of data and models to be visible, actionable and communicable to multiple actors in the DRR/ CCA workflow chains.

#### Rationale and key innovations:

1. Translating climate risk information and research into policy and action has been severely lacking<sup>10</sup> (Klein and Juhola, 2014). It is acknowledged that a linear, supply-driven flow of climate risk information has limitations<sup>11</sup>. This requires a move away from “experts” or “providers” producing information for decision-making “users”, who help to simply ‘tailor’ the end-product. The **TANDEM (WP4)** framework<sup>12</sup> and the

9 Street, R. B. et al. (2019) How could climate services support disaster risk reduction in the 21st century, International Journal of Disaster Risk Reduction, 34, 28–33, <https://doi.org/10.1016/j.ijdrr.2018.12.001>

10 Klein, R. J. T. and Juhola, S. (2014). A framework for Nordic actor-oriented climate adaptation research. Environmental Science & Policy, 40, 101–15. DOI: 10.1016/j.envsci.2014.01.011

11 Brasseur, G. P. and Gallardo, L. (2016). Climate services: Lessons learned and future prospects. Earth’s Future, 4(3), 79–89. DOI: 10.1002/2015EF000338

derived **RISK-TANDEM (WP3)** framework (which will be one of the new innovations of DIRECTED) will be applied, tested and refined in this project. Both represent a major shift away from a focus on ‘products’ to a transdisciplinary knowledge co-production ‘process’ in which co-design and collaborative learning is the defining characteristic, and both stakeholders and modellers alike build their capacity to understand the decision context and the potential of data and tools<sup>10</sup>.

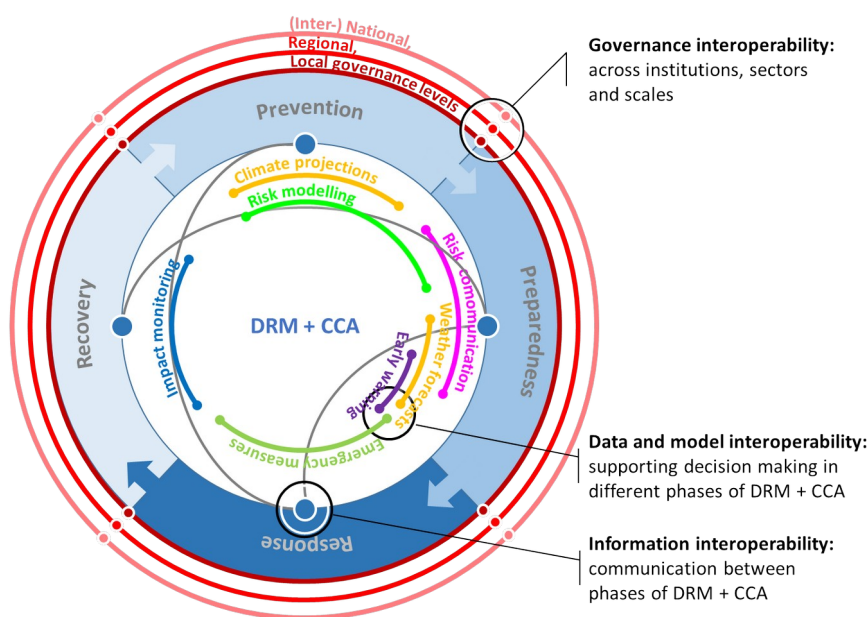
2. By forging interoperability standards aimed at scientific and IT communities, we will seek to trial and enable tools and data to be responsive to one another thus providing examples of how tools developed through the H2020, Horizon Europe and other programmes can become interoperable and thereby actionable tools to assist the DRR/ CCA communities in solving real-world challenges, DRM and DRR problems, as well as providing actionable results to encourage climate adaptation and to promote “multi-risk thinking”. **Table 1 provides an overview of the planned technical innovations** in this regard, including the expected development in Technology Readiness Levels (TRLs) over the course of the project.
3. The complexity of access to, management of, and appropriate communications on the basis of multiple sources on data, models, information and scientific results will be reduced through use of novel data science techniques, e.g., a data fabric and mesh techniques, and the creation of an innovative digital architecture to do this. See Section 1.2.4 (DATA-FABRIC).

DIRECTED will not stop at the improvement of tools, systems and techniques but will seek to use and integrate them into the real-world context in the RWLs. Through the labs co-production process we will be able to test, reflect and feedback experiences to continuously improve outputs by the final stages of DIRECTED.

## 1.2 Methodology

### 1.2.1 Concept

DIRECTED builds on a highly *interactive transdisciplinary knowledge co-production process* and an innovative *digital architecture for process integration and analytics* aimed at facilitating enhanced knowledge-based dialogues, communication, cooperation and “interoperability” on the three levels that are essential for integrating DRR and CCA related to extreme climate events in a multi-scale and multi-risk perspective: **1) Governance interoperability**, **2) Information interoperability**, and **3) Data and model interoperability** (Figure 1).



For this aim, experts and expertise from the Social Sciences and Humanities (SSH) provided from within the consortium will play a crucial role. *Governance interoperability* seeks to integrate relevant actors, responders and stakeholders across institutions, sectors and scales through suitable governance and enabling mechanisms, suggestions for adjusted legal frameworks and tailored responsibilities and financing arrangements. *Information interoperability* pursues a verifiably and timely information exchange between all phases of the DRM cycle through improved dialogues and

Figure 1. The DIRECTED concept.

communication between DRR and CCA communities across multiple levels, such as resolving issues in understanding early warnings and turning relevant information into effective and coordinated actions. In this regard, model-based information such as flood forecasts, disaster risk assessments, climate projections and cost-

12 Daniels, E., et al. (2020). Refocusing the climate services lens: Introducing a framework for co-designing “transdisciplinary knowledge integration processes” to build climate resilience. *Climate Services*, 19. 100181. DOI: 10.1016/j.cliser.2020.100181

benefit analyses play a critical role in decision-support in different phases of the integrated DRM-CCA cycle. *Data and model interoperability* addresses the need for combining data and models (e.g. multi-risk), including proprietary resources, from/at different domains, providers, resolutions, vintages, sources, formats (and more) into highly customized DRR and CCA workflows given the frequent absence of standards, and the lack of a common understanding and infrastructure. This includes but is not limited to differences with respect to purpose, spatio-temporal scales, resolutions and conflicting model assumptions. DIRECTED aims to pave the way for the generic use of existing state-of-the-art data and models combined by means of open standards for information and data exchange; and to demonstrate the feasibility thereof when available tools are made interoperable. Four RWLs form the core of our DIRECTED approach and frame the settings for co-creating solutions and demonstrating integrated DRM and CCA, including our new and enhanced tools and processes. Our four laboratories cover representative European geographies (Scandinavia, Central and Eastern Europe and the Mediterranean) and are characterized by a diversity of challenges from extreme climate events (including compound events), multi-risks, climate adaptation options, scales (from local to regional), and institutional and legal settings. This approach ensures that co-designing solutions to real-world challenges is central, and that stakeholder involvement occurs throughout the project. The DIRECTED consortium includes at least one expert representative for each of our RWLs as well as one or more key partners representing local authorities, first or second-responders or a relevant actor from the private sector (e.g. insurance). In general, the consortium comes with an excellent network to reach out to all relevant actors in the RWLs and beyond.

### 1.2.2 Methodology

DIRECTED is a 48 month project and will be implemented by five closely interrelated and interdisciplinary work packages (Figure 2) with additional work packages dedicated to “C&D&E and Impact” and “Management and coordination”. All innovation work packages (**WP1 - WP5**) combine expertise from various SSH disciplines with natural, engineering and data sciences, and information technology. As outlined, the Real World Labs (**WP1**) play pivotal role because it is here where innovations regarding data and model interoperability, governance, and knowledge co-creation as well as data-fabric technologies are co-developed and demonstrated in the context of real-world DRR and CCA problem settings. The RWLs also provide the context for science-driven and transdisciplinary dialogues to diagnose societal requirements and needs, dynamic knowledge co-production with stakeholders and practitioners from authorities, first and second responders, (re-)insurance and other representatives from the private sector and communities. Closely linked to **WP6**, the RWL will organize demonstration and training events to collect feedback on project developments and for capacity building among users. The DATA-FABRIC (**WP5**) is a cross-cutting work package, which provides technical capabilities to support the solution of DRR and CCA problems along specified workflows. Accordingly, the architecture will be designed around the RWLs within DIRECTED’s co-creation process. **WPs 2-4** are thematic work packages that address the above-mentioned levels of interoperability needed for integrated DRR and CCA: interoperability of data and models (**WP2**), multi-level multi-risk governance (**WP3**), and transdisciplinary knowledge co-production (**WP4**). The overarching **WP6** works on maximising the impacts of the project results and outcomes by aligned dissemination, communication and exploitation measures complemented by knowledge transfer and training activities. The management and coordination work package (**WP7**) oversees and directs the project’s processes and developments as a whole and takes care of efficient project implementation and quality control. The DIRECTED workflow and tasks are described in detail in Section 3.

#### **Box 2: Impact on Real World Labs**

The RWLs will be **focal points** for the expected impacts of DIRECTED (see Section 2), and for **monitoring** the effectiveness of the proposed multi-risk governance mechanisms (**WP3**). Devoted activities will serve to enhance **stakeholder and community engagement**, e.g. the transdisciplinary co-development process, which will be used in all our methods and tools development, and to stimulate **real-world partnerships and collaboration** that will last beyond the project. To establish clear linkages and synergies within as well as between WPs, a **co-production cycle** will be defined and periodically reviewed for each RWL, defining activities, allocation of persons, organization and participation in joint **events** (i.e. workshops, meetings, serious gaming, reviews and evaluation of the project produced models and tools). A conceptual approach to better understand the multi-risk governance frameworks related to climate extremes will be applied in all RWLs, aimed at **shifting perceptions** from single risk to **multi-risk** thinking over varying timelines and geographic resolutions across the DRM + DRR + CCA cycle. Synergies and trade-offs will be explored. These new insights will lead to improved strategic (integrated) decision-making at long and immediate time scales. Focus will be on **community engagement** for prevention, preparedness, response, recovery and learning from extreme climate events and on **overcoming silos** between technical & political authorities of all levels, e.g. organisations, sectors and disciplines.

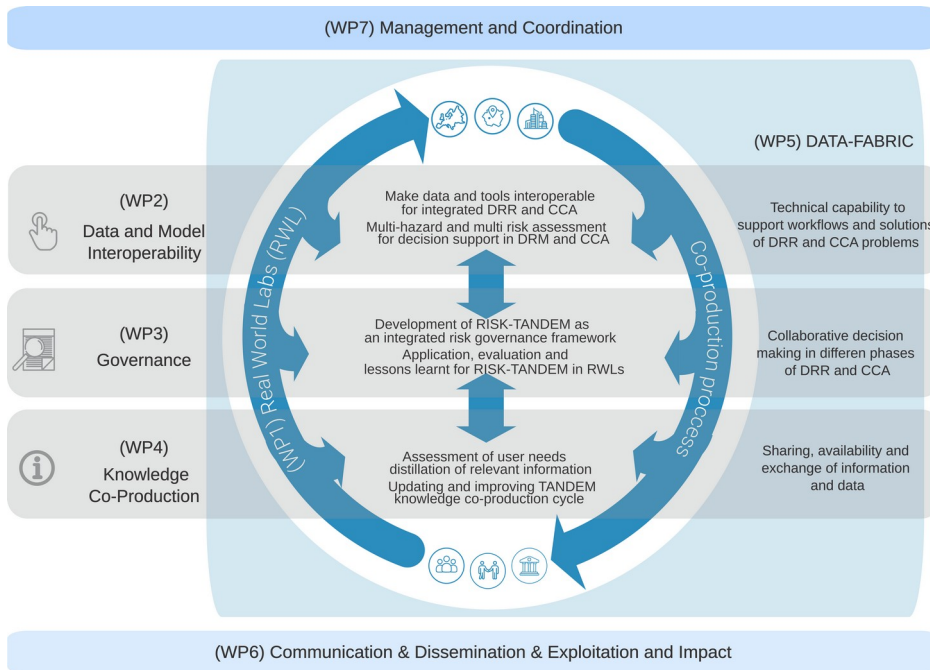


Figure 2. Overview of DIRECTED main building blocks and approach.

### 1.2.3 Real World Labs

The RWLs (**WP1**) create a collaborative environment for **learning and innovation**, and will promote **multi-level risk governance** among actors in the DRM + DRR + CCA cycle through demonstration and training. The four RWLs represent different European regions, climate change hotspots and multi-risks (Figure 3).

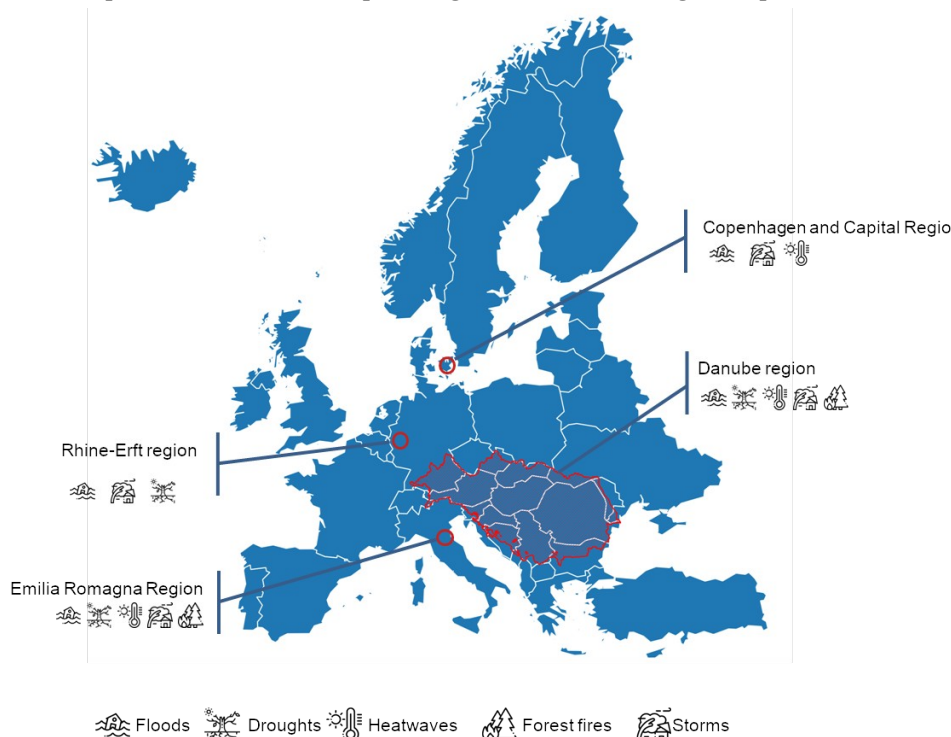


Figure 3: RWLs in European geographies and extreme climate event profiles

All the RWLs have been selected in the context of **real-life cases**, and particularly address the first and second responders such as (national, regional, local) authorities, citizens, volunteers, and business sectors. Each RWL is led by an accountable practice partner. Serving as “lab manager” and **WP1** Leader, consortium partners from GECO will ensure **coherence** among the RWLs within the inception, development and evaluation phases, and facilitate **connections** with other WPs, particularly with **WP3** and **WP4** (i.e. to frame the RWL inside the RISK-TANDEM Framework and manage stakeholder interaction), and **WP2** and **WP5** (i.e. feedback and demonstration of interoperable multi-risk models and tools).

### ***RWL-1: Copenhagen and the Capital Region***

**Challenges:** Copenhagen and the surrounding Capital Region of Denmark are estimated to hold some of the highest flood damage potential amongst countries bordering the Baltic Sea. Due to climate change, changed rainfall patterns combined with a heightened frequency and intensity of cloudbursts are increasingly leading to overflows from streams and sewer systems, impacting densely populated and rural areas in the region, e.g. as was the case of the 2011 cloudburst event that caused insured losses of €700M in Copenhagen. Recently drought has emerged as another critical factor to consider (e.g. 2018). The large and compound diversity of climate-related hazards combined with the exceptionally high concentration of people, valuable assets and critical infrastructure in Copenhagen and the Capital Region urgently necessitates effective and coordinated DRM and CCA. Currently, major challenges relate to governance and policy integration, and to coordination and collaboration across municipal boundaries as the enactment, funding and planning of, e.g. climate adaptation in Denmark is carried out at the municipal level, often in collaboration with privatised water utilities, within a broad national and legal framework. In some cases, this leaves climate adaptation planning in an institutional void. Also, emergency response services are principally anchored at the municipal level. As a result, overall risk governance, impact assessment models, data availability, emergency preparedness, adaptive capacity and even community involvement and risk acceptance levels often vary across administrative borders, hindering effective DRR of current and future pressures from climate extremes. **Expected outcomes:** This RWL will employ the RISK-TANDEM framework as means of co-innovating new real-life governance strategies and robust decision-support methodologies for integrated risk reduction and improved adaptation to climate extreme events at the regional and local levels. Specifically, the RWL will use the knowledge, participatory and technical innovations from DIRECTED to reconcile the key aspects of “interoperability” that currently serves as a barrier for effective DRR. The enhanced and interoperable model and data-transformation components developed in **WP2** and **WP5** will be demonstrated and co-evaluated at different scales and levels. New and improved practices, dialogues and collaboration between first and second responders, scientific and technical communities, local policy-makers, communities and other stakeholders will be pursued in order to build lasting partnerships and direct the rapid deployment of the new innovations.

