

Project number: 653289  
Project duration: June 2015 – September 2018  
Project Coordinator: Ivonne Herrera, SINTEF



HORIZON 2020: Secure Societies  
TOPIC DRS-7-2014  
Crisis and disaster resilience –  
operationalising resilience concepts  
RESEARCH AND INNOVATION ACTION

Website: [www.h2020darwin.eu](http://www.h2020darwin.eu)

## D7.9 – Public



**Expecting the unexpected and knowing how to respond**

ADAPT TO SURVIVE

# Final data management plan

## VERSION

Version 1.0

## DATE

30-September-2018

## ABSTRACT

The DARWIN project aims to develop state of the art resilience guidelines and innovative training modules for crisis management. The guidelines, which will evolve to accommodate the changing nature of crises, are developed for those with responsibility of protecting the population or critical infrastructure/services from policy to practice.

This deliverable describes the open research data the DARWIN project has collected and generated and the procedures for handling such data and making it accessible. It is an updated version of Deliverable 7.3 (Initial data management plan).

## KEYWORDS:

Resilience, Resilience Engineering, Crisis Management, DMP, data management, FAIR data management

## DELIVERABLE ID

D7.9

## SYGMA ID

D37

## DISSEMINATION LEVEL

PU

## DELIVERABLE TYPE

R



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30-09-2018

### ETHICS BOARD REVIEW REQUIRED?

NO

### SECURITY BOARD REVIEW REQUIRED?

NO



## Release history

| VERSION | DATE         | VERSION DESCRIPTION / MILESTONE DESCRIPTION               |
|---------|--------------|---|
| 01      | 11-June-2018 | PCOS proposed   |
| 02      | 05-Sept-2018 | PCOS updated based on EC FAIR data management guidelines. |
| 03      | 13-Sept-2018 | Updated with input from WP1.                              |
| 04      | 17-Sept-2018 | Updated with input from WP4 and WP5                       |
| 05      | 26-Sept-2018 | External Proposed   |
| 06      | 28-Sept-2018 | External Revised  |
| 07      | 30-Sept-2018 | External Approved. Released to the EC.                    |

\*The project uses a multi-stage internal review process, with defined milestones. Milestone names include terms (in bold) as follows:

- **PCOS proposed:** Describes planned content and structure of different sections. Document authors submit for internal review.
- **PCOS revised:** Document authors produce new version in response to internal review comments.
- **PCOS approved:** Internal project reviewers accept the document.
  
- **Intermediate proposed:** Document is approximately 50% complete – review checkpoint. Document authors submit for internal review.
- **Intermediate revised:** Document authors produce new version in response to internal reviewer comments.
- **Intermediate approved:** Internal project reviewers accept the document.
  
- **External proposed:** Document is approximately 100% complete – review checkpoint. Document authors submit for internal review.
- **External revised:** Document authors produce new version in response to internal reviewer comments.
- **External approved:** Internal project reviewers accept the document.
  
- **Released:** Executive Board accepts the document. Coordinator releases the deliverable to the Commission Services.



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## List of Abbreviations

**Table 1: List of abbreviations**

| Term  | Explanation  |
|-------|--|
| DRMG  | DARWIN Resilience Management Guidelines  |
| DRS-7 | Disaster-resilience: safeguarding and securing society, including adapting to climate change (Topic 7) |
| DCoP  | DARWIN Community of Practice   |
| DMP   | Data Management Plan   |
| GDPR  | General Data Protection Regulation   |
| WP    | Work Package   |
| CI    | Critical Infrastructure  |
| CCs   | Capability Card  |
| DoA   | Description of the Action  |
| KPI   | Key Performance Indicator  |
| ATM   | Air Traffic Management   |
| DMP   | Data Management Plan   |

## List of Definitions

**Table 2: List of definitions**

| Term   | Explanation   |
|--|---|
| Capability Cards (CCs)                         | The Capability Cards (CC) are the building blocks of the guidelines. CCs propose specific interventions in order to develop and enhance specific resilience management capabilities. They are built based on knowledge captured through literature review and interviews with practitioners, and revised by incorporating operational perspectives. The guidelines build on the Capability Cards by organising and relating them, because the resilience management capabilities they refer to are not independent  |
| DARWIN Community of Practitioners (DCoP)       | An open association including crisis and resilience practitioners for interactive communication concerning topics related to resilience. Members of the DCoP are from different domains and are important potential contributors to and users of resilience guidelines. Membership is voluntary   |
| DARWIN Resilience Management Guidelines (DRMG) | The DARWIN Resilience Management Guidelines (DRMG) consist of guiding principles to help or advise a certain organisation in the creation, assessment or improvement of its own guidelines. Such principles should help the organisation in developing a critical view on its own crisis management activities (management of resources, procedures, training, etc.) based on resilience management concepts. It is important to underline that the DRMG could become complementary to guidelines, procedures and practices already present in a certain organisation, but they are not intended to replace them. |