### ***RWL-2: Emilia Romagna Region***

**Challenges:** The Civil Protection of the Emilia-Romagna Region (ARSTPC-ER) together with the ARPAE Hydrometeo Service Civil Protection Functional Centre are responsible for DRR related to climate risks. This includes early warning, DRM systems and CCA planning. The region is susceptible to a multitude of natural hazards including extreme rainfall events, marine incursions, coastal erosion and wildfires. The dominant erosive phenomena and the morphological structure of the territory make a large part of the coastline prone to marine incursion, which is exacerbated by the rising sea levels and increasing frequency and intensity of extremes. The risk of flooding is widespread and particularly high during compound events and extreme marine-weather events. It is aggravated by the inefficiency and/or inadequacy of urban drainage systems in some places. Likewise, the risk of wildfires is particularly high during summer as forests and densely populated residential areas are highly co-located along the coastline. To mitigate the diverse risks, effective warning systems are critically needed, based on short and medium-term (seasonal) forecasts with high spatial resolution. It has also been pointed out that there is a need for improving the coordination between the various first responders (public bodies, service managers, volunteers) in case of extreme events to support actions in the emergency phase, based on an effective and coordinated analysis of a large diversity of data from monitoring networks (wind, temperature and rain gauges, hydrometers, wave meters, tide gauges) and modelling tools for real time data integration and forecasting. Similarly, there is a need for pre-emptive damage assessment tools to support public administrations in choosing medium and long-term prevention measures, fostering adaptation to changing risks of floods and wildfires, particularly in view of climate change. A challenge for local governance of disaster risks is the limited ability to coordinate and support multiple stakeholders in both early warning and when planning climate change mitigation and adaptation. The lack of capacity building and cultural awareness among multiple stakeholders concerning climate change threats currently seems to be a critical barrier in implementing integrated DRR and CCA strategies. **Expected outcomes:** The RWL will address the above-mentioned challenges, increase knowledge and build capacity towards new and existing DRR and CCA tools and models for supporting both early warning and long-term CCA strategies. DIRECTED will also increase awareness of the importance of interoperability-deployed dataset, tools and workflows for a more effective implementation of integrated DRR and CCA strategies. Improved knowledge on the physical multi-hazards and multiple risks under different climate change scenarios will particularly support capacity-building in structural and non-structural measures for resilience.

### **RWL-3: Danube Region**

**Challenges:** In total, 19 countries and 81 million people share the Danube River Basin, which makes it the world's most international river basin.. Recent studies show that climate change has already impacted the frequency and severity of hydroclimatic extremes in the Danube basin, challenging existing protective measures for residential buildings, industry and infrastructure. For example, in the last three years, as well as severe local flooding in several countries, extreme droughts and heatwaves have led to reduce water levels in summer along with associated economic and ecological effects. In 2019 and 2020, the Delta Danube Nature Reserve in Romania accounted for almost half of the total burnt area within Natura 2000 sites in Europe.<sup>13</sup> A variety of private and public institutions pursue better technologies and data to support risk assessment of future events for long term adaptation and (financial) resilience building. As the Danube region is a transboundary river basin, DRR has to be actioned and coordinated at different administrative levels. However, as the Danube region is also characterised by a very large and fragmented official and community environment, the role of liaison is often bridged by dedicated professionals in the region, organised on a grassroots basis. As a result, basin-wide assessments and scientific results on climate change impacts and possibilities for DRR are generally rarely taken up or indeed included in current risk-management and emergency strategies. Finally, experience from emergencies over the last decade have shown that in addition to professional state forces, specially equipped and mentally-prepared volunteer and professional rescue groups were necessary to reach local communities. Extreme climate events point to the importance of psychological preparation for helpers, also. As a result, in many places even local rescue-teams receive theoretical and practical training to prepare for the impact of climate change-induced extremes. **Expected outcomes:** A multitude of data, models and tools for risk-management have been gathered and/or were developed in the past decade. In this RWL, we will focus on the multi-hazard-and-risk model-suite Future Danube Model (FDM)<sup>14</sup> and its regional uptake, e.g. as means of supporting innovative DRR strategies. The FDM will enable seamless predictions of extreme events such as floods, droughts, heatwaves, consistently across space-and-time scales for the Danube basin. A refinement of the FDM framework will be conducted in a cooperative process with the relevant actors. A wide range of sectors and their requirements will be approached and analysed, including stakeholders from the local communities, practitioners, civil protection organizations, regional authorities, and members of the private sector. Greater recognition and collaboration for DRR and CCA strategies and support for the further integration of the needs of the different local to regional stakeholder groups will be facilitated and numerical tools made interoperable. Such enhanced models will support the evaluation and improvement of existing national and local early warning systems in terms of accuracy of prediction, as well as the preparation of targeted risk communication and training activities. This will ensure greater transparency and accessibility of information on the impact of extreme events for all parties, so that more people and institutions are enabled to make data-driven and coordinated decisions for climate risk management. In the longer term, this is expected to contribute to active partnerships between public administration and private institutions, like the insurance industry, for DRR and CCA strategies. Furthermore, the integrated risk governance framework RISK-TANDEM will leverage synergies, strengthen community engagement, promote multi-risk thinking, and facilitate the transboundary management of natural hazards and risks.

### **RWL-4: Rhine-Erft Region**

**Challenges:** The Erft river catchment was among the most affected regions by the flood in July 2021. The hydrological responses to extreme rainfall (up to 200 mm within 24 hours) produced unprecedented flooding along the Erft river and its tributaries causing havoc, huge economic losses and loss of life. While the risk of intense flood events is especially high for the upper reaches, in the lowland part of the catchment the opposite extreme, i.e. drought risk is much more severe. Due to ongoing open pit mining activities and related groundwater pumping, the Erft river does not have contact to the groundwater in most parts of the lowland catchment and no baseflow can be maintained during meteorological droughts. Both hydrological extremes impose particular challenges to the communities living and working in, and managing, the Erft catchment. A major challenge is related to the question of how unprecedented floods like those in July 2021 need to be considered in flood frequency statistics, risk assessments and ultimately in flood risk management and governance. The definition of worst case scenarios will need to consider climate change projections to derive DRR strategies covering structural and non-structural measures. It is acknowledged that no structural measure would have been able to control the amount of runoff generated from precipitation in July 2021. Therefore, risk awareness and its communication needs significant improvements to enhance the management of flood events in the future. Learnings from past events must be accounted for in risk governance processes. Further, by the end of the 2020s the end of open pit mining will

13 San-Miguel-Ayanz, J., et al.: Forest Fires in Europe, Middle East and North Africa 2020, EUR 30862 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-42351-5, doi:10.2760/216446, JRC126766.

14 Hattermann, F. F., et al.: Simulation of flood hazard and risk in the Danube basin with the Future Danube Model, Climate Services, 12, 14–26, <https://doi.org/10.1016/j.cliser.2018.07.001>, 2018.



significantly change the runoff regime in the lower catchment area. Water pumped out of open pit mines currently contributes 70% of the Erft river discharge in more than one third of the catchment. In view of such structural changes, the assessment of future drought-risk is challenging and poses important requirements for integrated multi-risk governance. **Expected outcomes:** The RWL expects to enhance existing communication pathways for hydroclimatic extreme events as well as to co-develop an integrated risk-management strategy that is coordinated with relevant stakeholders from both DRR and CCA domains and citizens in the Erft catchment. From a scientific point of view, the aim is to investigate how climate-change impacts will affect the frequency and severity of future floods to obtain a robust estimation of design values for structural and non-structural measures. For this purpose, new data sources and products, e.g. seamless forecasts will be used by existing numeric flood and water resources management models. Existing hydrological models are based on the NASIM model software and can be used and further developed in the framework of the project. Moreover, we expect to get a better understanding of climate-change impacts on different planning scenarios of the Erft river. Finally, the Erft water board envisages to build capacity and become part of a lasting European RWL partnership.

#### 1.2.4 DIRECTED innovations beyond the state-of-the-art

##### **Data and model interoperability [WP2]**

**Rationale and state-of-the-art:** Considerable amounts of hazard/disaster-related data are currently available from a large diversity of sources, including the Copernicus program, but they are often dispersed geographically, recorded and stored in diverse formats, or owned by different entities making them difficult to access. The success of both DRM and CCA depends on the ability of multiple stakeholders to integrate, reuse and disseminate disaster-related data. Likewise, for disaster-risk governance, organisations require resources and capabilities of other stakeholder institutions on a regular, operational basis, thus making effective collaboration and inter-operation essential. In contrast, barriers in sharing and coordinating information before and after hazard events often evoke failures in prevention, preparedness and response to extreme hazard events<sup>15</sup>. For this reason, the Sendai Framework highlights the need for findable, accessible, interoperable and reusable (FAIR) data, and such data contribute to the SDG targets 11.5 and 13.1<sup>16</sup>. Several key policy instruments have therefore been implemented by the EC to promote the adoption of Application Programming Interfaces (APIs) for the publication of public-sector information and for public- service provision<sup>17</sup> with API offering modular, reusable, and easily scalable solutions (e.g. *the EU Directive 2019/1024 on open data and reuse of public sector information, the EU eGovernment Action Plan 2016–2020, the eGovernment Declaration 2017-2021*<sup>18</sup> and *the European Interoperability Framework (EIF)*<sup>19</sup>).

DIRECTED will develop a compendium of standards for the exchange of data and information among any combination of models, databases and analytical and visualization tools for the DRR and CCA domain. This will build on the guiding principles for FAIR data and associated metrics for evaluating compliance<sup>20</sup> and frameworks for assessing interoperability in the disaster domain<sup>21,22</sup> we will take stock of available interoperable standards and identify reusable interoperability patterns, i.e. **interoperability best practices**, which are applied to existing tools and data to enhance their functionalities and usability for DRR and CCA. To demonstrate interoperability patterns in real-life scenarios, several existing state-of-the-art tools developed within EU and national projects will be enhanced for interoperability and co-assessed in the RWLs (**WP1**). For different tools used in the individual phases

15 Bharosa, N.; Lee, J.; Janssen, M. Challenges and obstacles in sharing and coordinating information during multi-agency disaster response: Propositions from field exercises. *Inf. Syst. Front.* 2010, 12, 49–65.

16 UN Sustainable Development Goals. Available online: <https://www.un.org/sustainabledevelopment/> (accessed on 30 December 2020).

17 Vaccari, L. et al. *Application Programming Interfaces in Governments: Why, What and How*; EUR 30227 EN; Publications Office of the European Union: Luxembourg, 2020; ISBN 978-92-76-18982-4.

18 eGovernment Declaration. Available online: <https://ec.europa.eu/digital-single-market/en/news/ministerial-declaration-egovernment-tallinn-declaration>. (accessed on 22 January 2021).

19 European Interoperability Framework—EIF. Available online: [https://ec.europa.eu/isa2/eif\\_en](https://ec.europa.eu/isa2/eif_en) (accessed on 20 January 2021).

20 Wilkinson, M.D. et al. The FAIR Guiding Principles for scientific data management and stewardship. *Sci. Data* 2016, 3, 160018

21 da Silva Avanzi, D.; Foggiatto, A.; dos Santos, V.A.; Deschamps, F.; Loures, E.D. A framework for interoperability assessment in crisis management. *J. Ind. Inf. Integr.* 2017, 5, 26–38.

22 Leal, G.D.; Guédria, W.; Panetto, H. Interoperability assessment: A systematic literature review. *Comput. Ind.* 2019, 106, 111–132

of the DRM cycle, such as climate projections, risk assessment, weather forecasts, early warning, event monitoring (see Figure 1), which are developed and applied by distinct entities with diverse capabilities and targets, interoperability must be achieved in a flexible fashion. DIRECTED will demonstrate for selected models *how data and knowledge from other tools or additional (open) data sources, can be made interoperable* (see Table 1 below) and included into DRR and CCA workflows.

**Table 1: Enhanced tools for demonstration of interoperability in RWLs**

Tool or model	TRL	Innovations for interoperability	TRL
(a) SaferPLACES Digital Twin Solution for flood risk intelligence (GFZ, GECO)	7	[Web platform][Python code] Developing compliancy (API, REST) with RWLs input flood hazard/damage data (forecast and real-time). Output compliancy with DATA-FABRIC and (b), (d), (e).	8
(b) RIMurban pluvial flood risk modelling and forecasting (GFZ)	6	[Numerical model] Added functionality for using additional input data sources, e.g. (c), and for merging model outputs (inundation maps) with data from other sources (remote sensing, VGI), and combining them with vulnerability models.	8
(c) Seamless Forecasting Tool (PIK)	6	[Web platform] The existing and implemented Future Danube Model is extended with seamless forecasting capability in a co-design mode with regional end users.	8
(d) CLIMADA (ETH)	6	(probabilistic risk assessment and adaptation option appraisal tool) [Python code] Adding functionality for multi-criteria inputs and analyses.	8
(e) Damage Cost and Adaptation Model – DCAM (DTU)	6	[QGIS tool] Added input compliancy with hazard data from (a), (b), and (c). Output compliancy with DATA-FABRIC. Alignment with damage cost functions used in CLIMADA.	8
(f) Connectivity Hub (SEI)	NA	Development of an open-source taxonomy enabling external platforms to share qualitative data (e.g. lessons learned) seamlessly with the Hub (and other platforms/models potentially), to enhance 'search and discovery', and to maximise connections between the content.	NA
(g) Oasis-CAIMAN app (OASIS)*	6	Add flood hazard warnings (c), information on how to prepare for a disaster and links to, e.g. (a) and DATA-FABRIC to ensure the wider exploitation of results.	8-9

\* The Oasis-CAIMAN citizen app enables the management and collection of disaster related loss and damage information from householders. It enables householders to record and share information with relevant agencies in the DRR process e.g. local authorities, responders and insurers thus reducing time spent to record losses in difficult times and enabling citizens to control their data.

**Governance [WP3]**

**Rationale and state-of-the-art:** There is a growing need for coherence, alignment and integration across DRR and CCA enabling policy frameworks, driven globally by the Sendai Framework for DRR and the Paris Agreement, and at the EU level by the EU Civil Protection Mechanism, the EU Climate Adaptation Strategy, amongst many others. Cross-border, multi-stakeholder and cross-sectoral collaboration is crucial to disentangle the interdependencies and exploit the synergies across these policy frameworks, to influence the implementation of risk prevention and preparedness to response and recovery interventions, and stimulate continuous learning, innovation and research. In general, governance is increasingly shared by non-state actors. This also holds true

for policies regarding DRR and risk governance: beyond the traditional category of states, subnational and regional actors, transnational coalitions, partnerships and alliances are active in governance related to disaster risk. Disaster-related governance takes place in multi-faceted forms ranging from international environmental agreements and national legislature to activities without strict legal character, such as climate strategies, action plans, non-binding programs, and mechanisms. These multiple forms of governance horizontally and vertically link state and non-state actors in a complex multi-level governance configuration.

Multi-level institutional configurations, esp. when encompassing the European policy, cannot be represented by one theoretical model or approach alone. Our objective is to analyse governance of disaster risks at different levels (European Union, national, sub-national and local) in the RWLs. Risk governance merges aspects of risk analysis and governance<sup>23</sup>. Risk governance denotes the application of governance principles to the identification, assessment, management and communication of risk<sup>24</sup>. Therefore, risk governance is about the institutional structures and socio-political processes that guide collective activities when dealing with risk issues. It includes the totality of actors, rules, conventions, processes and mechanisms concerned with how relevant risk information is collected, analysed and communicated, and how management decisions are taken. Risk governance builds on analyses of institutional settings, regulatory regimes, actor networks, and social perceptions of risks. Inclusive risk governance assumes that all stakeholders can make important contributions to the process of risk governance and that mutual communication and exchange of ideas, assessments and evaluations improve the final decisions rather than impeding the decision-making process or compromising the quality of scientific input and the legitimacy of legal requirements<sup>25,26</sup>. Evidence-based risk analysis provides relevant scientific facts needed for risk characterisation and risk management. Inclusion of stakeholder and civil society is expected to provide a normative yardstick for evaluating characterisations and management options available<sup>27</sup>. Governance of disaster risks consists of many dimensions, e.g. the rule structure, the distribution of resources, value orientations and cultural settings, as well as attitudes and beliefs. Our approach brings together ideas central to the study of DRR, CCA, risk governance, and stakeholder/public engagement. **WP3** aims to integrate current state-of-the-art governance approaches for improved knowledge integration by means of co-creative approaches towards user and stakeholder engagement and increased accountability. This involves merging the International Risk Governance Council's Risk Governance Framework with the TANDEM framework developed by SEI, the risk-layering approach put forth by IIASA, and scoping alignment with other governance frameworks for DRR and CCA planning and decision-making processes, such as the SHIELD model from the EPRESSO project<sup>28</sup>.

#### **Knowledge co-production [WP4]**

Implementing knowledge co-production processes is challenging because: **(i)** it is resource intensive due to its iterative, reflexive, non-linear nature<sup>29</sup>; **(ii)** it is transdisciplinary at its core, which involves a wide range of stakeholders across the science-society interface, representing a diversity of disciplines, sectors, skills and knowledge types<sup>30</sup>; **(iii)** it can surface or compound inequalities<sup>31</sup>; and, thus, it ideally requires actors with a particular set of skills to carry out the process, including facilitators or knowledge brokers<sup>32</sup>. While the TANDEM

23 Schweizer, P.-J. (2021) Systemic risks – concepts and challenges for risk governance, *Journal of Risk Research*, 24(1), 78-93

24 Aven, T., & Renn, O. (2019). Some foundational issues related to risk governance and different types of risks. *Journal of Risk Research*, 1–14

25 Renn, O., & Schweizer, P.-J. (2009). Inclusive risk governance: concepts and application to environmental policy making. *Environmental Policy and Governance*, 19(3), 174–185.

26 Renn, O., & Schweizer, P.-J. (2020). Inclusive governance for energy policy making: conceptual foundations, applications, and lessons learned. In O. Renn, F. Ulmer, & A. Deckert (Eds.), *The Role of Public Participation in Energy Transitions* (pp. 39–79). Elsevier Academic Press.

27 Schweizer, P.-J., Renn, O. (2019). Governance of Systemic Risks for Disaster Prevention and Mitigation. *Disaster Prevention and Management: An International Journal*, 28(6).

28 Baills, Audrey, et al. "The ESPRESSO Action Database: Collecting and assessing measures for disaster risk reduction and climate change adaptation." *International Journal of Disaster Risk Reduction* 48 (2020): 101599.