| Term                               | Explanation   |
|------------------------------------|---|
|                                    | Consistently with this nature, the DRMG are mainly addressed to policy makers, decision makers and managers at different levels in an organisation. They can only indirectly affect the activities of front-line operators or first responders in crisis management, since these actors are users of those guidelines, procedures, practices that may have been redesigned or generated ex novo, after the adoption of the DRMG by their organisation   |
| General Data Protection Regulation | EU regulation (regulation (EU) 2016/679) on the protection of natural persons with regard to the processing of personal data and on the free movement of such data.   |
| Green Open Access                  | Self-archiving / 'green' open access – the author, or a representative, archives (deposits) the published article or the final peer-reviewed manuscript in an online repository before, at the same time as, or after publication. Some publishers request that open access be granted only after an embargo period has elapsed <sup>1</sup> .  |
| Gold Open Access                   | Open access publishing / 'gold' open access - an article is immediately published in open access mode. In this model, the payment of publication costs is shifted away from subscribing readers. The most common business model is based on one-off payments by authors. These costs, often referred to as Article Processing Charges (APCs) are usually borne by the researcher's university or research institute or the agency funding the research. In other cases, the costs of open access publishing are covered by subsidies or other funding models <sup>2</sup> . |
| Personal data                      | Personal data is any information that relates to an <b>identified or identifiable living individual</b> . Different pieces of information, which collected together can lead to the identification of a particular person, also constitute personal data. Personal data that has been de-identified, encrypted or <b>pseudonymised</b> but can be used to re-identify a person remains personal data and falls within the scope of the law.   |
| Anonymised data                    | Personal data that has been rendered <b>anonymous</b> in such a way that the individual is not or no longer identifiable.   |
| Privacy                            | In the EU, human dignity is recognised as an absolute fundamental right. In this notion of dignity, privacy or the right to a private life, to be autonomous, in control of information about yourself, to be let alone, plays a pivotal role. Privacy is not only an individual right but also a social value. The right to privacy or private life is enshrined in the Universal Declaration of Human Rights (Article 12), the European Convention of Human Rights (Article 8) and the European Charter of Fundamental Rights (Article 7) <sup>3</sup> .                  |
| Data protection                    | Data protection is about protecting any information relating to an identified or identifiable natural (living) person, including names, dates of birth, photographs, video footage, email addresses and telephone numbers. The notion of data protection originates from the right to privacy and both are instrumental in preserving and promoting fundamental values and rights; and to exercise other rights and freedoms - such as free speech or the right to  |

<sup>1</sup> [http://ec.europa.eu/research/participants/data/ref/h2020/grants\\_manual/hi/oa\\_pilot/h2020-hi-oa-pilot-guide\\_en.pdf](http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-pilot-guide_en.pdf)

<sup>2</sup> Ibid.

<sup>3</sup> [https://edps.europa.eu/data-protection/data-protection\\_en](https://edps.europa.eu/data-protection/data-protection_en)



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| Term                 | Explanation  |
|----------------------|--|
|                      | assembly. Data protection has precise aims to ensure the fair processing (collection, use, storage) of personal data by both the public and private sectors <sup>4</sup> . |
| FAIR Data Management | FAIR stands for: <b>F</b> indable, <b>A</b> ccessible, <b>I</b> nteroperable and <b>R</b> eusable data.  |

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<sup>4</sup> Ibid.





## Executive Summary

This deliverable presents the final version of the Data Management Plan (DMP) and is an update of deliverable 7.3 *Initial data management plan*. It presents the data collected in the project and how the project will make this data **findable, accessible, interoperable and reusable**, in accordance with the concept of FAIR data management.

It follows the template for DMP provided by the European Commission in the *Guidelines on FAIR Data Management in Horizon 2020*, version 3.0, July 2016<sup>5</sup>, and provides technical details on the data collected, as well as purpose for data collection, data utility and where and how data can be accessed and reused.

**About the project:** The DARWIN project aims to develop state of the art resilience guidelines and innovative training modules for crisis management. The guidelines, which will evolve to accommodate the changing nature of crises, are developed for those with the responsibility of protecting population or critical services from policy to practice.

The guidelines address the following resilience capabilities and key areas:

- Capability to anticipate
  - Mapping possible interdependencies
  - Build skills to notice patterns using visualisations
- Capability to monitor
  - Identify resilience related indicators, addressing potential for cascade
  - Establish indicators that are used and continuously updated
- Capability to respond and adapt (readiness to responds to the expected and the unexpected)
  - Conduct a set of pilot studies
  - Investigate successful strategies for resilient responses
- Capability to learn and evolve
  - Explore how multiple actors and stakeholders operate in rapidly changing environments
  - Enable cross-domain learning on complex events
- Key areas: social media and crisis communication; living and user-centred guidelines; continuous evaluation and serious gaming

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<sup>5</sup> [http://ec.europa.eu/research/participants/data/ref/h2020/grants\\_manual/hi/oa\\_pilot/h2020-hi-oa-data-mgt\\_en.pdf](http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf)



## 1 Introduction

### 1.1 Purpose of the document

This deliverable constitutes the project's DMP and describes what data has been collected and how it has been processed and managed in the project. It further outlines how and what parts of the data will be available after the project has been completed, and by what means these will be made available.

### 1.2 Authorship and Intellectual Property Rights (IPR)

This deliverable has been prepared by SINTEF with input from the work package (WP) leaders from WP1 (FOI), WP2 (SINTEF), WP4 (DBL) and WP5 (KMC). The WP leaders have mainly contributed to section 3 and 0 with detailed descriptions of the data collected in their WPs, and how these data have been managed and will be preserved. ISS and FOI have contributed with feedback and input through their role as reviewers of the document.

In this deliverable the DARWIN Wiki is described as a channel for making data generated by the project available. The IPR principle that applies to this tool is outlined in the table below. For information on IPR principles applied to other DARWIN results, please see deliverable 6.8 Plan for Business and Exploitation of Results (Final).

| Key Results                             | Asset (IP)  | IPR Principle                      | Primary Exploitation Partner(s)       |
|---|-------------|------------------------------------|---------------------------------------|
| Darwin Resilience Management Guidelines | DARWIN Wiki | Creative Commons CC-BY 4.0 license | SINTEF, ENAV, ISS, DBL, FOI, KMC, BGU |

### 1.3 Intended readership

This deliverable is mainly intended for use internally in the project, to provide guidance on data management to project partners and participants. In addition, section 3 and 4 can be used by external actors to gain knowledge of what data has been generated and how to access such data after the project ends.

### 1.4 Structure of this document

Section 3-5 follows the official template for DMP and FAIR data management, whereas section 2 gives an introduction to the guiding principles for data management applied in the project.

- Section 2 describes the guiding principles for the overall data management in DARWIN
- Section 3 provides details on the data collected and generated in the project
- Section 4 provides an overview of how the open data can be accessed and reused.
- Section 4 addresses how DARWIN will relate to the concept of FAIR Data Management
- Section 6 describes how the project has handled issues related to secure storage of research data and data protection.

### 1.5 Stakeholder involvement

The involvement of end-users and stakeholders is central to achieving the development of the DARWIN Resilience Management Guidelines (DRMG), which is the main objective and core result of the DARWIN



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project. Their involvement will ensure transnational, cross-sector applicability and long-term relevance, and to secure their input and involvement in the project the *DARWIN Community of Practice* (DCoP) has been established. The DCoP includes relevant stakeholders and end-users representing different domains and critical infrastructures (CIs) as well as resilience experts.

The DCoP has been an important source of data collected in the project. DCoP members, in addition to other relevant stakeholders who participated in the pilot exercises, provided input on end user needs, requirements and practices relevant to the development of the DARWIN Resilience Management Guidelines (DRMG) and associated innovative tools and training material, as well as continuous feedback during the development phase. Such data was collected through surveys, interviews, webinars, questionnaires and face-to-face workshops.

### 1.6 Relationship with other deliverables

The DMP presented in this document complements the following deliverables:

- D7.1 – Project Management Manual: D7.9 presents procedures for managing research data developed during the project and thus enables the management procedures presented in D7.1
- D7.3 – Initial data management plan: D7.9 presents an updated version of D7.3
- D7.4 – DARWIN Ethical approvals: The content of D7.4 provides input to D7.9 through the Ethical approvals.