29 Polk, M. (2015). Transdisciplinary co-production: Designing and testing a transdisciplinary research framework for societal problem solving. *Futures*, 65. 110–22. DOI: 10.1016/j.futures.2014.11.001

30 Norström, A. V., Cvitanovic, C., Löf, M. F., West, S., Wyborn, C., et al. (2020). Principles for knowledge co-production in sustainability research. *Nature Sustainability*, 3(3). 182–90. DOI: 10.1038/s41893-019-0448-2

31 Turnhout, E., Metz, T., Wyborn, C., Klenk, N. and Louder, E. (2020). The politics of co-production: participation, power, and transformation. *Current Opinion in Environmental Sustainability*, 42. 15–21. DOI: 10.1016/j.cosust.2019.11.009

32 Cvitanovic, C., McDonald, J. and Hobday, A. J. (2016). From science to action: Principles for undertaking

framework will be iteratively refined to incorporate governance aspects (**WP3**), the transdisciplinary knowledge co-production processes at its core will be applied to RWL in **WP4** to: **(i)** identify context-specific knowledge needs; **(ii)** enhance shared understandings of values, norms and perceptions of disaster risk; **(iii)** build confidence, awareness and capacity of information, data and models; and, **(iv)** strengthen institutional relationships and networks, to improve coordination, communication, feed into better information sharing and governance processes (**WP4**).

#### **DATA-FABRIC [WP5]**

DIRECTED will introduce a DATA-FABRIC Reference Architecture to address the large number of challenges typical of a “data fabric” framework: *(i)* very large data volumes; *(ii)* near real-time data delivery; *(iii)* large diversity of data-types and formats; *(iv)* diverse data ownership and permission constructs; *(v)* data security and protection; *(vi)* different data standards; *(vii)* multiple cloud providers and on-premise locations; *(viii)* flexible and agile data source and usage configuration; *(ix)* unified data catalogue for end-use discovery including lineage, active/passive metadata; *(x)* contextualisation and association of diverse data sources; and, *(xi)* automated and ML/AI-based data transformation and data pipeline workflows. The DATA-FABRIC will serve to address the different needs and associated challenges that comes with interoperability, e.g.: multiple organisations, across multiple national boundaries and working with diverse technology; and diverse organisations with differing operational requirements (research, local/ regional authorities, practitioners, commercial/ private sector) and perspectives across the full DRM cycle (social, economic, response, resilience building). In addition to existing “data fabrics”<sup>33 34</sup> as usually found in more homogeneous environments, our innovative approach will draw upon current and emerging “Data Mesh”<sup>35 36</sup> and “Data Virtualisation”<sup>37 38</sup> frameworks. Hence, it was recently recognised that the evolving data organisation and management architectures and components are not mutually exclusive, but instead complement each other, particularly in highly complex and demanding environments such as that envisaged for DIRECTED. The consortium partner 52N will apply its deep experience and knowledge of Data Engineering and Architecture to co-develop an architecture that addresses the manifold requirements for communication and interoperability in collaboration with stakeholders within and beyond DIRECTED. The DATA-FABRIC will support end-to-end DRR and CCA processes, providing context-relevant views across a wide variety of information consumers and actors. These shared views will encompass not only data used as input for modelling and other analytic decision-making processes, but also insights that emerge from those analytic processes. The proposed data fabric will include tools to provide meaning and context to different forms of data such as structured, unstructured, time-series, relational, wide column, graph and qualitative data. Data pipelines will be automated through workflows and integration orchestration. Orchestrated data pipelines can, for example, be configured to be triggered or conditionally altered at runtime, based on human input and/or the outcome of numeric modelling.

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environmental research that enables knowledge exchange and evidence-based decision-making. *Journal of Environmental Management*, 183. 864–74. DOI: 10.1016/j.jenvman.2016.09.038

33 Alice LaPlante. *'Data Fabric as Modern Data Architecture'*. O'Reilly Media, Inc. June 2021

34 Claudia Imhoff, Ph.D. *'Creating a Successful Data Fabric for Your Enterprise, Understanding the Data Fabric Processes and Technologies'*. Intelligent Solutions, Inc. May 2021

35 Piethein Strengholt. *'Data Mesh topologies - Design considerations for building a data mesh architecture'*. July 28 2021. <https://towardsdatascience.com/data-mesh-topologies-85f4cad14bf2>

36 Zhamak Dehghani, *'Data Mesh Principles and Logical Architecture'*. Thoughtworks December 2020. <https://martinfowler.com/articles/data-mesh-principles.html>

37 Ehtisham Zaidi, Mark Beyer, Ankush Jain, Sharat Menon. *'Market Guide for Data Virtualization'*. Gartner November 2018.

38 Rick F. van der Lans. *'Overcoming Cloud Data Silos with Data Virtualization'*. R20 Consultancy May 2020.

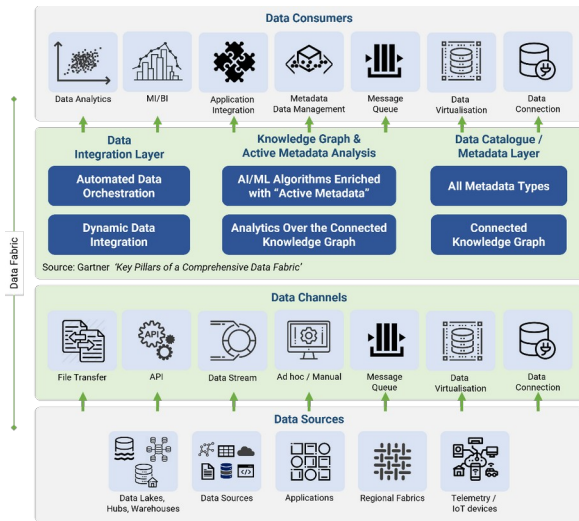


Figure 4: “Data Fabric” Architectural Framework for managing any data – any source, diverse use cases, intelligently identifying, tagging, governing & associating data in near real-time.

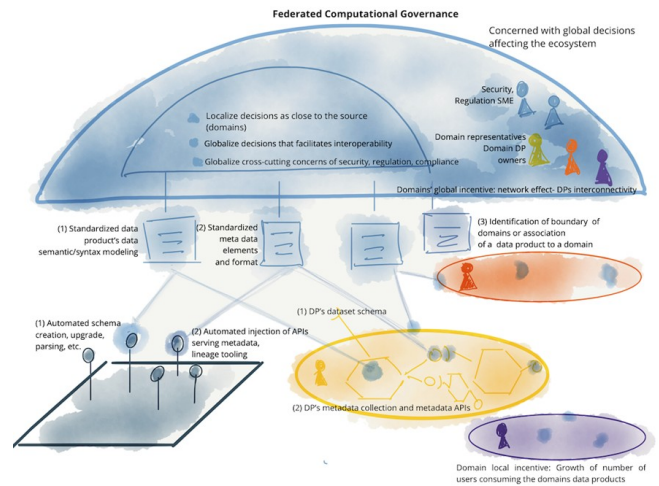


Figure 5: “Data Mesh” Architectural Framework for Data Governance and Interoperability<sup>39</sup>.

1.2.5 International research and innovations feeding into DIRECTED

DIRECTED is related to, will deploy and/or enhance a number of research outcomes and innovations derived from pivotal European research projects, leading initiatives and thought leading networks (Table 2). In most of these, one or more of the consortium partners were/are involved, placing our consortium in a unique position for building upon and adding value to cutting-edge research and innovations across different domains and to go beyond the state-of-the-art. These relationships will also support stakeholders in swiftly adopting the outcomes from DIRECTED and expanding the total outreach along our pathways to impact. Our consortium maintains strong ties to the Global Risk Assessment Framework (GRAF) expert group of the UNDRR, the International Federation of the Red Cross Red Crescent (IFRC), the European Emergency Response Coordination Centre (ERCC), and the Joint Research Centre (JRC) and related projects such as PESETA. Several organisations have expressed their support for and commitment to work within the DIRECTED RWLs by signed letters of endorsement: International Risk Governance Centre (IRGC), National Association of Radio Distress-Signalling and Infocommunications (RSOE), Oasis Loss Modelling Framework (OASISlmf), Federal Ministry of Agriculture, Regions and Tourism (Austria), University of Public Service, Faculties of Water Science and Law Enforcement, Institute for Disaster Management, Civil Protection Organisations of Ferrara, Riviera del Conca (Italy), as well as province and community authorities, namely Emilia-Romagna, Ferrara, Comacchio, and Parco del Delta del Po (Italy).

Table 2. Non-exhaustive list of related activities and networks, which are related to DIRECTED (\* denotes projects where a partner was/is involved)

Projects / networks	Contributions to DIRECTED
<b>*SaferPLACES</b> (EIT Climate KIC)	Innovative climate service for mapping flood risk and cost benefit analysis of adaptation options in. We will build on and further develop the Digital Twin cloud web platform for flood risk intelligence ( <a href="http://www.platform.saferplaces.co">www.platform.saferplaces.co</a> ).
<b>*OASIS HUB</b> (Formed with support from EIT Climate-KIC and H2020 Insurance)	Global Window to Free and Commercial Environmental and Risk Data, Tools and Services. All the data, tools and services, both public and commercial, are available to be linked to the DATA-FABRIC if needed. The Oasis Hub has a global community of 2500 members from a range of sectors and a large social media network who are users of climate change and risk information that will be used to communicate DIRECTED information and updates
<b>H2020 I-react</b>	Improving Resilience to Emergencies through Advanced Cyber Technologies. This project has provided cutting edge AI and big data based technology for emergency response and disaster management. The enhancement of impact forecasting and event monitoring apps, e.g. Oasis-CAIMAN will build on these developments and

39 Source: Zhamak Dehghani, *Data Mesh Principles and Logical Architecture*. (ThoughtWorks, December 2020)

<b>Projects / networks</b>	<b>Contributions to DIRECTED</b>
	innovations.
<b>H2020 beAWARE</b>	Decision support and management services for extreme weather climate events. Improving the management of extreme weather-related emergencies from forecasting and prevention to early warning and response coordination.
<b>H2020 ANYWHERE -</b>	EnhANCing emergencY management and response to extreme WeatHER and climate Events. The ANYWHERE Pan-European multi-hazard platform for improving the prediction and prevention of weather-induced impacts will be analysed during the stocktaking of interoperability, i.e. through the lens of interoperability standards and technical feasibility to integrate with other data, models and tools.
<b>*H2020 PLACARD</b>	Strengthening Climate Change Adaptation (CCA) and Disaster Risk Reduction (DRR) communities. The Connectivity Hub offers visualisation of climate change adaptation and DRR landscape, lessons learned
<b>*H2020 ETN SYSTEM-RISK.</b>	A large-scale systems approach to flood risk assessment and management. A systems approach to the assessment and management of hydrological extremes, expanding on methods and tools for risk modelling, assessment and multi-level integration of actors.
<b>*RECIPES</b>	REconciling sCience, Innovation and Precaution through the Engagement of Stakeholders. DIRECTED will build on the participatory development of guidelines and tools for precautionary decision-making and socially responsible innovations.
<b>RISKKAN</b> Knowledge Action Network on Emergent Risks and Extreme Events	The network provides an open platform for different scientific communities working on extreme events, disaster risk reduction and governance to exchange information, knowledge and data. We will cooperate with the network and disseminate our findings and developments to the community. Vice versa, we will take-up key insights from ongoing research and innovation activities.
<b>*International Risk Governance Centre</b>	The IRGC Risk Governance Framework serves as the conceptual point of departure for <b>WP3</b> .
<b>H2020 MYRIAD</b>	Multi-hazard and sYstemic framework for enhancing Risk-Informed mAnagement and Decision-making in the E.U. We will team up with MYRIAD for mutual exchange regarding multi-hazard, multi-sector, systemic risk management, integrating the envisaged web-based dashboard as a highly topical information resource and hub for relevant data and services. RWL synergies will be fathomed (e.g. Danube).
<b>*EPRREsSO</b> Enhancing Synergies for Disaster Prevention in the European Union	The SHIELD model illustrates interlinkages and interdependencies between management and governance in DRR and CCA, generating recommendations around knowledge sharing, harmonizing capacities, institutionalizing coordination, engaging stakeholders, leveraging political commitment and developing communication. The SHIELD model will be used to inform the development of an integrated governance framework in <b>WP3</b> (Task 3).
<b>H2020 DAREnet -</b> Danube River Region Resilience Exchange network	DAREnet is a network of national practitioner networks, dealing with flood resilience in the Danube River Region. These partners and the associated information are highly relevant for the RWL Danube.
<b>*H2020 Insurance -</b> Oasis Innovation Hub for Catastrophe and Climate Extremes Risk Assessment	With the insurance and public sectors as main end users, methods and standards for climate risk assessment were developed and published. DIRECTED will maintain contacts with global insurers and reinsurers through insurance partnership members - e.g. Oasis LMF, Swiss Re, Generali and others with whom we will discuss potential access to DIRECTED systems. We also build on the multi-hazard multi risk model developed for the Danube region (Future Danube Model) for modelling and assessing future climate risks and hazard forecasting within the RWL Danube region.
<b>*H2020 TransFormAr</b> <b>*H2020 ARSINOE</b>	Both Green Deal projects aims to develop and demonstrate pathways, products and services to launch and accelerate large-scale and disruptive adaptive processes for transformational adaptation in vulnerable regions and communities across Europe.

In addition, DIRECTED will actively pursue synergies with relevant projects to be funded under Horizon Europe Clusters 3 (Disaster Resilient Societies) and 5 (Climate, Energy and Mobility), including those funded under HORIZON-CL3-2021-DRS-01-01 and HORIZON-CL3-2021-DRS-01-03. In the case of the DATA-FABRIC

(**WP5**) we will review previous work, similar initiatives and interoperability tools used in order to leverage best practice and align our efforts with the current state-of-the-art. This includes for example, the Sendai Framework, FP7<sup>40</sup>, H2020<sup>41</sup>, priorities of the Green Deal and the IFAFRI<sup>42</sup> Capability Gaps. Alignment of value with other current initiatives will also be investigated such as the work of the GRII<sup>43</sup>.

#### 1.2.6 Integration of social sciences and humanities

DIRECTED blends conceptual and empirical contributions, underpinned by a comprehensive portfolio of knowledge-exchange strategies that ensures that our findings are shared widely with key stakeholders and can help to secure tangible improvements in risk governance related to DRR and CCA in the RWLs and beyond. Our team has existing strong links with and excellent access to senior policymakers, first responders, users and other stakeholders that will both facilitate the empirical research in the RWLs and enable us to communicate the results. Our research will adopt an interdisciplinary approach. We draw on and combine perspectives from the natural sciences and engineering as well as the social sciences and humanities. First, this interdisciplinary cooperation and integration of knowledge across scientific disciplines contributes towards a more comprehensive framework for generating significant new findings which will, in turn, advance science and practice for DRR and CCA, and contribute to policy. Second, the challenges of multi-risk, multi-hazard DRR and CCA cannot be addressed by technological solutions alone. Societal contexts matter for implementing effective and acceptable DRR and CCA. Therefore, DIRECTED bridges the gap between social science research on risk governance, knowledge integration, co-production and dissemination as well as the natural science research aiming for an integrated interoperable framework merging quantitative and qualitative indicators. Our expertise in social science disciplines such as sociology and political science contributes towards mapping societal structures and governance arrangements but also scoping and analysing societal needs (**WP 3, WP 4**). The integration of social science expertise safeguards the project's adaptability and responsiveness to societal requirements and enhances the societal impact of the research and innovations of the project.

#### 1.2.7 Gender dimension

The DIRECTED consortium is aware and committed to adhering to the European Gender Equality Strategy 2020-2025. It will aim to go beyond ensuring gender balance across the project structures (e.g. General Assembly / Steering Committee – **WP7**), maintaining inclusive participation at any stakeholder engagement events (Joint Workshops – **WP1, WP3**), co-designed processes (**WP2, WP4**), user guidance (**WP5**) and in planned communications, dissemination and exploitation activities (**WP6**). As such, it will aim to promote gender equality and inclusiveness throughout its research and innovation and across all seven work packages to ensure diversity. In addition, the consortium will highlight where gender considerations can add value to the research outputs and therefore ensure increased impact from DIRECTED. The consortium is committed to the key elements of Responsible Research and Innovation (RRI) including gender and will build on the experiences of completed European funded RRI projects (for example, the RRING project, co-ordinated by Partner 8). DIRECTED also recognises that climate change has a disproportionately higher impact on women and as such will strive to integrate gender dimensions in its work programme by adopting a mainstreaming approach.

We are aware of major differences in the vulnerability, impacts and experiences of disasters, in particular the impacts on women, the elderly and children due to cultural, caring duties, resource constraints and inequality. Also, in Europe 70% of those killed in disasters are men due to being more involved in rescue efforts. We will ensure in the RWLs that full consideration and linked improvements will try to reduce the vulnerability to disasters of these groups.

40 EC. 'Seventh Framework Programme 2007-2013'.

41 EC. 'Horizon 2020 Framework Programme'. <https://ec.europa.eu/programmes/horizon2020/en>

42 International Forum to Advance First Responder Innovation. 2020. 'Capability Gaps'.

<https://www.internationalresponderforum.org/capability-gaps-overview>

43 IDF. 'Global Resilience Index Initiative'. Launched at CoP26 Glasgow. [www.globalresilienceindex.org](http://www.globalresilienceindex.org)

### 1.2.8 Implementation of open science

DIRECTED is dedicated to Open Science, in line with the EU recommendations on Open Access, Open Source and Open Data. Additionally, **WP6** will reach out and make DIRECTED's science available to policy makers and EU, national, regional, and local stakeholders. As a central piece, all RWLs (**WP1**) will actively include civil society in the knowledge creation process of DIRECTED. Some of the data, computer code and otherwise gathered and produced information within DIRECTED will only be partially suitable for open science due to privacy rights, states actors' rules, or commercial interests. Consequently, as a first task in **WP7** an Intellectual Property Rights (IPR) agreement is agreed by all partners in order to minimize any limitations from financial, technical and legal obstacles towards the implementation of the project. Licensing agreements for the use of propriety models beyond the duration of the project are negotiated with the relevant partners.