## 2 Guiding Principles

The DARWIN project is an "open" project with 23 of the 38 deliverables in the project being public. Among the 15 that are confidential 11 are related to project management and reporting. The figure below is taken from D7.3 and illustrates the main procedure used in the project to ensure open access to research data and publications.

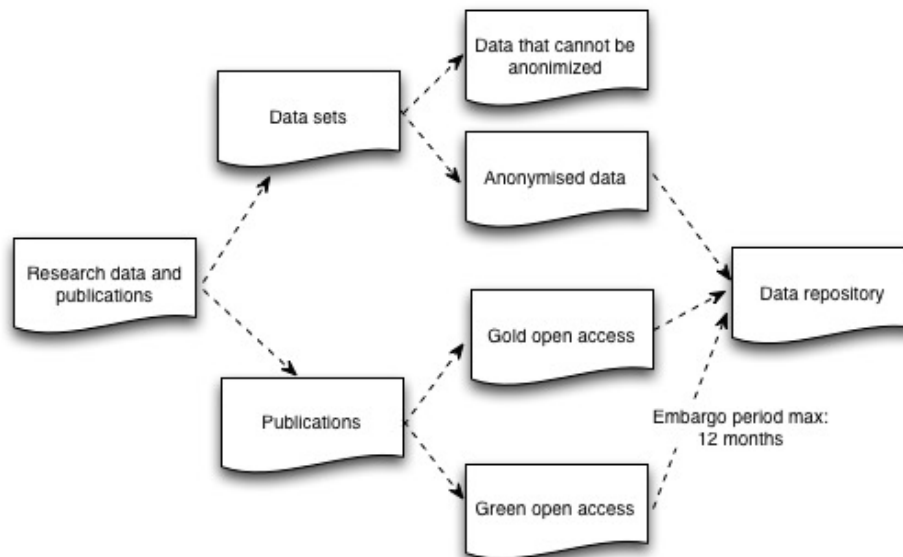


Figure 1: DARWIN data sets and publications

### 2.1 General Data Protection Regulation (GDPR)

As of May 2018, the General Data Protection Regulation (GDPR) is applicable in all Member States in the European Union, as well as in the countries in the European Economic Area (EEA). GDPR updates and modernises existing laws on data protection to strengthen citizens' fundamental rights and guarantee their privacy in the digital age.

The DARWIN project has reviewed the data collected through the project and how this has been processed and stored. We have received confirmation from the Norwegian Social Science Data Services (NSD)<sup>6</sup>, who is our main advisor in handling sensitive data as well as our main data archiving facility, that they operate in accordance with the new GDPR rules. We have also consulted our Ethics and Security Board comprised of project external experts to confirm that our procedures are in line with GDPR and sound research ethics. In addition, we have contacted all members of the DCoP to get updated permission to store their contact data for involving them in project work and activities.

All data collected from stakeholders in the project has been done in accordance with applicable ethical standards and requirements in the respective countries of the data collection, as well processed and handled secure and in line with applicable rules and regulations on privacy and data protection. Deliverable 7.4 *Ethical approvals* outline how the project has handled sensitive data, as well as presents the required ethics approvals from the countries where data was gathered.

<sup>6</sup> <http://www.nsd.uib.no/nsd/english/index.html>



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Before any of the data collected were published, it went through a process of anonymisation, aggregation and analysis, so that none of the publicly available data can be traced back to an individual participant or respondent.



### 3 Data summary

This chapter describes the datasets that has been gathered and processed during the project and follows the template for DMP as presented in the *Guidelines on FAIR Data Management in Horizon 2020*, version 3.0 from July 2016<sup>7</sup>.

Datasets in DARWIN are defined as *organised data* and excludes *un-organised data*. An example of un-organised data is notes from interviews, workshops and exercises that are not directly included in the project deliverables but are only used in deliverables in aggregated or analysed form. Such data was used for guidance and analysis internally in the project only and were not structured in a way to make them reusable after the end of the project. As you will see, not all datasets from the project will be openly available after the end of the project, and in the cases were a dataset is public, there might still be parts of the dataset that remain non-public. There are five main reasons for this:

1. Data collected from volunteers participating in interviews, workshops and pilot exercises (etc.) contains personal data that is confidential. The project is subject to Ethical Requirements to protect this data and ensure the participants privacy. Only aggregated, anonymised and analysed data from datasets are included in project deliverables and/or published in articles and papers. In the cases were datasets are not made public, the main reason is that the data has the potential to be traced back to the individual participants and must remain confidential to protect their privacy.
2. The data collected in this project is context specific, and the publicly available part of this data is at the highest level of detail that can be interpreted and understood by external readers. Including more data, as in the form of "raw data", could lead to misinterpretations of the data.
3. Some of the data collected in its "raw form" in the pilot exercises reveals details of critical infrastructure operations that are to be considered *security* and *organisational sensitive information*<sup>8</sup> and we do not have permission from the concerned organisations to make this data available. For more information, please see deliverable 4.3, section 9.4<sup>9</sup>.
4. Most data from stakeholders and participants were collected in local languages, for example in the pilot studies in Sweden and Italy. This data was then aggregated and analysed, and only the analysis of this data is available in English. To translate all raw material from interviews, workshops etc. to English would require resources beyond the availability of the DARWIN project, and would again potentially lead to the identification of individual participants (or organisations).
5. Data collected from scientific publications is in most cases copyright-protected so that datasets with entries of text taken directly from scientific publications cannot be reproduced publicly, except for occasional quotes of very limited length.

Since all descriptions of datasets follow the same template, the same wording might be repeated between the different descriptions. The name for each data set includes a prefix "DS" for data set, followed by a case-study identification number, the partner responsible for collecting and processing the data, as well as a short title.

Table 3 provides an overview of the datasets collected. Updated and more detailed descriptions of each set is provided in the following sub-sections.

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<sup>7</sup> [http://ec.europa.eu/research/participants/data/ref/h2020/grants\\_manual/hi/oa\\_pilot/h2020-hi-oa-data-mgt\\_en.pdf](http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf)

<sup>8</sup> [https://ec.europa.eu/research/participants/data/ref/h2020/other/hi/secur/h2020-hi-guide-classif\\_en.pdf](https://ec.europa.eu/research/participants/data/ref/h2020/other/hi/secur/h2020-hi-guide-classif_en.pdf)

<sup>9</sup> <https://h2020darwin.eu/project-deliverables/>



**Table 3: Overview of data sets**

| No.        | Identifier/Name                        | Brief description   | Public                                  |
|------------|--|---|---|
| 1          | DS.WP1.FOI.Practices                   | This data set provides the aggregated data from an interview series conducted with relevant practitioners to gather data on practices, needs, expectations and experiences with crisis management and resilience.   | Yes                                     |
| 2          | DS.WP1.FOI.Literature.Analysis         | This data set provides the aggregated data from a worldwide literature survey (conducted in WP1) addressing crisis management and resilience.   | Yes                                     |
| 3<br>(new) | DS.WP1.FOI.Literature.Working.Material | This data set is the DARWIN-internal dataset that provides guidance for the DRMG developers to extract relevant input from the Literature Analysis.   | No                                      |
| 4<br>(new) | DS.WP2.SINTEF.DRMG.Working.Material    | This data set have collected stakeholder input/feedback on the DRMG/CCs during the development phase, through DCoP surveys, interviews with outside experts, interviews with project internal experts, and cycles of revisions of the guidelines.   | No                                      |
| 5          | DS.WP4.DBL.Pilots                      | This data set provides feedback and qualitative insights on the use of DARWIN resilience management guidelines (including practices and associated methods) by end-users, in the context of the pilot cases conducted in healthcare and ATM as well as other related domains.   | Yes                                     |
| 6<br>(new) | DS.WP4.DBL.Questionnaires              | This data set provides feedback on the potential impact of the DRMG in improving resilience, as perceived by the practitioners that were involved in the different evaluation events, including the Pilot Exercises, the Interactive Sessions of the 3 <sup>rd</sup> DCoP Workshop and all the other smaller scale evaluation events. | No                                      |
| 7          | DS.WP5.KMC.DCoP_Workshops.Feedback     | This data set provides qualitative insights and inputs from the DARWIN Community of Practice giving feedback on the presented project work( e.g. DRMG, simulation tool and training materials).   | Yes                                     |
| 8<br>(new) | DS.WP5.KMC.DCoP_Workshops.Evaluation   | This data set provides feedback and qualitative insights on the DCoP Workshop organization and execution during the DARWIN project.   | No<br>(except quotes in D5.2, 5.3, 5.5) |



### 3.1 DS.WP1:FOI.Practices

| Type of data                                | Format | Size of data   | Public/Non-public |
|---|--------|----------------|-------------------|
| Text file<br>(Deliverable 1.1, section 3.3) | PDF/A  | 13 pages (PDF) | Public            |

**Purpose of the data collection/generation:** Identify resilience and brittleness aspects from significant crisis and everyday practices of crisis response organisations and the public, in order to provide content to and requirements for the DRMG.