**Open communication.** It is a core goal of this project to share knowledge and data as early as possible in the research and innovation process with all relevant actors to diffuse the latest knowledge. **WP6** will be tasked explicitly with fostering knowledge transfer; **WP4** ensures knowledge co-production between actors; in **WP1** knowledge is disseminated to and from end-actors directly in RWLs; **WP2** aims to make selected numerical models interoperable, i.e. able to share and incorporate information; **WP5** will provide the means, i.e. a data fabric, for efficient sharing of diverse data types and formats between multiple organisations, across national boundaries and working with diverse technology to produce diverse outcomes, for associated analytic and governance purposes.

**Open Access.** Open Access to peer reviewed scientific publications and project reports will be incorporated as a natural part of disseminating outcomes for the benefit of society. For all peer-reviewed scientific publications related to the results of DIRECTED project research, open access (free of charge online access for any user) will be ensured, primarily published in Open Access journals (Gold Open Access). For reports and articles in non-open access journals, preprints of articles will be made available through commonly used repositories (Green Open Access i.e., through CC-BY or equivalent licenses). The metadata of all publications will be openly available and machine readable in line with the FAIR (*findable, accessible, interoperable, reusable*) principles. Authors will ensure that published articles include all necessary information to validate their conclusions and reproduce the respective research data.

**Open Source.** Open sourcing tools and providing open access to knowledge increases the efficacy of science through an improved supply of information and increases innovation based on scientific knowledge by facilitating the transfer of knowledge to society, the economy, and politics. Thus, models, and configurations of governance-workflows and data-transformation workflows, developed during this project will be available open-source to guarantee sustained use after the end of the project.

**Open data.** TUBS will lead the data management and is responsible for the development of a Data Management Plan (DMP) (**WP7**). **All datasets produced by the DIRECTED consortium will be made available openly.** FAIR principles will apply for all datasets with exact rules defined in the DMP and the IPR agreement. Data of scientific publications will be made accessible openly through e.g. Digital Library Institutional Repository of TU Braunschweig, GFZ data services, EUDAT's B2SHARE, OASIS HUB, ZENODO or similar platforms that ensure FAIR principles, and through the data-fabric as part of **WP5**. Additionally, DIRECTED data will be findable through referencing with persistent identifiers, e.g., Digital Object Identifiers (DOIs), and rich, standardized metadata; interoperable through the use of data formats, metadata and conventions defined in **WP2** (Task 2).

### 1.2.9 Data management

The DMP will be based on the [EC's template](#) and describe the data management life cycle for the project data to be collected, processed or generated, and the measures to curate, store, protect and give access to them. Annual reviews of the DMP will reflect the project progress and developments (**WP7**).

## 2. Impact

### 2.1 Project's pathways towards impact

#### 2.1.1 Unique contribution

The DIRECTED Project more broadly seeks to improve the practical management and efficiency of managing disaster risk, disaster risk reduction and climate change adaptation. Reviews of common practice provide a range of institutional and practical issues that reduce the efficiency of current DRR and CCA systems. These include:

- Decision-making processes relevant to disaster risk management and CCA
- Institutional barriers to improved DRR and CCA management e.g. working over large areas with multiple municipalities and associated management structures
- Issues between national & local government roles
- Lack of formal links between the scientific community and local actors & the general public, as well as scientific knowledge transferred in an understandable way
- Separate organisations and departments dealing with DRR & CCA



- The need to counteract increasing impacts from extreme weather events driven by climate change and socio-economic development (needed adaptation efforts which must leverage synergies with DRM)
- The recent availability of multiple data and analytical tools (some developed as a result of EC funding) that could be used to assist risk assessment, planning and decision-making but are limited in scope (e.g. focus on one hazard), unable to provide more comprehensive risk assessment in a multi-risk context and spanning over a range of providers both in the public and private sector – a more interoperable and comprehensive systems approach to management of risk assessment and adaptation planning is required
- The ability to create actionable intelligence based on data and information from multiple sources
- The need to improve capabilities to prepare for and respond to unprecedented and compounding extreme weather events
- The need to break up silos: fragmented policy domains, sectors to enable interaction and exchange among actors
- The need for improved communication systems between agencies and stakeholders

Therefore, to tackle the above, the development of more appropriate governance frameworks that improve joint working, provide replicable workflow processes and enable management of complexity are needed to improve current working practices. Likewise, the interoperability and integration of multiple analytical tools needs to be developed to increase access and efficiency to multiple forms of hazard data and tools in risk assessment. Developing a data ecosystem that enables communication of relevant information to multiple partners and enables the access to multiple forms of data and results is critical to increasing a joined up and rapid approach to DRR/CCA management.

#### 2.1.2 Outcomes, indicators of scale and significance

**Outcome 1** *Improved dialogue and cooperation among scientific and technical communities, stakeholders, policy-makers and local communities in the field of extreme climate events and associated events (e.g. forest fires, droughts, floods, heatwaves and storms) and disaster risk reduction.*

**Output 1:** Using the RISK-TANDEMAssessment Technique we will increase the interactions, co-exploration, co-production with transdisciplinary stakeholders in the DRR/ CCA sectors (including first & second responders, planners, scientists, media, utilities, social services & NGO's) - through the creation of four real world labs – assisting the development of long-term working relationships; understanding roles, responsibilities, dependencies, barriers to improvements and efficiencies needed. **Indicator 1:** Real world lab case studies and summary reports used by DRR/CCA stakeholders for planning purposes

**Scale of contribution** – The RISK-TANDEM Assessment Technique will enable the building of consensus approaches towards disaster risk management, reduction and climate adaptation for the four regions of the real world labs: the Danube River Basin, covering the multiple municipalities – in city and countryside contexts, Copenhagen and Capital Region, Emilia Romagna region, Italy, and the Rhine-Erft Region, Germany

**Outcome 2** *Enhanced community engagement for prevention, preparedness, response, recovery and learning to extreme climate events by strengthening knowledge and involvement of volunteers linked to recognised organisations into the planning, design and implementation of prevention, including building with nature, preparedness and emergency response activities.*

**Output 2:** A Co-production methodology for disaster resilience will be developed and used by at least two municipalities increasing the connections and engagement of volunteers in the planning, design and implementation of prevention, including building with nature, preparedness and emergency response activities. **Indicator 2:** Co-produced planning reports

**Scale of contribution** – Disaster Resilience Planning Reports will be developed and included in local planning in Copenhagen and Capital Region, Emilia Romagna region, Italy and the Rhine-Erft Region, Germany

**Outcome 3** *Strengthening of disaster risk reduction and resilience building through innovative use of media means, namely by examining the potential of new communication tools and apps for better preparedness and response.*

**Output 3a:** A data fabric/ mesh/ ecosystem – and linked tools, developed into workflows, that enable the rapid delivery of relevant information, data, maps etc. to relevant stakeholders e.g. maps of potential areas at risk using forecast information for risk assessment to early responders or communications for mass media delivered with warning visualisations or integration of data sources for climate change adaptation

etc. **Indicator 3a:** workflows will be utilised by real world lab participant stakeholders to improve current processes

**Output 3b:** Visualisations – Simple communications in the form of visualisations of threat level, action required and how to get communications on hazard events will be developed for the general public consumption – enabling faster actions of citizens to prepare for climate events – for 3 municipalities.

**Indicator 3b:** Visualisations disseminated to general public online, social media &/or via printed mailings

**Scale of contribution** – The data fabric/ mesh/ ecosystem will provide a prototype system and tools enabling replicable workflows of work including multiple stakeholder organisations, all types of quantitative and qualitative: including data, maps, visualisations and text formats for communications to diverse stakeholders. The system is intended to radically reform and improve the management and communications for disaster management, risk assessment and adaptation planning enabling actionable decisions using complex and multiple data sources. We intend for this tools to be replicated across Europe and beyond.

**Outcome 4** *Overview of existing knowledge, tools and development of new tools (innovative data collection, satellite data, data harmonisation, artificial-intelligence tools, algorithms, sensors and decision-aid approaches) for early warning, response and resilience / adaptation to be demonstrated in the framework of real-case scenarios designed for training addressed to first and second responders, (national, regional, local) authorities and populations. The overview should document how legal and ethical rules of operation as well as fundamental rights such as privacy and protection of personal data are taken into account.*

**Output 4:** Forecasting and risk assessment, and adaptation tools made interoperable to increase functionality and multi-risk outputs necessary for seamless early warning, risk assessment and risk reduction strategy decision-making. The tool collaboration will have the capability to be used for training and implementation of disaster risk management. **Indicator 4:** Use of interoperable systems by DRR and CCA authorities to assist training, planning and decision making

**Scale of contribution** – From within the Project a range of existing tools in flood risk assessment, adaptation planning, forecasting, citizen App will be enabled to become interoperable – thus improving multi-hazard risk assessment capabilities and functions – on top of this the work on interoperability is set to develop a standard so that multiple tools and data from beyond the project can also become interoperable in the future and in doing so improve access to and functionality of single use tools into a multi-hazard ecosystem for decision support for multiple stakeholders across sectors and European regions and beyond.

**Outcome 5** *Based on the demonstrations, development of new governance strategies and robust decision-support methodologies for integrated risk reduction and improved adaptation to climate extreme events.*

**Output 5:** Data fabric/ mesh that enables the sharing, management and communication to relevant stakeholders in useable formats of complex information, data, maps and risk assessment – managed through one multi-partner system. **Indicator 5:** – Governance workflows agreed by stakeholders and implemented into management system/ data fabric

**Scale of contribution** – Governance workflows on a range of case studies will be implemented in the Danube River Basin, covering the multiple municipalities – in city and countryside contexts, Emilia Romagna region, Italy, Copenhagen and Capital Region, and the Rhine-Erft Region, Germany

**Outcome 6** *Improved understanding of enablers and barriers to multi-risk governance frameworks and multi-risk thinking, by involving interdisciplinary teams in different fields, particularly the social and behavioural sciences.*

**Output 6:** Policy brief on risk governance in the context of DRR and CCA highlighting barriers and potential solutions to improve multi-risk governance. **Indicator 6:** Uptake of recommendations from policy brief by at least one DRR/CCA agency

**Scale of contribution** – The EC and national policy-makers in Germany, Hungary and Italy will have access to findings and results of the DIRECTED Project. We envisage this will assist future governance of disasters and climate adaptation planning.

**Outcome 7** *Cost-benefit or cost-effectiveness analyses of investment and regulatory strategies to protect people and nature in vulnerable areas.*

**Output 7:** Cost-benefit analysis of climate adaptation/ disaster reduction measures made for at least 2 municipalities during the project. **Indicator 7:** Cost-benefit analysis of climate adaptation/ disaster reduction measures for at least 2 municipality used in future planning document or applications for adaptation funding for climate adaptation/ disaster risk reduction

**Scale of contribution** – Two municipalities will have conducted cost/ benefit analysis of potential climate adaptation actions enabling a strong needs analysis of multiple climate adaptation solutions that increases the potential for investment

### 2.1.3 Target groups

DRR and CCA communities involve multiple stakeholder groups, all requiring information for different purposes and at different levels of communication. Likewise, the work undertaken involves different time dimensional needs e.g. disaster information during a disaster and the need for risk reduction and climate adaptation planning. We seek to reduce complexity and increase efficiency to access the relevant information and data needs through understanding and creating appropriate workflows where we will seek to link appropriate climate science outputs and information to make operational decisions at the appropriate time, e.g. risk reduction and adaptation planning or for training and preparation or operational response. We have carefully selected representational organisations of our target groups to be directly involved as co-production, co-design partners in the Project. Our target groups include: 1) first and second responders, 2) Regional and municipal civil authorities - including disaster management, planning authorities and cross regional municipalities, 3) Physical and social scientific organisations - those who work in climate change, natural disaster sciences and damage and loss, governance and innovation, and 4) The general public - will be represented by municipalities

The Real World Labs will invite other local stakeholders including utility companies, NGO's, health and social care organisations to become part of the consultations. We perceive that the four RWL's in the Danube catchment basin, Germany, Italy and Scandinavia will be representative of stakeholders from across Europe to ensure the potential for scalability of governance structures, the use of interoperable tools and management via data fabric/ mech digital architectures.

### 2.1.4 Outcomes and impacts of the DIRECTED project

**Scientific:** the DIRECTED Project will assist the scientific community in stocktaking of standards for the interoperability of data and models, identifying gaps and requirements to exchange information between different phases of DRM/ CCA cycle and across hazards and integrating quantitative and qualitative indicators. This will assist the scientific community with providing an interoperability framework that enables future tool development that can become part of a wider network for decision making data, tools and systems increasing the potential to provide actionable intelligence based on data and information from multiple sources by the DRR and CCA community.

Through the production of workflow processes within the Project – the provision at what stages, to whom and in what format scientific information is included and communicated will be an impact of the Project providing collaboration between sectors that do not traditionally have access to science and scientists directly, likely to become a policy recommendation moving forward, thus increasing access to actionable science by all levels of government and society.

**Economic:** the DIRECTED Project outputs will contribute a range of economic impacts in the future:

- The breakdown of silos e.g. between cross boundary municipalities, between multiple stakeholder groups in the DRR/CCA process will increase the economic efficiency of work and linked funding by creating more seamless workflows, preventing duplication of spend on the same actions with the potential to more carefully budget and target spend across actors and locations.
- Work that has enabled the interoperability of multiple forms of data and tools into producing multi-risk, risk assessment and climate change adaptation solutions plus linked cost benefit analysis will increase the potential to implement adaptation actions, targeted at locations most at risk, thus reducing the overall spend required to enable increased resilience by society.
- Losses from climate disasters are reduced through enhanced disaster risk reduction based on preventive actions, better societal preparedness and resilience and improved disaster risk management in a systemic way – with the

potential to reduce losses significantly over time in the regions of billions of Euros

**Societal:** The DIRECTED Project outputs will also contribute to societal impacts in the future:

- Losses from climate disasters are reduced through enhanced disaster risk reduction based on preventive actions, better societal preparedness and resilience and improved disaster risk management in a systemic way.
- Enabling scientific outputs to more rapidly be utilised by DRR/CCA actors and also directly communicated to the general public – helping to inform potential for damage and then actions required across society including at household & business levels to reduce the impact of climate-related catastrophes.
- Supporting first, second and third responders with forecast and risk assessment information they need to utilise emergency services more effectively – understanding the likelihood of the most impacted zones after a disaster and conditions associated with that emergency e.g. flood levels, types of properties and multiple other data sources as brought together by interoperable tools and the data fabric/ mesh
- Supporting first, second and third responders with training materials enabling more efficient responses to climate emergencies

2.1.5 Requirements and potential barriers arising from factors beyond the scope and duration of the project

Barriers beyond the scope of the Project include:

Barrier	Mitigation
Willingness of neighbouring municipalities some with differing political allegiances to collaborate together on improving DRR/CCA actions – this is both an immediate risk, as well as a longer terms risk as political administrations change over time	Longer term EC DRR/ CCA strategies EU Adaptation Strategy/ EU Green Deal – encouraging longer term cross party strategic approaches
Willingness to consider better budget allocation between agencies and national and local government	Greater cross silo working
Budgets provided to encourage climate adaptation and disaster reduction	National investment in increased climate adaptation and disaster risk reduction

The DIRECTED Project will improve disaster risk management and CCA process, data and analytical tool output management across the range of actors in the DRR and CCA workflows - increasing our understanding of context-specific disaster risk management and CCA decision-making processes, making the processes replicable, improving data outputs, and improving communication to relevant stakeholders whilst increasing the accountability of stakeholders in these processes.

Results that will need communication and dissemination will take the form of:

- Agreed case studies resulting from discussions in the real world labs, but protecting any confidential information gained from these discussions
- New work on making data, tools and services in the form of forecast, risk assessment, risk management and climate adaptation more interoperable and appropriate to wider DRR and CCA management planning systems
- New decision-making and management processes for governance connected to DRR and CCA
- Information on the types of analytical tools being improved in the project
- How both established and emerging data architectural frameworks such as data fabrics and a data mesh can be used effectively to increase data visibility, workflow effectiveness and efficiency - as well as ensure communications of relevant data to relevant partners in the DRR/ CCA process and increase accountability of stakeholders
- Training programmes and webinars

The communication and dissemination aspects of the Project will require important consideration due to the seriousness and nature of the content, ensuring communication accurately reflects the science and its implications. Therefore, DIRECTED will create a communications hub that will target a large range of stakeholders through the following three vehicles.

**2.2 DIRECTED Research and Innovation Communications Hub**

Oasis Hub will lead on the formal communications of the Project in conjunction with all partners in the DIRECTED Project. Formal and social media communications will be centralised through the Oasis Hub with dissemination of news, articles, blogs, social media messaging through Oasis Hub networks and the partner organisations in the Project. Oasis Hub has experienced science communication and innovation professionals thus DIRECTED will communicate professional level materials aimed at non-specialist audiences through a diary of planned releases related to the different stages of the project. Releases will be translated into a range of European languages linked to relevant target audiences. The phases are broadly outlined below, however if out of sequence communications opportunities are identified these will be pursued:

## Stages of DIRECTED communications

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
<p>Communications strategy developed</p> <p>Project launch communications</p> <p>Start of Project Blog – quarterly blog posts to continue to end of the Project</p> <p>Bi-weekly social media posts began and continued to the end of the Project e.g. stories, plans etc.</p> <p>Website development</p>	<p>Communications on Project events, workshops, processes, techniques and the physical and social scientists/ themselves - building a picture of the people, stakeholder involvement and outcomes during this phase</p> <p>Continued social media dissemination</p>	<p>Communications on early scientific &amp; governance and process findings from market research and stakeholder needs assessment and workshops – in particular from real world labs</p> <p>Beginning of conference dissemination</p> <p>Continued social media dissemination</p> <p>Case study creation</p>	<p>Research publications and related news and articles</p> <p>Training material and programme on use of tools and systems</p> <p>Webinar series with physical and social scientists</p> <p>Continued social media dissemination</p> <p>Media pack creation &amp; dissemination (press releases for international media)</p>	<p>Policy-maker meetings, policy briefs.</p> <p>Conference dissemination of results</p> <p>Continued social media dissemination</p>

### General communication techniques

**A project specific website** will be created to ensure increased visibility of the Project website

**Social media networks and targeting** – Oasis Hub will use its social media communities on twitter, LinkedIn, YouTube (where video is available) to communicate messaging. Existing audiences on Oasis Hub twitter (mixed community of specialists in: insurance/ reinsurance, scientists, economists, climate change specialists (including policy), risk management & reduction, disaster risk reduction, remote sensing, flood risk, climate adaptation, sustainable development, natural hazards, climate risk, climate change adaptation, big data in both public and private sectors) and LinkedIn (mainly insurance, reinsurance and finance specialists), partner, other beneficiary communications teams will be requested to retweet to their audiences (mainly academia and municipalities) – we will also seek support from EC communication hubs such as Climate Adapt, weADAPT and through other departments and platforms of the EC.

**New audiences** will be targeted through linking to particular influencers in relevant sectors – new target sectors will include risk managers in municipalities, local authorities and services, policy-makers, DRR professionals and local planning departments and specific targets as they become clear after the ideation/ market research/ user needs engagement in the Project.

**Blogs** will be used as a medium to fully engage audiences in a more detailed fashion. Blogs will be posted at a minimum on a quarterly basis, at the beginning of the Project but will increase as activity and outputs increase in the Project

**Webinar series** will be designed for specific sectors phase 4 of the project communications with the physical and social scientists, and local governance actors engaged in the project, presenting and talking to specifically targeted sectors and then further engagement by Oasis Hub of attendees in encouraging the use of outputs by those stakeholders engaged in the webinars. Oasis Hub webinars attract in the region of 200 people per webinar. The recordings of the webinars will be shared on YouTube.

**Conference attendance** – partners will attend and develop sessions for academic, public sector and business conferences to promote the new methodologies, data, tools/ tool-kits/ training packs and reports etc. These conferences will include EGU, COP, ICLEI, Disaster Risk, ECCA, DRR and CCA conferences – to target specific audiences where relevant. Where possible stands will be located at larger conferences promoting the full outputs of the Project.

**Visualisations for the general public** will be designed for effective communications of stages of risk decision for public information to enable a simple understanding on the processes of risk e.g. prepare, evacuate, where to find official communication, level of flood that sparks decision stages – these will be designed in local languages and for the local context for the RWL's

**Media Packs** – will be designed for digital distribution to specialist on-line media portals e.g. insurance magazines, FinExtra finance and tech, EU Adapt and other EU comms platforms, and medias targeted at Cities and public

authorities and the international media. These packs will contain case studies and press releases related to specific outputs of the DIRECTED Project. A major media campaign will occur in the 4th phase of the communications plan when results are ready to be published.

**Academic journals** – academic partners will target online high impact journals with academic research and new methodologies produced by the Project

**Policy briefs** – will be created using the results of the DIRECTED Project to make recommendations towards EU disaster risk, economic and climate adaptation policies. A briefing of the results of the Project will be conducted in phase 5 of the Project to relevant EU DG's – we will also seek an understanding whether relevant DG's would seek to be kept up-to-date in the progress of the project e.g. how & when.

### **Exploitation/ Innovation will take place in three phases.**

#### **Phase 1 – User needs analysis**

The project will explore the underlying needs of five key sectors for access to the forecast, risk assessment and climate adaptation information and use of a synthesising data fabric/ mesh - communication needs:

- Community/ Municipality Risk and General EU public (Cities & municipalities & local communities & umbrella NGOs) (developed by RegionH, ARPC-ER, ARP AE)
- First, second and third responders (developed by ZSRT, ARPC-ER)
- Media (Oasis Hub)
- Risk Transfer (Insurance/ Reinsurance) - (developed by Genillard & Co)
- Policy-makers/ Government – (Genillard & Co)

Stakeholder needs assessment will be conducted through B2B, Online surveys and local/ online workshops/ the Real World Labs and will include:

- Identify changing patterns and needs of sectoral work caused by the needs increased climate extremes and the need to combine risk management, reduction and adaptation
- Access to information – identifying issues and gaps in access to data and information
- Multi-risk data, analytical tools and information needed by the sectors to address needs (actionable intelligence)
- Necessary connections to improve DRR/ CCA management
- Workflow analysis and development

Phase 1 will be completed by month 24 of the Project to be fed back into the Work Packages for consideration and tool & data ecosystem and adjustments

#### **Phase 2 Business model planning**

Market sizing has been produced by IFAFRI Gap 9 report which states *“The Global Big Data Analytics Market was estimated to be worth more than \$8.5 billion USD in 2017 and is projected to grow at a Compound Annual Growth Rate (CAGR) of 29.8% through 2023. This equates to a market value of more than \$40 billion USD in 2023.”* In terms of the Market we will need to reflect on the longer term sustainability and scaling of the tools and systems and how to gain increased uptake. The current market spans a myriad of data, tools and services providers, from multi-national IT systems providers, to SME's around single hazard or task tools and many new innovations e.g. those developed from the EC H2020 that have not reached maturity so could be risky to invest in fully until they are proven in the market. The DRR/CCA context spans over both the public and private sector so understanding from potential funders e.g. EC, central or local government or through commercial sector scaling, needs to be examined. For example, the government sector may or may not wish to fund such work internally or may seek to tender such systems management to the commercial sector. This project will explore the system sustainability dynamics through the development of a business development plan by consulting with relevant budgeting authorities in the EC and Government sectors and by seeking guidance from the project External Advisory board made up of experts in the field of DRR/ CCA.

A business development plan will be developed to cover new data, interoperable analytical tools and the exploitation of the data fabric/ mesh. The potential of the tools and systems will be examined in both the public sector and the private sector, e.g. discussion around the best way to scale the use of tools further developed and made interoperable in the project.

The plans will include:

- Business model canvas for the identification of the market ecosystem (this may be in the public or private sectors)

- Competition analysis
- Identify any patent/ protection needs of products
- Identify audiences/ end user markets
- Pricing potential for identified audiences
- Delivery mechanism (e.g. SaaS, external platform, licenses, subscription etc.)
- Continuity of tools (remain in-house, development or exploitation by external partners)
- Go-to-market planning (if appropriate)

It is important to note that some analytical tools in the project will remain fully open source, whilst others particularly those with foreground IP developed in the commercial sector will need to consider both open source and commercial business potential. Data, tools and information will be placed on the Oasis Hub, Placard, weADAPT, Climate-Adapt and where appropriate Copernicus CDS or other identified venues for dissemination/ exploitation at any time during the Project, thus enabling the data to be exploited as quickly as possible.

### **Phase 3 - DIRECTED eLearning Portal**

Development of programmes that marry governance frameworks (**WP3**) that can be supported by innovative technical frameworks (**WP5**) to access, transform and integrate data and models into customized workflows for creating actionable solutions. Programmes would target vocational long-life training to support the Real World Labs, student support materials and provide support and help build risk and adaptation solutions, especially those identified by Real World Labs. In order to perpetuate learning programmes, a co-designed and co-developed “Training of Trainers” programme will be developed through a dedicated Workshop with trainers, and curriculum developed in response to needs, so that capability beyond the DIRECTED project is ensured. Workshops delivered both in-person and online will be highly participatory and practical, focusing on techniques, tools and tips of training management, with participants themselves designing, delivering and critiquing methods. A suitable e-learning portal will be identified during the project to deposit and make available all training materials produced; this will increase the ability to deliver 21st century learning and training opportunities.

## 2.3 Summary

SPECIFIC NEEDS	D & E & C MEASURES	EXPECTED RESULTS
<p>Decision-making processes relevant to disaster risk management and CCA</p> <p>Institutional barriers to improved DRR and CCA management e.g. working over large areas with multiple municipalities and associated management structures</p> <p>Issues between national &amp; local government roles</p> <p>Lack of formal links between the scientific community and local actors &amp; the general public, as well as scientific knowledge transferred in an understandable way</p> <p>Separate organisations and departments dealing with DRR &amp; CCA</p> <p>The need to counteract increasing impacts from extreme weather events driven by climate change and socio-economic development</p> <p>The recent availability of multiple data and analytical tools, that could be used to assist risk assessment, planning and decision-making but are limited in scope (e.g. focus on one hazard), unable to provide more comprehensive risk assessment in a multi-risk context and spanning over a range of providers both in the public and private sector</p> <p>The ability to create actionable intelligence based on data and information from multiple sources</p> <p>The need to improve capabilities to prepare for and respond to unprecedented and compounding extreme weather events</p> <p>The need to break up silos: fragmented policy domains, sectors to enable interaction and exchange among actors</p>	<p>Project specific website</p> <p>Social media networks and targeting</p> <p>New audiences will be targeted through linking to particular influencers in relevant sectors</p> <p>Blogs</p> <p>Webinar series</p> <p>Conference attendance</p> <p>Visualisations</p> <p>Media Packs</p> <p>Academic journals</p> <p>Policy briefs</p> <p>User needs analysis</p> <p>Business Plan Development</p> <p>eLearning Portal &amp; work on integrating learnings into RWL participants</p>	<p>Real world lab case study publications</p> <p>Guidance for improving the way we manage DRR/ CCA</p> <p>Interoperability Report + Interoperability Factsheets – technical workflow descriptions &amp; illustrations</p> <p>Forecasting, risk assessment, and adaptation tools made interoperable to increase functionality and multi-risk outputs necessary for seamless early warning, risk assessment and risk reduction strategies &amp; decision-making</p> <p>Improved RISK-TANDEM Framework</p> <p>Policy brief on risk governance</p> <p>Guidance on good practices regarding interoperability of governance mechanisms</p> <p>Co-production methodology for disaster resilience – Paper</p> <p>Methodology for distilling assumptions in different modelling approaches - Paper</p> <p>Data Fabric, Data Mesh &amp; Data Virtualisation system architecture for DRR report</p> <p>Prototype data fabric/ mesh that enables linkages of data types, communication between stakeholders and output generation of results and information needed by DRR/CCA stakeholders</p> <p>eLearning Portal – to aid training and training the trainer programmes for tools and systems developed in the Project</p>



TARGET GROUPS	OUTCOMES	IMPACTS
National Government Institutions	<p><b>Project outcome:</b> RISK-TANDEM will enable the building of consensus approaches towards disaster risk management, reduction and climate adaptation for the four regions of the RWLs</p>	<p><b>Scientific:</b> stocktaking of standards for the interoperability of data and models, identifying gaps and requirements to exchange information between different phases of DRM and CCA cycle and across hazards and integrating quantitative and qualitative indicators. This will provide an interoperability framework to the DRR and CCA community, that enables future tool development and can become part of a wider network for decision making data, tools and systems increasing the potential to provide actionable intelligence based on data and information from multiple sources. Through the production of workflow processes within DIRECTED the provision at what stages, to whom and in what format scientific information is included and communicated increases access to actionable science by all levels of government and society.</p>
Regional and municipal civil authorities - including disaster management, planning authorities and cross regional municipalities	<p><b>Project outcome:</b> as a result of co-production work Disaster Resilience Planning Reports will be developed and included in local planning in the RWLs</p>	<p><b>Economic:</b> The breakdown of silos (e.g. cross boundary municipalities, multiple stakeholder groups) in the DRR and CCA process will increase the economic efficiency of work and linked funding by creating more seamless workflows, preventing duplication of spend on the same actions with the potential to more carefully budget and target spend across actors. Cost benefit analysis will increase the potential to implement adaptation actions, targeted at locations most at risk, thus reducing the overall spend to enable increased resilience by society. Losses from climate disasters are potentially reduced over time in the regions of billions of Euros.</p>
First/second responders	<p><b>Project outcome:</b> The DATA-FABRIC ecosystem will provide a prototype system and tools enabling replicable workflows of work including multiple stakeholder organisations, all types of quantitative and qualitative: including data, maps, visualisations and text formats for communications to diverse stakeholders. The system is intended to radically reform the management and communications for disaster management, risk assessment and adaptation planning enabling actionable decisions using complex and multiple data sources. We intend for these tools to be replicated across Europe and beyond.</p>	<p><b>Societal:</b> Losses from climate disasters are reduced through enhanced disaster risk reduction based on preventive actions, better societal preparedness and resilience and improved disaster risk management in a systemic. Enabling scientific outputs to more rapidly be utilised by DRR and CCA actors and also directly communicated to the general public – helping to inform potential for damage and then actions required across society including at household &amp; business levels. Supporting first, second and third responders with forecast and risk assessment information they need to utilise emergency services more effectively and training materials.</p>
Utility companies	<p><b>Project outcome:</b> From within the Project a range of existing tools in flood risk assessment, adaptation planning, forecasting, citizen App will be enabled to become interoperable – thus improving multi-hazard risk assessment capabilities and functions – on top of this the work on interoperability is set to develop a standard so that multiple tools and data from beyond the project can also become interoperable for decision support for multiple stakeholders across sectors and European regions and beyond.</p>	
Insurance & Reinsurance		
IFAFRI		
NGO's	<p><b>Project outcome:</b> Governance workflows on a range of case studies will be implemented in the RWLs covering the multiple municipalities in city and countryside contexts.</p>	
Health and social care organisations	<p><b>Project outcome:</b> The EC and national policy-makers in Germany, Hungary, Denmark and Italy will have access to policy recommendations from DIRECTED Project. We envisage this will assist future governance of disasters and climate adaptation planning.</p>	
Communities and individuals	<p><b>Project outcome:</b> Two municipalities will have conducted cost/ benefit analysis of potential climate adaptation actions enabling strong needs analysis of climate adaptations that increases the potential for investment.</p>	



### 3.1.3 Resources to be committed

A budget of 5.283.350,00 Euro has been allocated in a balanced way across WPs and consortium partners, taking account of partners' roles and responsibilities. About 34% has been allocated to the RWLs (**WP1**) associated with the activities to connect with partners and stakeholders in a deep co-creation and co-evaluation process. The efforts related to the innovation **WP2, WP3, WP4, and WP5** have been allocated 18%, 15%, 11% and 9% of the total budget. For the communication, dissemination, exploitation work and the efforts to maximise impacts 13% of the budget have been assigned. Other costs total ca. 355.700 EUR with major amounts allocated to RWL activities and travel costs for project partners and external partners. Sub-contracting is planned for external services including set-up and maintenance of the project website, other IT developments (apps and online tools) as well as for other potential expenses such as translation services or purchase of site specific proprietary data. For subcontracting as listed in Table 3.1.g Article 6.2.B and 9.3 of the GA and its principles are applicable and respected during the selection of the subcontractor (i.a. best value for money, no conflict of interest).

**Table 3.1g: 'Subcontracting costs' items (Article 6.2.B and 9.3 of the GA and its principles are applicable and respected during the selection of the subcontractor (i.a. best value for money, no conflict of interest))**

1/TUBS		
	Cost (€)	Description of tasks and justification
<b>Subcontracting</b>	115.000	Creation and maintenance of project website and budget to cover costs related to the involvement of additional local partners in RWLs, provide translation services during local stakeholder events preparation and provision of site specific and proprietary data required for DRR and CCA modelling in RWLs by third parties.

2/PIK		
	Cost (€)	Description of tasks and justification
<b>Subcontracting</b>	30.000	IT development of a user friendly interface for the Future Danube model for visualizing results for floods, droughts, intense precipitation and heatwaves and carrying out interactive analysis.

**Table 3.1h: 'Purchase costs' items (travel and subsistence, equipment and other goods, works and services)**

7/REGIONH		
	Cost (€)	Justification
<b>Travel and subsistence</b>	15.000	Travel cost for participation of staff members in project meetings, final conference, and joint RWL activities
<b>Equipment</b>		
<b>Other goods, works and services</b>	15.000	Hosting local stakeholder workshops in RWL Copenhagen and Capital Region (5 multi-day workshops) including catering for coffee breaks, lunches, conference room and services
<b>Remaining purchase costs (&lt;15% of pers. Costs)</b>		
<b>Total</b>	30.000	

8/ARSTPC_ER		
	Cost (€)	Justification
<b>Travel and subsistence</b>	10.000	Travel cost for participation of staff members in project meetings, final conference, and joint RWL activities
<b>Equipment</b>		
<b>Other goods, works and services</b>	15.000	Hosting local stakeholder workshops in RWL Emilia Romagna Region (5 multi-day workshops) including catering for coffee breaks, lunches, conference room and services
<b>Remaining purchase costs (&lt;15% of pers. Costs)</b>		

<b>Costs)</b>		
<b>Total</b>	25.000	
<b>9/G&amp;C</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Travel and subsistence</b>	10.000	Travel cost for participation of staff members in project meetings, final conference, and joint RWL activities
<b>Equipment</b>		
<b>Other goods, works and services</b>	15.000	Hosting local stakeholder workshops in RWL Copenhagen and Capital Region (5 multi-day workshops) including catering for coffee breaks, lunches, conference room and services
<b>Remaining purchase costs (&lt;15% of pers. Costs)</b>		
<b>Total</b>	25.000	

**Table 3.1i: ‘Other costs categories’ items (e.g. internally invoiced goods and services)**

Not applicable

<b>Participant Number/Short Name</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Internally invoiced goods and services</b>	NA	NA

**Table 3.1j: ‘In-kind contributions’ provided by third parties**

Not applicable

<b>Participant Number/Short Name</b>			
<b>Third party name</b>	<b>Category</b>	<b>Cost (€)</b>	<b>Justification</b>
	NA	NA	NA

### 3.2 Capacity of participants and consortium as a whole

The DIRECTED consortium has unique and unparalleled strengths and expertise for a successful implementation of the project. The highly qualified inter-disciplinary consortium consists of 18 partners with extensive experience and complementary knowledge and skills who are distinguished in their fields and have a long-time track record of successfully implementing European, international and national collaborative research and innovation projects. Our consortium matches the knowledge, expertise and skills required in the HORIZON-CL3-2021-DRS-01-02 call including both natural sciences, and SSH disciplines. All partners are knowledgeable in open science practices and experience in gender aspects related to disaster risk reduction and climate change impacts. The consortium is equally balanced among academic partners from SSH disciplines (4 partners: IASS, UCC, SEI, IIASA) and natural sciences (5 partners: TUBS, GFZ, PIK, DTU, ETH). Partners from the private sector (3 partners: OASIS, GECO, 52N) ensure involvement of know-how about practical implementation and link to the market and uptake of tools by potential users. The largest group consists of communities, local or regional authorities and other practical partners from four different EU Member States (6 partners: REGIONH, ARSTPC-ER, G&C, EV, ZSRT, and ARP AE) with responsibilities for emergency management, civil protection (first and second responders) and/or DRR and CCA in the RWL regions. ZSRT is part of a Visegrad cooperation for disaster management, and in that role able to deliver and disseminate project outcomes to organisations in the entire Central European Visegrad region.