**Relation to the objectives of the project:** This data contributed to achieving objective 5:

*To build on “lessons learned” in the area of resilience by:*

1. *Identifying criteria that provide indicators of what works well and what does not;*
2. *Applying these criteria in defining and evolving resilience guidelines.*

**Re-use of existing data:** None.

**Origin of data:** Interviews with stakeholders and practitioners.

**Data utility:** This data can be useful for actors that are interested in issues concerning crisis management, e.g. crisis response practitioners from safety- and security-critical complex domains, the research communities involved with the various aspects of resilience and crisis management research and application, and the project partners of DARWIN.

### 3.2 DS.WP1.FOI.Literature.Analysis

| Type of data  | Format | Size of data             | Public/Non-public |
|---|--------|--------------------------|-------------------|
| Text files:<br>Literature analysis in D1.1, section 2 | PDF/A  | Analysis: 74 pages       | Public            |
| Reference list in D1.1, appendix A                    | PDF/A  | Reference list: 19 pages | Public            |

**Purpose of the data collection/generation:** To identify resilience concepts, methods, definitions, practices, tools, in order to provide content and requirements for the DRMG.

**Relation to the objectives of the project:** This data contributed to achieving objective 5:

*To build on “lessons learned” in the area of resilience by:*

1. *Identifying criteria that provide indicators of what works well and what does not;*
2. *Applying these criteria in defining and evolving resilience guidelines.*

**Re-use of existing data:** Systematic Literature Review (SLR): We performed and aggregation and analysis of existing (published) journal articles.

**Origin of data:** Data collected from relevant scientific journals, identified through searching the SCOPUS database and the DARWIN Description of Action (DoA).

**Data utility:** This aggregated and structured data that is presented in the catalogue that is D1.1 can be useful for actors that are interested in issues concerning crisis management, e.g. crisis response practitioners from safety- and security-critical complex domains, the research communities involved with the various aspects of resilience and crisis management research and application, and the project partners of DARWIN.





### 3.3 DS.WP1.FOI.Literature.Working.Material

| Type of data  | Format | Size of data                     | Public/Non-public |
|---|--------|----------------------------------|-------------------|
| Excel spreadsheet containing specific questions for the use of creating DRMG content, interpreting the scope and gathering relevant input to the project. | .xlsx  | 138 k (DoA)<br>2089 k (articles) | Non-public        |

**Purpose of the data collection/generation:** To assist project partners in navigating data from the SLR and identify resilience concepts, methods, definitions, practices and tools, in order to provide content and requirements for the DRMG. This data is organised as a spreadsheet database in excel format to be used by project-internal DRMG developers, searching for input to the guidelines.

**Relation to the objectives of the project:** This data contributed to achieving objective 5:

*To build on “lessons learned” in the area of resilience by:*

1. *Identifying criteria that provide indicators of what works well and what does not;*
2. *Applying these criteria in defining and evolving resilience guidelines.*

**Re-use of existing data:** SLR: We performed an aggregation and analysis of existing (published) journal articles.

**Origin of data:** Data collected from relevant scientific journals, identified through searching the SCOPUS database and the DARWIN Description of Action (DoA).

**Data utility:** Project internal: used by DRMG developers searching for input to the guidelines.

### 3.4 DS.WP2.SINTEF.DRMG.Working.Material

| Type of data  | Format          | Size of data         | Public/Non-public |
|---|-----------------|----------------------|-------------------|
| Text files – stakeholder analysis:  |                 |                      |                   |
| Deliverable 2.1   | PDF/A           | 160 pages (14,32 MB) | Public            |
| Deliverable 2.4   | PDF/A           | Approx. 300 pages    | Public            |
| Text files – adaption of the DRMG:  |                 |                      |                   |
| Deliverable 2.2   | PDF/A           | 137 pages (3,71 MB)  | Public            |
| Deliverable 2.3   | PDF/A           | 140 pages (4 MB)     | Public            |
| Text files – adaption of the DRMG:  |                 |                      |                   |
| Hand-written notes from interviews, workshops and exercises. Data collected in local languages. | Paper documents |                      | Non-public        |



| Type of data  | Format                                | Size of data     | Public/Non-public                  |
|---|---------------------------------------|------------------|------------------------------------|
| Text files - Cycles of revisions of the involving members of the DARWIN research team:<br><br>Electronic notes and comments provided in the wiki<br><br>Electronic documents including notes and feedback on the DRMG | .txt<br><br>.txt / .docx              |                  | Non-public                         |
| Text files: part of DARWIN Resilience Management Guidelines – Deliverable 2.4<br>DARWIN Resilience Management Guidelines – Wiki<br><br>DARWIN Resilience Management Guidelines – Book format                          | PDF/A<br><br>Online Wiki<br><br>PDF/A | Appox. 300 pages | Public<br><br>Public<br><br>Public |

**Purpose of the data collection/generation:** To collect feedback on the development of the DRMG and Capability Cards (CCs) and their adaptability to different domains, focusing on ATM and healthcare. And to perform cycles of revisions of the DRMG to improve their relevance and usability for end-users. The non-public data contain personal data that can be traced back to individuals and are therefore subject to data protection and privacy measures and cannot be shared.

**Relation to the objectives of the project:** This data contributed mainly to achieving objective 1 but also other objectives (see deliverable 2.4 for more details):

*To make resilience guidelines available in a form that makes it easy for a particular infrastructure operator to apply them in practice, by:*

1. *Surveying and cataloguing resilience concepts, approaches, practices, tactics and needs*
2. *Adapting/customising them to the needs of a domain or specific organisation;*
3. *Utilization of social media by emergency authorities, first responders and the public as part of resilience management;*
4. *Quickly locating and accessing the details relevant to a specific situation;*
5. *Integrating them within existing working processes within organisations;*
6. *Entering new information (e.g. based on practical experience) that updates the guidelines (to “learn and evolve”).*

**Re-use of existing data:** Input from WP1 and WP4 deliverables.

**Origin of data:** Surveys, interviews and workshops with both project internal experts, external experts, and practitioners, end-users and external experts that are members of the DCoP.

**Data utility:**

Non-public data: Project internal - used by DRMG developers for input to development of the DRMG.

Public data:

Deliverable 2.1: Practitioners and researchers outside the project that are involved in developing the resilience of critical infrastructures, and to developers of guidelines: 1) the development process (including assessment and revision activities) is described in detail in order to provide potential methodological support; 2) the content, organisation and nature of the guidelines can serve as a source of reference; and, 3) the development of the DARWIN Wiki highlights the issues of knowledge management and access associated with the evolving guidelines content, and implements various capabilities to support such efforts.



**Deliverable 2.2:** This is useful for policy, healthcare crisis managers, healthcare critical infrastructure managers and community of practice healthcare and other CIs as source of inspiration when adapting resilience guidelines for their domains.

**Deliverable 2.3:** useful for ATM stakeholders (i.e. policy makers, crisis managers, critical infrastructure managers and community of practice) and other CIs as source of inspiration when adapting resilience guidelines for their domains.

**Deliverable 2.4:** Primary users are managers and stakeholders responsible for CIs who are interested in adapting and adopting resilience management guidelines in their organisation, especially within the ATM and healthcare domain, but also relevant to other CIs. Other groups this could be useful for include: 1) Members of the DCoP and of the DARWIN consortium who might be involved in pursuing this work, expanding and improving the guidelines described here; 2) practitioners and researchers outside the project that are involved in enhancing the resilience of Critical Infrastructures; and, 3) other developers of guidelines, who might find insight in the content and process described. This is useful for the following groups:

### 3.5 DS.WP4.DBL.Pilots

| Type of data  | Format       | Size of data                       | Public/Non-public |
|---|--------------|------------------------------------|-------------------|
| Text files:   |              |                                    |                   |
| Deliverable 4.3   | PDF/A        | 140 pages                          | Public            |
| Deliverable 4.4   | PDF/A        | 180 pages                          | Public            |
| Excel spreadsheets<br>(Overall Summative and Formative Evaluation grid) | .xlsx        | 1 spreadsheet with 6 tabs<br>278KB | Non-public        |
| Audio recordings  | .m4A<br>.mp3 | 560MB<br>177M                      | Non-public        |

**Purpose of the data collection/generation:** Provide accounts of involved personnel and end-users' experiences in using the DRMGM, to provide feedback to the development and support the improvement of end results.

**Relation to the objectives of the project:** This data contributed to achieving objective 6:

*To carry out two pilots that apply project results in two key areas - Health care and Air Traffic Management (ATM) – and use the experience gained to improve project results and demonstrate their practical benefits in these domains, as well as add value to established risk management practices and guidelines.*

**Re-use of existing data:** None.

**Origin of data:** Focus Groups, Workshops, Interviews with and observations of participants at pilot exercises.

**Data utility:** This data can be useful for practitioners and researchers that are interested in the result of the assessment of the DRMGM. They can also be of interest for other organizations that operate in the same domain of crisis management tested in the pilot exercises and would like to know more about the effects of adopting the DRMGM (with focus, but not limited, to Healthcare and ATM).