Table Overview of DIRECTED consortium partners' skills and expertise for the priority working areas

Area of expertise	Research and Innovation							Communication & Exploitation				Policy & Society Interface					
	TIRS/CF7	DIR	DTI	ETH	IASS	SEI	IIASA	OASIS	CECO	UCC	52N	C&C	RFIONH	ARSTPC-FR	FV	ZSRT	ADDAE
<b>Priority thematic areas</b>																	
<b>DRR + CCA</b>																	
Hazard modelling	X	X	X	X				X	X				X		X	X	
Risk modelling and assessment	X	X	X	X	X			X	X	X		X	X		X	X	
Early warning	X	X		X	X				X				X		X	X	
Emergency response			X		X								X		X		
Climate adaptation		X	X	X		X		X	X	X			X				
Climate Change Projections		X	X					X		X					X	X	
Climate Change impact assessment	X	X	X	X	X			X	X	X		X				X	
User and stakeholder engagement	X	X	X	X	X	X		X	X	X		X	X	X	X		
<b>Social Sciences and Humanities</b>																	
Risk governance			X		X	X				X		X	X	X	X		
Co-production and implementation	X	X	X		X	X			X	X		X	X	X	X	X	
Environmental economics			X														
Human geography						X			X	X		X			X	X	
Sociology and psychology					X										X		
Political science					X	X				X							
Training program design		X	X		X	X				X					X		
<b>Technology &amp; market knowledge</b>																	
data management systems	X	X	X	X				X	X	X	X		X		X	X	
IT-services		X				X		X	X						X	X	
cloud computing		X							X		X						
business model innovation								X	X		X	X			X		
evaluation of impacts		X		X	X			X	X	X		X	X		X		
special rescue equipment and innovation													X		X		
Data Architecture										X							
Data analytics										X							
Big data and real-time data pipelines										X							
Data Fabric										X							
Cyber risk management										X							

### 3.2.1 Role and budget of Associated Partners

The DIRECTED consortium includes three associated partners from UK (OASIS, SEI) and one associated partner from Switzerland (ETH). The role and contribution of these partners is detailed in the work-package descriptions and assignment of responsibilities for deliverables.

The Associated Partners OASIS, SEI, and ETH will not receive any EU funding and the budget set out in this subsection (Table Associated partners budget) will be provided by the UK and Swiss Governments respectively. The Swiss Government has provided a financial guarantee (<https://www.sbf.admin.ch/sbfi/en/home/research-and-innovation/international-cooperation-r-and-i/eu-framework-programmes-for-research/horizon-europe.html/>) to cover the project costs of Swiss organisations.

OASIS HUB limited is based in London (UK). OASIS works as an aggregator for catastrophe, extreme weather and environmental risk data, tools & services, as well to provide data set enhancement, development and data aggregation services. The idea behind OASIS HUB was to create an open, transparent, data platform that would inevitably help provide environmental, climate change and catastrophe risk information to business and wider society, whilst providing everyone with a platform that encourages collaboration and crossover around data and services. Further, OASIS has profound expertise in DRR&CCA innovation projects with a particular focus on stakeholder engagement, communication, dissemination and exploitation. In our consortium OASIS will lead work package 6 on Dissemination&Communication&Exploitation and Impacts.

Stockholm Environment Institute Oxford Office limited (SEI) is an international non-profit research and policy organization based in Oxford (UK). SEI's work focuses on bridging science and policy on climate-related issues and sustainable development with the aim to inform effective adaptation to climate change, and climate-related governance and policy-making. SEI features landmark developments regarding co-production processes with stakeholders (TANDEM) and the Connectivity HUB which aims to help the CCA and DRR communities to work together. This interactive "search and discovery" hub allows people in these fields to find potential synergies, to better communicate with one another, and to learn about which organisations are working on what issues. In the DIRECTED project SEI will lead work package 4 on Co-production.

Eidgenoessische Technische Hochschule Zuerich (ETH), Department of Environmental Systems, Weather and Climate Risks Group is an internationally leading research group on climate risk assessment and economics of climate adaptation. ETH is based in Zurich (Switzerland) and will contribute particularly to work-package 2 on data and model interoperability. With the open source climate risk modelling tool CLIMADA, ETH provides key knowledge about multi-hazard multi-risk modelling using open data sources.

Table Overview of budget for associated partners

Associated Partner Name	Personnel Costs Actual/unit/sme owner	Subcontracting Costs	Purchase costs C.1 Travel and Subsistence	C.2 Equipment	C.3 Other goods, Works and services	Inidrect costs flat rate 25%	TOTAL Costs	Funding RATE	Maximum EC Contribution
OASIS	269.700,00 €	56.000,00 €	10.000,00 €	0,00 €	0,00 €	69.925,00 €	405.625,00 €	70 %	0,00 €
SEI	464.000,00 €	40.000,00 €	15.000,00 €	0,00 €	13.000,00 €	123.000,00 €	655.000,00 €	100 %	0,00 €
ETH	209.208,00 €	0,00 €	7.227,00 €	0,00 €	9.545,00 €	56.495,00 €	282.475,00 €	100 %	0,00 €

Table ‘Subcontracting costs’ items (Article 6.2.B and 9.3 of the GA and its principles are applicable and respected during the selection of the subcontractor (i.a. best value for money, no conflict of interest) for associated partners

OASIS		
	Cost (€)	Description of tasks and justification
Subcontracting	56.000	Development CAIMAN App
SEI		
	Cost (€)	Description of tasks and justification
Subcontracting	40.000	IT development Connectivity HUB, TANDEM online tool and open-source taxonomy

#### 4. Ethics self-assessment

The proposal went through an ethics assessment because issues were identified regarding H-HUMANS, POPD – PERSONAL DATA, NEC – NON EU COUNTRIES, AI – ARTIFICIAL INTELLIGENCE. However all issues will be properly managed and the proposal has been cleared. The only requirement is that an independent ethics advisor with expertise in AI and ML needs to be appointed.

An independent Ethics Advisor with expertise in AI and ML to monitor the ethical concerns related to this project will be appointed. Periodic reports from the Ethics Advisor will be provided in project months 3, 12, 24, and 36.

Ethics Issues Table

<b>1. Human Embryonic Stem Cells and Human Embryos</b>	
Does this activity involve Human Embryonic Stem Cells (hESCs)?	no
Does this activity involve the use of human embryos?	no
<b>2. Humans</b>	
Does this activity involve human participants?	no
Does this activity involve interventions (physical also including imaging technology, behavioural treatments, etc.) on the study participants?	no
Does this activity involve conducting a clinical study as defined by the Clinical Trial Regulation (EU 536/2014)? (using pharmaceuticals, biologicals, radiopharmaceuticals, or advanced therapy medicinal products)	no
<b>3. Human Cells / Tissues (not covered by section 1)</b>	
Does this activity involve the use of human cells or tissues?	no
<b>4. Personal Data</b>	
Does this activity involve processing of personal data?	no
Does this activity involve further processing of previously collected personal data (including use of preexisting data sets or sources, merging existing data sets)?	no
Is it planned to export personal data from the EU to non-EU countries? Specify the type of personal data and countries involved	no
Is it planned to import personal data from non-EU countries into the EU or from a non-EU country to another non-EU country? Specify the type of personal data and countries involved	no
Does this activity involve the processing of personal data related to criminal convictions or offences?	no
<b>5. Animals</b>	
Does this activity involve animals?	no
<b>6. Non-EU Countries</b>	
Will some of the activities be carried out in non-EU countries?	yes (pages 1-45)
United Kingdom (Partner: OASIS HUB LIMITED, Partner: SEI Oxford) Switzerland (Partner: ETH Zürich)	
In case non-EU countries are involved, do the activities undertaken in these countries raise potential ethics issues?	no
Is it planned to use local resources (e.g. animal and/or human tissue samples, genetic material, live animals, human remains, materials of historical value, endangered fauna or flora samples, etc.)?	no
Is it planned to import any material (other than data) from non-EU countries into the EU or	no
Is it planned to export any material (other than data) from the EU to non-EU countries? For data exports, see section 4.	no
Does this activity involve low and/or lower middle income countries, (if yes, detail the benefit-sharing actions planned in the self-assessment)	no
Could the situation in the country put the individuals taking part in the activity at risk?	no



7. Environment, Health and Safety	
Does this activity involve the use of substances or processes that may cause harm to the environment, to animals or plants.(during the implementation of the activity or further to the use of the results, as a possible impact)?	no
Does this activity deal with endangered fauna and/or flora / protected areas?	no
Does this activity involve the use of substances or processes that may cause harm to humans, including those performing the activity.(during the implementation of the activity or further to the use of the results, as a possible impact)?	no
8. Artificial Intelligence	
Does this activity involve the development, deployment and/or use of Artificial Intelligence? (if yes, detail in the self-assessment whether that could raise ethical concerns related to human rights and values and detail how this will be addressed).	no
9. Other Ethics Issues	
Are there any other ethics issues that should be taken into consideration?	no
Ethical dimension of the objectives, methodology and likely impact	
The DIRECTED project does not foresee any ethical issues related to its content, objectives and methodology. Shall any ethical issue emerge during the project execution, the DIRECTED consortium will inform the European Commission and promptly take any necessary compliance measure.	
Compliance with ethical principles and relevant legislations	
The DIRECTED consortium commits itself to comply with the highest standards of ethical scientific work and follow all relevant legislation in all the countries of its execution. The project will fulfil all fundamental ethical principles exposed in the Charter of Fundamental Rights of the European Union. All data transferred from the EU to a non-EU country will be in accordance with the EU General Data Protection Regulation (GDPR).	

## 5. Security

The project went through the security scrutiny and not security issues have been identified.

## ANNEX 2

## ESTIMATED BUDGET FOR THE ACTION

Forms of funding	Estimated eligible <sup>1</sup> costs (per budget category)									Estimated EU contribution <sup>2</sup>				
	Direct costs						Indirect costs			Total costs	EU contribution to eligible costs			Maximum grant amount <sup>6</sup>
	A. Personnel costs		B. Subcontracting costs	C. Purchase costs			D. Other cost categories	E. Indirect costs <sup>3</sup>	Funding rate % <sup>4</sup>		Maximum EU contribution <sup>5</sup>	Requested EU contribution		
	A.1 Employees (or equivalent)	A.2 Natural persons under direct contract	A.3 Seconded persons	A.4 SME owners and natural person beneficiaries	B. Subcontracting	C.1 Travel and subsistence	C.2 Equipment	C.3 Other goods, works and services	D.2 Internally invoiced goods and services	E. Indirect costs				
Actual costs	Unit costs (usual accounting practices)	Unit costs <sup>7</sup>	Actual costs	Actual costs	Actual costs	Actual costs	Actual costs	Unit costs (usual accounting practices)	Flat-rate costs <sup>8</sup>					
a1	a2	a3	b	c1	c2	c3	d2	e = 0,25 * (a1 + a2 + a3 + c1 + c2 + c3)	f = a + b + c + d + e	U	g = f * U%	h	m	
1 - TUBS	448 091.00	0.00	0.00	115 000.00	18 000.00	0.00	39 700.00	0.00	126 447.75	747 238.75	100	747 238.75	747 238.75	747 238.75
2 - PIK	280 000.00	0.00	0.00	30 000.00	15 000.00	0.00	8 000.00	0.00	75 750.00	408 750.00	100	408 750.00	408 750.00	408 750.00
3 - DTU	391 000.00	0.00	0.00	0.00	15 000.00	0.00	13 000.00	0.00	104 750.00	523 750.00	100	523 750.00	523 750.00	523 750.00
4 - GECCO	432 000.00	0.00	0.00	0.00	15 000.00	0.00	0.00	0.00	111 750.00	558 750.00	70	391 125.00	391 125.00	391 125.00
5 - IASS	312 000.00	0.00	0.00	0.00	15 000.00	0.00	5 000.00	0.00	83 000.00	415 000.00	100	415 000.00	415 000.00	415 000.00
6 - UCC	390 000.00	0.00	0.00	0.00	15 000.00	0.00	16 000.00	0.00	105 250.00	526 250.00	100	526 250.00	526 250.00	526 250.00
7 - REGIONH	168 000.00	0.00	0.00	0.00	15 000.00	0.00	15 000.00	0.00	49 500.00	247 500.00	100	247 500.00	247 500.00	247 500.00
8 - ARSTPC-ER	53 200.00	0.00	0.00	0.00	10 000.00	0.00	15 000.00	0.00	19 550.00	97 750.00	100	97 750.00	97 750.00	97 750.00
9 - G&C	138 000.00	0.00	0.00	0.00	10 000.00	0.00	15 000.00	0.00	40 750.00	203 750.00	70	142 625.00	142 625.00	142 625.00
10 - IIASA	195 000.00	0.00	0.00	0.00	10 000.00	0.00	2 000.00	0.00	51 750.00	258 750.00	100	258 750.00	258 750.00	258 750.00
11 - EV	248 400.00	0.00	0.00	0.00	15 000.00	0.00	15 000.00	0.00	69 600.00	348 000.00	100	348 000.00	348 000.00	348 000.00
12 - ZSRT	80 000.00	0.00	0.00	0.00	10 000.00	0.00	0.00	0.00	22 500.00	112 500.00	100	112 500.00	112 500.00	112 500.00
13 - ARPAAE	38 000.00	0.00	0.00	0.00	5 000.00	0.00	0.00	0.00	10 750.00	53 750.00	100	53 750.00	53 750.00	53 750.00
14 - GFZ	250 189.00	0.00	0.00	0.00	6 000.00	0.00	8 000.00	0.00	66 047.25	330 236.25	100	330 236.25	330 236.24	330 236.24
15 - 52N	331 100.00	0.00	0.00	0.00	10 000.00	0.00	20 000.00	0.00	90 275.00	451 375.00	100	451 375.00	451 375.00	451 375.00
16 - ETH														
17 - OASIS														
18 - SEI														
<b>Σ consortium</b>	<b>3 754 980.00</b>	<b>0.00</b>	<b>0.00</b>	<b>145 000.00</b>	<b>184 000.00</b>	<b>0.00</b>	<b>171 700.00</b>	<b>0.00</b>	<b>1 027 670.00</b>	<b>5 283 350.00</b>		<b>5 054 600.00</b>	<b>5 054 599.99</b>	<b>5 054 599.99</b>

<sup>1</sup> See Article 6 for the eligibility conditions. All amounts must be expressed in EUR (see Article 21 for the conversion rules).

<sup>2</sup> The consortium remains free to decide on a different internal distribution of the EU funding (via the consortium agreement; see Article 7).

<sup>3</sup> Indirect costs already covered by an operating grant (received under any EU funding programme) are ineligible (see Article 6.3). Therefore, a beneficiary/affiliated entity that receives an operating grant during the action duration cannot declare indirect costs for the year(s)/reporting period(s) covered by the operating grant, unless they can demonstrate that the operating grant does not cover any costs of the action. This requires specific accounting tools. Please immediately contact us via the EU Funding & Tenders Portal for details.

<sup>4</sup> See Data Sheet for the funding rate(s).

<sup>5</sup> This is the theoretical amount of the EU contribution to costs, if the reimbursement rate is applied to all the budgeted costs. This theoretical amount is then capped by the 'maximum grant amount'.

<sup>6</sup> The 'maximum grant amount' is the maximum grant amount decided by the EU. It normally corresponds to the requested grant, but may be lower.

<sup>7</sup> See Annex 2a 'Additional information on the estimated budget' for the details (units, cost per unit).

<sup>8</sup> See Data Sheet for the flat-rate.

## **ANNEX 2a**

### **ADDITIONAL INFORMATION ON UNIT COSTS AND CONTRIBUTIONS**

#### **SME owners/natural person beneficiaries without salary** (Decision C(2020) 7115<sup>1</sup>)

Type: unit costs

Units: days spent working on the action (rounded up or down to the nearest half-day)

Amount per unit (daily rate): calculated according to the following formula:

{EUR 5 080 / 18 days = **282,22**}  
multiplied by  
{country-specific correction coefficient of the country where the beneficiary is established}

The country-specific correction coefficients used are those set out in the Horizon Europe Work Programme (section Marie Skłodowska-Curie actions) in force at the time of the call (see [Portal Reference Documents](#)).

#### **HE and Euratom Research Infrastructure actions**<sup>2</sup>

Type: unit costs

Units<sup>3</sup>: see (for each access provider and installation) the unit cost table in Annex 2b

Amount per unit\*: see (for each access provider and installation) the unit cost table in Annex 2b

\* Amount calculated as follows:

For trans-national access:

$$\frac{\text{average annual total trans-national access costs to the installation (over past two years}^4\text{)}}{\text{average annual total quantity of trans-national access to the installation (over past two years}^5\text{)}}$$

For virtual access:

$$\frac{\text{total virtual access costs to the installation (over the last year}^6\text{)}}{\text{total quantity of virtual access to the installation (over the last year}^7\text{)}}$$

#### **Euratom staff mobility costs**<sup>8</sup>

##### **Monthly living allowance**

Type: unit costs

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<sup>1</sup> Commission [Decision](#) of 20 October 2020 authorising the use of unit costs for the personnel costs of the owners of small and medium-sized enterprises and beneficiaries that are natural persons not receiving a salary for the work carried out by themselves under an action or work programme (C(2020)7715).

<sup>2</sup> [Decision](#) of 19 April 2021 authorising the use of unit costs for the costs of providing trans-national and virtual access in Research Infrastructure actions under the Horizon Europe Programme (2021-2027) and the Research and Training Programme of the European Atomic Energy Community (2021-2025).

<sup>3</sup> Unit of access (e.g. beam hours, weeks of access, sample analysis) fixed by the access provider in proposal.

<sup>4</sup> In exceptional and duly justified cases, the granting authority may agree to a different reference period.

<sup>5</sup> In exceptional and duly justified cases, the granting authority may agree to a different reference period.

<sup>6</sup> In exceptional and duly justified cases, the granting authority may agree to a different reference period.

<sup>7</sup> In exceptional and duly justified cases, the granting authority may agree to a different reference period.

<sup>8</sup> [Decision](#) of 15 March 2021 authorising the use of unit costs for mobility in co-fund actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).

Units: months spent by the seconded staff member(s) on research and training in fission and fusion activities (person-month)

Amount per unit\*: see (for each beneficiary/affiliated entity and secondment) the unit cost table in Annex 2b

\* Amount calculated as follows from 1 January 2021:


{**EUR 4 300** multiplied by country-specific correction coefficient\*\* of the country where the staff member is seconded}<sup>9</sup>

\*\*Country-specific correction coefficients as from 1 January 2021<sup>10</sup>

EU-Member States<sup>11</sup>

Country / Place	Coefficient (%)
Bulgaria	59,1
Czech Rep.	85,2
Denmark	131,3
Germany	101,9
Bonn	95,8
Karlsruhe	98
Munich	113,9
Estonia	82,3
Ireland	129
Greece	81,4
Spain	94,2
France	120,5
Croatia	75,8
Italy	95
Varese	90,7
Cyprus	78,2
Latvia	77,5
Lithuania	76,6
Hungary	71,9
Malta	94,7
Netherlands	113,9
Austria	107,9
Poland	70,9
Portugal	91,1
Romania	66,6
Slovenia	86,1

<sup>9</sup> Unit costs for living allowances are calculated by using a method of calculation similar to that applied for the secondment to the European Commission of seconded national experts (SNEs).

<sup>10</sup>  For the financial statements, the amount must be adjusted according to the actual place of secondment. The revised coefficients were adopted in the Decision authorising the use of unit costs for the Fusion Programme co-fund action under the Research and training Programme of the European Atomic Energy Community 2021-2025. They are based on the 2020 Annual update of the remuneration and pensions of the officials and other servants of the European Union and the correction coefficients applied thereto (OJ C 428, 11.12.2020) to ensure purchasing power parity. The revised coefficient are applied as from 1 January 2021 through an amendment to the grant agreement.

<sup>11</sup> No correction coefficient shall be applicable in Belgium and Luxembourg.

Slovakia	80,6
Finland	118,4
Sweden	124,3

#### Third countries

Country/place	Coefficient (%)
China	82,2
India	72,3
Japan	111,8
Russia	92,7
South Korea	92,3
Switzerland	129,2
Ukraine	82,3
United Kingdom	97,6
United States	101,4 (New-York) 90,5 (Washington)

#### Mobility allowance

Type: Unit costs

Units: months spent by the seconded staff member(s) on research and training in fission and fusion activities (person-month)

Amount per unit: **EUR 600** per person-month; see (for each beneficiary/affiliated entity and secondment) the unit cost table in Annex 2b

#### Family allowance

Type: unit costs

Units: months spent by the seconded staff member(s) on research and training in fission and fusion activities (person-month)

Amount per unit: **EUR 660** per person-month; see (for each beneficiary/affiliated entity and secondment) the unit cost table in Annex 2b

#### Education allowance

Type: Unit costs

Units: months spent by the seconded staff member(s) on research and training in fission and fusion activities (person-month)

Amount per unit\*: see (for each beneficiary/affiliated entity and secondment) the unit cost table in Annex 2b

\*Amount calculated as follows from 1 January 2021:  
{**EUR 283.82** x number of dependent children<sup>12</sup>}

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<sup>12</sup> For the estimated budget (Annex 2): an average should be used. (⚠ For the financial statements, the number of children (and months) must be adjusted according to the actual family status at the moment the secondment starts.)

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**POTSDAM-INSTITUT FUR KLIMAFOLGENFORSCHUNG EV (PIK)**, PIC 999464042,  
established in TELEGRAFENBERG A31, POTSDAM 14412, Germany,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101073978 — DIRECTED** ('the Agreement')

**between TECHNISCHE UNIVERSITAET BRAUNSCHWEIG (TUBS) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**DANMARKS TEKNISKE UNIVERSITET (DTU)**, PIC 999990655, established in ANKER ENGELUNDSVEJ 1 BYGNING 101 A, KGS LYNGBY 2800, Denmark,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101073978 — DIRECTED** ('the Agreement')

**between TECHNISCHE UNIVERSITAET BRAUNSCHWEIG (TUBS) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary



**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**GECOSISTEMA SRL (GECO)**, PIC 959248327, established in PIAZZA MALATESTA 21, RIMINI RN 47900, Italy,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101073978 — DIRECTED** ('the Agreement')

**between** TECHNISCHE UNIVERSITAET BRAUNSCHWEIG (TUBS) **and** the **European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**INSTITUTE FOR ADVANCED SUSTAINABILITY STUDIES EV (IASS)**, PIC 960542404,  
established in BERLINER STRASSE 130, POSTDAM 14467, Germany,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101073978 — DIRECTED** ('the Agreement')

**between TECHNISCHE UNIVERSITAET BRAUNSCHWEIG (TUBS) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**UNIVERSITY COLLEGE CORK - NATIONAL UNIVERSITY OF IRELAND, CORK (UCC)**,  
PIC 999975717, established in WESTERN ROAD, CORK T12 YN60, Ireland,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101073978 — DIRECTED** ('the Agreement')

**between TECHNISCHE UNIVERSITAET BRAUNSCHWEIG (TUBS) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**REGION HOVEDSTADEN (REGIONH)**, PIC 999654744, established in KONGENS VAENGE 2, HILLEROD 3400, Denmark,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101073978 — DIRECTED** ('the Agreement')

**between TECHNISCHE UNIVERSITAET BRAUNSCHWEIG (TUBS) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**AGENZIA REGIONALE PER LA SICUREZZATERRITORIALE E LA PROTEZIONE CIVILE (ARSTPC-ER)**, PIC 998349803, established in VIALE SILVANI 6, BOLOGNA 40122, Italy,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101073978 — DIRECTED** ('the Agreement')

**between** TECHNISCHE UNIVERSITAET BRAUNSCHWEIG (TUBS) **and** the **European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**GENILLARD & CO GMBH (G&C)**, PIC 920168870, established in ISMANINGER STRASSE 102, MUNCHEN 81675, Germany,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101073978 — DIRECTED** ('the Agreement')

**between TECHNISCHE UNIVERSITAET BRAUNSCHWEIG (TUBS) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**INTERNATIONALES INSTITUT FUER ANGEWANDTE SYSTEMANALYSE (IIASA), PIC 999452596, established in Schlossplatz 1, LAXENBURG 2361, Austria,**

**hereby agrees**

**to become beneficiary**

**in Agreement No 101073978 — DIRECTED** ('the Agreement')

**between TECHNISCHE UNIVERSITAET BRAUNSCHWEIG (TUBS) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**ERFTVERBAND (EV)**, PIC 939668974, established in AM ERFTVERBAND 6, BERGHEIM 50126, Germany,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101073978 — DIRECTED** ('the Agreement')

**between TECHNISCHE UNIVERSITAET BRAUNSCHWEIG (TUBS) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary



**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**ZALA KULONLEGES MENTOK ES ONKENTES TUZOLTO EGYSULET (ZSRT)**, PIC 888552981, established in EPITOK UTJA 5 3//9, ZALAEGERSZEG 8900, Hungary,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101073978 — DIRECTED** ('the Agreement')

**between TECHNISCHE UNIVERSITAET BRAUNSCHWEIG (TUBS) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**AGENZIA REGIONALE PER LA PREVENZIONE, L'AMBIENTE E L'ENERGIA DELL'EMILIA-ROMAGNA (ARPAE)**, PIC 999454633, established in VIA PO 5, BOLOGNA 40139, Italy,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101073978 — DIRECTED** ('the Agreement')

**between TECHNISCHE UNIVERSITAET BRAUNSCHWEIG (TUBS) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**HELMHOLTZ ZENTRUM POTSDAM DEUTSCHESGEOFORSCHUNGSZENTRUM GFZ (GFZ)**, PIC 999994341, established in TELEGRAFENBERG 17, POTSDAM 14473, Germany,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101073978 — DIRECTED** ('the Agreement')

**between TECHNISCHE UNIVERSITAET BRAUNSCHWEIG (TUBS) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**52 NORTH SPATIAL INFORMATION RESEARCH GMBH (52N)**, PIC 997237407, established in MARTIN LUTHER KING WEG 24, MUNSTER 48155, Germany,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101073978 — DIRECTED** ('the Agreement')

**between TECHNISCHE UNIVERSITAET BRAUNSCHWEIG (TUBS) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 4 HORIZON EUROPE MGA — MULTI + MONO

FINANCIAL STATEMENT FOR [PARTICIPANT NAME] FOR REPORTING PERIOD [NUMBER]

Eligible <sup>1</sup> costs (per budget category)																	EU contribution <sup>2</sup>				Revenues	
Direct costs															Indirect costs	Total costs	EU contribution to eligible costs			Total requested EU contribution	Income generated by the action	
A. Personnel costs			B. Subcontracting costs	C. Purchase costs			D. Other cost categories						E. Indirect costs <sup>2</sup>	Funding rate % <sup>3</sup>	Maximum EU contribution <sup>4</sup>		Requested EU contribution					
Forms of funding	Actual costs	Unit costs (usual accounting practices)	Unit costs <sup>5</sup>	Actual costs	Actual costs	Actual costs	Actual costs	/ Actual costs	Unit costs (usual accounting practices)	/ Unit costs <sup>5</sup>	/ Unit costs <sup>5</sup>	/ Unit costs <sup>5</sup>	/ Actual costs	/ Unit costs <sup>5</sup>	/ Actual costs	/ Actual costs	Flat-rate costs <sup>6</sup>	U	g = f*U%	h	m	n
	a1	a2	a3	b	c1	c2	c3	/ d1a	d2	/ d3	/ d4	/ d5	/ d6	/ d7	/ d8	e = 0,25 * (a1 + a2 + a3 + b + c1 + c2 + c3 + d1a + d2 + d3 + d4 + d5 + d6 + d7 + d8)	f = a+b+c+d+e					
XX - [short name beneficiary/affiliated entity]																						

**The beneficiary/affiliated entity hereby confirms that:**  
 The information provided is complete, reliable and true.  
 The costs and contributions declared are eligible (see Article 6).  
 The costs and contributions can be substantiated by adequate records and supporting documentation that will be produced upon request or in the context of checks, reviews, audits and investigations (see Articles 19, 20 and 25).  
 For the last reporting period: that all the revenues have been declared (see Article 22).

<sup>1</sup> Please declare all eligible costs and contributions, even if they exceed the amounts indicated in the estimated budget (see Annex 2). Only amounts that were declared in your individual financial statements can be taken into account later on, in order to replace costs/contributions that are found to be ineligible.

<sup>2</sup> See Article 6 for the eligibility conditions. All amounts must be expressed in EUR (see Article 21 for the conversion rules).  
<sup>3</sup> If you have also received an EU operating grant during this reporting period, you cannot claim indirect costs - unless you can demonstrate that the operating grant does not cover any costs of the action. This requires specific accounting tools. Please contact us immediately via the Funding & Tenders Portal for details.  
<sup>4</sup> See Data Sheet for the reimbursement rate(s).  
<sup>5</sup> This is the theoretical amount of EU contribution to costs that the system calculates automatically (by multiplying the reimbursement rates by the costs declared). The amount you request (in the column 'requested EU contribution') may be less.  
<sup>6</sup> See Annex 2a 'Additional information on the estimated budget' for the details (units, cost per unit).  
<sup>7</sup> See Data Sheet for the flat-rate.

## **ANNEX 5**

### **SPECIFIC RULES**

#### **CONFIDENTIALITY AND SECURITY (— ARTICLE 13)**

##### **Sensitive information with security recommendation**

Sensitive information with a security recommendation must comply with the additional requirements imposed by the granting authority.

Before starting the action tasks concerned, the beneficiaries must have obtained all approvals or other mandatory documents needed for implementing the task. The documents must be kept on file and be submitted upon request by the coordinator to the granting authority. If they are not in English, they must be submitted together with an English summary.

For requirements restricting disclosure or dissemination, the information must be handled in accordance with the recommendation and may be disclosed or disseminated only after written approval from the granting authority.

##### **EU classified information**

If EU classified information is used or generated by the action, it must be treated in accordance with the security classification guide (SCG) and security aspect letter (SAL) set out in Annex 1 and Decision 2015/444<sup>1</sup> and its implementing rules — until it is declassified.

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

Action tasks involving EU classified information may be subcontracted only with prior explicit written approval from the granting authority and only to entities established in an EU Member State or in a non-EU country with a security of information agreement with the EU (or an administrative arrangement with the Commission).

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

#### **ETHICS (— ARTICLE 14)**

##### **Ethics and research integrity**

The beneficiaries must carry out the action in compliance with:

- ethical principles (including the highest standards of research integrity)

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<sup>1</sup> Commission Decision 2015/444/EC, Euratom of 13 March 2015 on the security rules for protecting EU classified information (OJ L 72, 17.3.2015, p. 53).

and

- applicable EU, international and national law, including the EU Charter of Fundamental Rights and the European Convention for the Protection of Human Rights and Fundamental Freedoms and its Supplementary Protocols.

No funding can be granted, within or outside the EU, for activities that are prohibited in all Member States. No funding can be granted in a Member State for an activity which is forbidden in that Member State.

The beneficiaries must pay particular attention to the principle of proportionality, the right to privacy, the right to the protection of personal data, the right to the physical and mental integrity of persons, the right to non-discrimination, the need to ensure protection of the environment and high levels of human health protection.

The beneficiaries must ensure that the activities under the action have an exclusive focus on civil applications.

The beneficiaries must ensure that the activities under the action do not:

- aim at human cloning for reproductive purposes
- intend to modify the genetic heritage of human beings which could make such modifications heritable (with the exception of research relating to cancer treatment of the gonads, which may be financed)
- intend to create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer, or
- lead to the destruction of human embryos (for example, for obtaining stem cells).

Activities involving research on human embryos or human embryonic stem cells may be carried out only if:

- they are set out in Annex 1 or
- the coordinator has obtained explicit approval (in writing) from the granting authority.

In addition, the beneficiaries must respect the fundamental principle of research integrity — as set out in the European Code of Conduct for Research Integrity<sup>2</sup>.

This implies compliance with the following principles:

- reliability in ensuring the quality of research reflected in the design, the methodology, the analysis and the use of resources
- honesty in developing, undertaking, reviewing, reporting and communicating research in a transparent, fair and unbiased way

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<sup>2</sup> European Code of Conduct for Research Integrity of ALLEA (All European Academies).

- respect for colleagues, research participants, society, ecosystems, cultural heritage and the environment
- accountability for the research from idea to publication, for its management and organisation, for training, supervision and mentoring, and for its wider impacts

and means that beneficiaries must ensure that persons carrying out research tasks follow the good research practices including ensuring, where possible, openness, reproducibility and traceability and refrain from the research integrity violations described in the Code.

Activities raising ethical issues must comply with the additional requirements formulated by the ethics panels (including after checks, reviews or audits; see Article 25).

Before starting an action task raising ethical issues, the beneficiaries must have obtained all approvals or other mandatory documents needed for implementing the task, notably from any (national or local) ethics committee or other bodies such as data protection authorities.

The documents must be kept on file and be submitted upon request by the coordinator to the granting authority. If they are not in English, they must be submitted together with an English summary, which shows that the documents cover the action tasks in question and includes the conclusions of the committee or authority concerned (if any).

## **VALUES (— ARTICLE 14)**

### **Gender mainstreaming**

The beneficiaries must take all measures to promote equal opportunities between men and women in the implementation of the action and, where applicable, in line with the gender equality plan. They must aim, to the extent possible, for a gender balance at all levels of personnel assigned to the action, including at supervisory and managerial level.

## **INTELLECTUAL PROPERTY RIGHTS (IPR) — BACKGROUND AND RESULTS — ACCESS RIGHTS AND RIGHTS OF USE (— ARTICLE 16)**

### **Definitions**

Access rights — Rights to use results or background.

Dissemination — The public disclosure of the results by appropriate means, other than resulting from protecting or exploiting the results, including by scientific publications in any medium.

Exploit(ation) — The use of results in further research and innovation activities other than those covered by the action concerned, including among other things, commercial exploitation such as developing, creating, manufacturing and marketing a product or process, creating and providing a service, or in standardisation activities.

Fair and reasonable conditions — Appropriate conditions, including possible financial terms or royalty-free conditions, taking into account the specific circumstances of the request for access, for example the actual or potential value of the results or background to which access is requested and/or the scope, duration or other characteristics of the exploitation envisaged.



FAIR principles — ‘findability’, ‘accessibility’, ‘interoperability’ and ‘reusability’.

Open access — Online access to research outputs provided free of charge to the end-user.

Open science — An approach to the scientific process based on open cooperative work, tools and diffusing knowledge.

Research data management — The process within the research lifecycle that includes the organisation, storage, preservation, security, quality assurance, allocation of persistent identifiers (PIDs) and rules and procedures for sharing of data including licensing.

Research outputs — Results to which access can be given in the form of scientific publications, data or other engineered results and processes such as software, algorithms, protocols, models, workflows and electronic notebooks.

### **Scope of the obligations**

For this section, references to ‘beneficiary’ or ‘beneficiaries’ do not include affiliated entities (if any).

### **Agreement on background**

The beneficiaries must identify in a written agreement the background as needed for implementing the action or for exploiting its results.

Where the call conditions restrict control due to strategic interests reasons, background that is subject to control or other restrictions by a country (or entity from a country) which is not one of the eligible countries or target countries set out in the call conditions and that impact the exploitation of the results (i.e. would make the exploitation of the results subject to control or restrictions) must not be used and must be explicitly excluded from it in the agreement on background — unless otherwise agreed with the granting authority.

### **Ownership of results**

Results are owned by the beneficiaries that generate them.

However, two or more beneficiaries own results jointly if:

- they have jointly generated them and
- it is not possible to:
  - establish the respective contribution of each beneficiary, or
  - separate them for the purpose of applying for, obtaining or maintaining their protection.

The joint owners must agree — in writing — on the allocation and terms of exercise of their joint ownership (**‘joint ownership agreement’**), to ensure compliance with their obligations under this Agreement.

Unless otherwise agreed in the joint ownership agreement or consortium agreement, each joint owner may grant non-exclusive licences to third parties to exploit the jointly-owned results (without any right to sub-license), if the other joint owners are given:

- at least 45 days advance notice and
- fair and reasonable compensation.

The joint owners may agree — in writing — to apply another regime than joint ownership.

If third parties (including employees and other personnel) may claim rights to the results, the beneficiary concerned must ensure that those rights can be exercised in a manner compatible with its obligations under the Agreement.

The beneficiaries must indicate the owner(s) of the results (results ownership list) in the final periodic report.

### **Protection of results**

Beneficiaries which have received funding under the grant must adequately protect their results — for an appropriate period and with appropriate territorial coverage — if protection is possible and justified, taking into account all relevant considerations, including the prospects for commercial exploitation, the legitimate interests of the other beneficiaries and any other legitimate interests.

### **Exploitation of results**

Beneficiaries which have received funding under the grant must — up to four years after the end of the action (see Data Sheet, Point 1) — use their best efforts to exploit their results directly or to have them exploited indirectly by another entity, in particular through transfer or licensing.

If, despite a beneficiary's best efforts, the results are not exploited within one year after the end of the action, the beneficiaries must (unless otherwise agreed in writing with the granting authority) use the Horizon Results Platform to find interested parties to exploit the results.

If results are incorporated in a standard, the beneficiaries must (unless otherwise agreed with the granting authority or unless it is impossible) ask the standardisation body to include the funding statement (see Article 17) in (information related to) the standard.

### **Additional exploitation obligations**

Where the call conditions impose additional exploitation obligations (including obligations linked to the restriction of participation or control due to strategic assets, interests, autonomy or security reasons), the beneficiaries must comply with them — up to four years after the end of the action (see Data Sheet, Point 1).

Where the call conditions impose additional exploitation obligations in case of a public emergency, the beneficiaries must (if requested by the granting authority) grant for a limited period of time specified in the request, non-exclusive licences — under fair and reasonable conditions — to their results to legal entities that need the results to address the public emergency and commit to rapidly and broadly exploit the resulting products and services at fair and reasonable conditions. This provision applies up to four years after the end of the action (see Data Sheet, Point 1).

### Additional information obligation relating to standards

Where the call conditions impose additional information obligations relating to possible standardisation, the beneficiaries must — up to four years after the end of the action (see Data Sheet, Point 1) — inform the granting authority, if the results could reasonably be expected to contribute to European or international standards.

### **Transfer and licensing of results**

#### Transfer of ownership

The beneficiaries may transfer ownership of their results, provided this does not affect compliance with their obligations under the Agreement.

The beneficiaries must ensure that their obligations under the Agreement regarding their results are passed on to the new owner and that this new owner has the obligation to pass them on in any subsequent transfer.

Moreover, they must inform the other beneficiaries with access rights of the transfer at least 45 days in advance (or less if agreed in writing), unless agreed otherwise in writing for specifically identified third parties including affiliated entities or unless impossible under the applicable law. This notification must include sufficient information on the new owner to enable the beneficiaries concerned to assess the effects on their access rights. The beneficiaries may object within 30 days of receiving notification (or less if agreed in writing), if they can show that the transfer would adversely affect their access rights. In this case, the transfer may not take place until agreement has been reached between the beneficiaries concerned.

#### Granting licences

The beneficiaries may grant licences to their results (or otherwise give the right to exploit them), including on an exclusive basis, provided this does not affect compliance with their obligations.

Exclusive licences for results may be granted only if all the other beneficiaries concerned have waived their access rights.

#### Granting authority right to object to transfers or licensing — Horizon Europe actions

Where the call conditions in Horizon Europe actions provide for the right to object to transfers or licensing, the granting authority may — up to four years after the end of the action (see Data Sheet, Point 1) — object to a transfer of ownership or the exclusive licensing of results, if:

- the beneficiaries which generated the results have received funding under the grant
- it is to a legal entity established in a non-EU country not associated with Horizon Europe, and
- the granting authority considers that the transfer or licence is not in line with EU interests.

Beneficiaries that intend to transfer ownership or grant an exclusive licence must formally notify the granting authority before the intended transfer or licensing takes place and:

- identify the specific results concerned
- describe in detail the new owner or licensee and the planned or potential exploitation of the results, and
- include a reasoned assessment of the likely impact of the transfer or licence on EU interests, in particular regarding competitiveness as well as consistency with ethical principles and security considerations.

The granting authority may request additional information.

If the granting authority decides to object to a transfer or exclusive licence, it must formally notify the beneficiary concerned within 60 days of receiving notification (or any additional information it has requested).

No transfer or licensing may take place in the following cases:

- pending the granting authority decision, within the period set out above
- if the granting authority objects
- until the conditions are complied with, if the granting authority objection comes with conditions.

A beneficiary may formally notify a request to waive the right to object regarding intended transfers or grants to a specifically identified third party, if measures safeguarding EU interests are in place. If the granting authority agrees, it will formally notify the beneficiary concerned within 60 days of receiving notification (or any additional information requested).

#### *Granting authority right to object to transfers or licensing — Euratom actions*

Where the call conditions in Euratom actions provide for the right to object to transfers or licensing, the granting authority may — up to four years after the end of the action (see Data Sheet, Point 1) — object to a transfer of ownership or the exclusive or non-exclusive licensing of results, if:

- the beneficiaries which generated the results have received funding under the grant
- it is to a legal entity established in a non-EU country not associated to the Euratom Research and Training Programme 2021-2025 and
- the granting authority considers that the transfer or licence is not in line with the EU interests.

Beneficiaries that intend to transfer ownership or grant a licence must formally notify the granting authority before the intended transfer or licensing takes place and:

- identify the specific results concerned
- describe in detail the results, the new owner or licensee and the planned or potential exploitation of the results, and
- include a reasoned assessment of the likely impact of the transfer or licence on EU interests, in particular regarding competitiveness as well as consistency with

ethical principles and security considerations (including the defence interests of the EU Member States under Article 24 of the Euratom Treaty).

The granting authority may request additional information.

If the granting authority decides to object to a transfer or licence, it will formally notify the beneficiary concerned within 60 days of receiving notification (or any additional information requested).

No transfer or licensing may take place in the following cases:

- pending the granting authority decision, within the period set out above
- if the granting authority objects
- until the conditions are complied with, if the granting authority objection comes with conditions.

A beneficiary may formally notify a request to waive the right to object regarding intended transfers or grants to a specifically identified third party, if measures safeguarding EU interests are in place. If the granting authority agrees, it will formally notify the beneficiary concerned within 60 days of receiving notification (or any additional information requested).

*Limitations to transfers and licensing due to strategic assets, interests, autonomy or security reasons of the EU and its Member States*

Where the call conditions restrict participation or control due to strategic assets, interests, autonomy or security reasons, the beneficiaries may not transfer ownership of their results or grant licences to third parties which are established in countries which are not eligible countries or target countries set out in the call conditions (or, if applicable, are controlled by such countries or entities from such countries) — unless they have requested and received prior approval by the granting authority.

The request must:

- identify the specific results concerned
- describe in detail the new owner and the planned or potential exploitation of the results, and
- include a reasoned assessment of the likely impact of the transfer or license on the strategic assets, interests, autonomy or security of the EU and its Member States.

The granting authority may request additional information.

**Access rights to results and background**

*Exercise of access rights — Waiving of access rights — No sub-licensing*

Requests to exercise access rights and the waiver of access rights must be in writing.

Unless agreed otherwise in writing with the beneficiary granting access, access rights do not include the right to sub-license.

If a beneficiary is no longer involved in the action, this does not affect its obligations to grant access.

If a beneficiary defaults on its obligations, the beneficiaries may agree that that beneficiary no longer has access rights.

#### Access rights for implementing the action

The beneficiaries must grant each other access — on a royalty-free basis — to background needed to implement their own tasks under the action, unless the beneficiary that holds the background has — before acceding to the Agreement —:

- informed the other beneficiaries that access to its background is subject to restrictions, or
- agreed with the other beneficiaries that access would not be on a royalty-free basis.

The beneficiaries must grant each other access — on a royalty-free basis — to results needed for implementing their own tasks under the action.

#### Access rights for exploiting the results

The beneficiaries must grant each other access — under fair and reasonable conditions — to results needed for exploiting their results.

The beneficiaries must grant each other access — under fair and reasonable conditions — to background needed for exploiting their results, unless the beneficiary that holds the background has — before acceding to the Agreement — informed the other beneficiaries that access to its background is subject to restrictions.

Requests for access must be made — unless agreed otherwise in writing — up to one year after the end of the action (see Data Sheet, Point 1).

#### Access rights for entities under the same control

Unless agreed otherwise in writing by the beneficiaries, access to results and, subject to the restrictions referred to above (if any), background must also be granted — under fair and reasonable conditions — to entities that:

- are established in an EU Member State or Horizon Europe associated country
- are under the direct or indirect control of another beneficiary, or under the same direct or indirect control as that beneficiary, or directly or indirectly controlling that beneficiary and
- need the access to exploit the results of that beneficiary.

Unless agreed otherwise in writing, such requests for access must be made by the entity directly to the beneficiary concerned.

Requests for access must be made — unless agreed otherwise in writing — up to one year after the end of the action (see Data Sheet, Point 1).

#### Access rights for the granting authority, EU institutions, bodies, offices or agencies and national authorities to results for policy purposes — Horizon Europe actions

In Horizon Europe actions, the beneficiaries which have received funding under the grant must grant access to their results — on a royalty-free basis — to the granting authority, EU institutions, bodies, offices or agencies for developing, implementing and monitoring EU policies or programmes. Such access rights do not extend to beneficiaries' background.

Such access rights are limited to non-commercial and non-competitive use.

For actions under the cluster 'Civil Security for Society', such access rights also extend to national authorities of EU Member States for developing, implementing and monitoring their policies or programmes in this area. In this case, access is subject to a bilateral agreement to define specific conditions ensuring that:

- the access rights will be used only for the intended purpose and
- appropriate confidentiality obligations are in place.

Moreover, the requesting national authority or EU institution, body, office or agency (including the granting authority) must inform all other national authorities of such a request.

*Access rights for the granting authority, Euratom institutions, funding bodies or the Joint Undertaking Fusion for Energy — Euratom actions*

In Euratom actions, the beneficiaries which have received funding under the grant must grant access to their results — on a royalty-free basis — to the granting authority, Euratom institutions, funding bodies or the Joint Undertaking Fusion for Energy for developing, implementing and monitoring Euratom policies and programmes or for compliance with obligations assumed through international cooperation with non-EU countries and international organisations.

Such access rights include the right to authorise third parties to use the results in public procurement and the right to sub-license and are limited to non-commercial and non-competitive use.

*Additional access rights*

Where the call conditions impose additional access rights, the beneficiaries must comply with them.

**COMMUNICATION, DISSEMINATION, OPEN SCIENCE AND VISIBILITY (— ARTICLE 17)**

**Dissemination**

*Dissemination of results*

The beneficiaries must disseminate their results as soon as feasible, in a publicly available format, subject to any restrictions due to the protection of intellectual property, security rules or legitimate interests.

A beneficiary that intends to disseminate its results must give at least 15 days advance notice to the other beneficiaries (unless agreed otherwise), together with sufficient information on the results it will disseminate.

Any other beneficiary may object within (unless agreed otherwise) 15 days of receiving notification, if it can show that its legitimate interests in relation to the results or background would be significantly harmed. In such cases, the results may not be disseminated unless appropriate steps are taken to safeguard those interests.

#### Additional dissemination obligations

Where the call conditions impose additional dissemination obligations, the beneficiaries must also comply with those.

### **Open Science**

#### Open science: open access to scientific publications

The beneficiaries must ensure open access to peer-reviewed scientific publications relating to their results. In particular, they must ensure that:

- at the latest at the time of publication, a machine-readable electronic copy of the published version or the final peer-reviewed manuscript accepted for publication, is deposited in a trusted repository for scientific publications
- immediate open access is provided to the deposited publication via the repository, under the latest available version of the Creative Commons Attribution International Public Licence (CC BY) or a licence with equivalent rights; for monographs and other long-text formats, the licence may exclude commercial uses and derivative works (e.g. CC BY-NC, CC BY-ND) and
- information is given via the repository about any research output or any other tools and instruments needed to validate the conclusions of the scientific publication.

Beneficiaries (or authors) must retain sufficient intellectual property rights to comply with the open access requirements.

Metadata of deposited publications must be open under a Creative Common Public Domain Dedication (CC 0) or equivalent, in line with the FAIR principles (in particular machine-actionable) and provide information at least about the following: publication (author(s), title, date of publication, publication venue); Horizon Europe or Euratom funding; grant project name, acronym and number; licensing terms; persistent identifiers for the publication, the authors involved in the action and, if possible, for their organisations and the grant. Where applicable, the metadata must include persistent identifiers for any research output or any other tools and instruments needed to validate the conclusions of the publication.

Only publication fees in full open access venues for peer-reviewed scientific publications are eligible for reimbursement.

#### Open science: research data management

The beneficiaries must manage the digital research data generated in the action ('data') responsibly, in line with the FAIR principles and by taking all of the following actions:

- establish a data management plan ('DMP') (and regularly update it)



- as soon as possible and within the deadlines set out in the DMP, deposit the data in a trusted repository; if required in the call conditions, this repository must be federated in the EOSC in compliance with EOSC requirements
- as soon as possible and within the deadlines set out in the DMP, ensure open access — via the repository — to the deposited data, under the latest available version of the Creative Commons Attribution International Public License (CC BY) or Creative Commons Public Domain Dedication (CC 0) or a licence with equivalent rights, following the principle ‘as open as possible as closed as necessary’, unless providing open access would in particular:
  - be against the beneficiary’s legitimate interests, including regarding commercial exploitation, or
  - be contrary to any other constraints, in particular the EU competitive interests or the beneficiary’s obligations under this Agreement; if open access is not provided (to some or all data), this must be justified in the DMP
- provide information via the repository about any research output or any other tools and instruments needed to re-use or validate the data.

Metadata of deposited data must be open under a Creative Commons Public Domain Dedication (CC 0) or equivalent (to the extent legitimate interests or constraints are safeguarded), in line with the FAIR principles (in particular machine-actionable) and provide information at least about the following: datasets (description, date of deposit, author(s), venue and embargo); Horizon Europe or Euratom funding; grant project name, acronym and number; licensing terms; persistent identifiers for the dataset, the authors involved in the action, and, if possible, for their organisations and the grant. Where applicable, the metadata must include persistent identifiers for related publications and other research outputs.

#### Open science: additional practices

Where the call conditions impose additional obligations regarding open science practices, the beneficiaries must also comply with those.

Where the call conditions impose additional obligations regarding the validation of scientific publications, the beneficiaries must provide (digital or physical) access to data or other results needed for validation of the conclusions of scientific publications, to the extent that their legitimate interests or constraints are safeguarded (and unless they already provided the (open) access at publication).

Where the call conditions impose additional open science obligations in case of a public emergency, the beneficiaries must (if requested by the granting authority) immediately deposit any research output in a repository and provide open access to it under a CC BY licence, a Public Domain Dedication (CC 0) or equivalent. As an exception, if the access would be against the beneficiaries’ legitimate interests, the beneficiaries must grant non-exclusive licenses — under fair and reasonable conditions — to legal entities that need the research output to address the public emergency and commit to rapidly and broadly exploit the resulting products and services at fair and reasonable conditions. This provision applies up to four years after the end of the action (see Data Sheet, Point 1).

#### **Plan for the exploitation and dissemination of results including communication activities**

Unless excluded by the call conditions, the beneficiaries must provide and regularly update a plan for the exploitation and dissemination of results including communication activities.

### **SPECIFIC RULES FOR CARRYING OUT THE ACTION (— ARTICLE 18)**

#### **Implementation in case of restrictions due to strategic assets, interests, autonomy or security of the EU and its Member States**

Where the call conditions restrict participation or control due to strategic assets, interests, autonomy or security, the beneficiaries must ensure that none of the entities that participate as affiliated entities, associated partners, subcontractors or recipients of financial support to third parties are established in countries which are not eligible countries or target countries set out in the call conditions (or, if applicable, are controlled by such countries or entities from such countries) — unless otherwise agreed with the granting authority.

The beneficiaries must moreover ensure that any cooperation with entities established in countries which are not eligible countries or target countries set out in the call conditions (or, if applicable, are controlled by such countries or entities from such countries) does not affect the strategic assets, interests, autonomy or security of the EU and its Member States.

#### **Recruitment and working conditions for researchers**

The beneficiaries must take all measures to implement the principles set out in the Commission Recommendation on the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers<sup>3</sup>, in particular regarding:

- working conditions
- transparent recruitment processes based on merit, and
- career development.

The beneficiaries must ensure that researchers and all participants involved in the action are aware of them.

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<sup>3</sup> Commission Recommendation 2005/251/EC of 11 March 2005 on the European Charter for Researchers and on a Code of Conduct for the Recruitment of Researchers (OJ L 75, 22.3.2005, p. 67).



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