### 3.6 DS.WP4.DBL.Questionnaires

| Type of data   | Format | Size of data                      | Public/Non-public |
|--|--------|-----------------------------------|-------------------|
| Excel spreadsheets   | .xlsx  | 11 Spreadsheets<br>(one tab each) | Non-public        |
| Google Forms Entries<br>(De-identified and accessible only to DBL) | PDF/A  | 182 Entries                       | Non-public        |

**Purpose of the data collection/generation:** To collect additional feedback on the DRMGs and CCs after each pilot exercise, as well as in smaller scale evaluations including other domains, separate from and in between pilot exercises. Data were collected both via online surveys and paper questionnaires (one per each CC plus one for the DARWIN Wiki as a whole). The structure and content of the questionnaire was the same in both formats. The resulting data was aggregated into Excel spreadsheets, and the anonymised analysis of it was included in the overall evaluation documents described in section 3.5. The questionnaire data itself was only used internally in the project, for reasons listed in the introduction to this section.

**Relation to the objectives of the project:** This data contributed to the achievement of objective 6:

*To carry out two pilots that apply project results in two key areas - Health care and Air Traffic Management (ATM) – and use the experience gained to improve project results and demonstrate their practical benefits in these domains, as well as add value to established risk management practices and guidelines.*

**Re-use of existing data:** None.

**Origin of data:** Questionnaires (both as online survey and paper format).

**Data utility:** Project-internal DRMG developers: This data was used to feed the Summative and Formative Evaluation in combination with qualitative data deriving from Pilot Exercises.

### 3.7 DS.WP5.KMC.DCoP\_Workshops\_Input

| Type of data  | Format          | Size of data         | Public/Non-public |
|---|-----------------|----------------------|-------------------|
| Text files:   |                 |                      |                   |
| Deliverable 5.2   | PDF/A           | 27 pages (746,42 KB) | Public            |
| Deliverable 5.3   | PDF/A           | 51 pages (1,88 MB)   | Public            |
| Deliverable 5.5   | PDF/A           | 71 pages (2,47 MB)   | Public            |
| Text files (paper)<br>Unprocessed original paper questionnaires | Paper documents | 370 A4 pages         | Non-public        |

**Purpose of the data collection/generation:** Data collected and generated in this set had two main purposes: 1) to establish and manage a community of crisis and resilience practitioners that would, 2) provide input from end-users and practitioners to WP2, WP4, WP3 to improve results and ensure that the DRMGs and associated tools are relevant, useful and adaptable across different domains and critical infrastructures.

**Relation to the objectives of the project:** This data contributed to achieving objective 4 and 5.

*Objective 4: To establish a forum - the Community of Resilience and Crisis Practitioners - with a lifetime that will extend beyond the end of the project, that will:*



## D7.9 – Final data management plan

1. *Bring together infrastructure operators, policy makers and other relevant stakeholders;*
2. *Allow them to exchange views and experiences in a dynamic, interactive and fluent way enabled by social media;*

*Objective 5: To build on “lessons learned” in the area of resilience by:*

3. *Identifying criteria that provide indicators of what works well and what does not;*
4. *Applying these criteria in defining and evolving resilience guidelines.*

**Re-use of existing data:** None.

**Origin of data:** Data collected at 3 face-to-face workshops held at KMC's premises in Linköping, Sweden; 6 webinars using GoToMeeting; and, 1 DCoP Questionnaire.

**Data utility:** The utility of this data was mainly internally in the project, as input to develop and improve project results. However, the results of the DCoP questionnaire will also be useful for the members of the DCoP who will participate in the community beyond the end of the project, as well as for other related research projects that are interested in establishing similar communities or connecting with the DCoP.

### 3.8 DS.WP5.KMC.DCoP\_Workshops\_Evaluation

| Type of data  | Format          | Size of data | Public/Non-public |
|---|-----------------|--------------|-------------------|
| Excel spreadsheets<br>(Input to deliverables 5.2, 5.3, 5.5)     | .xlsx           | 25Kb         | Non-public        |
| Unprocessed original paper questionnaires, notes, and post-it's | Paper documents | 259 A4 pages | Non-public        |

**Purpose of the data collection/generation:** Collect feedback from participants at DCoP workshops and webinars to improve and tailor future events to their wants and needs.

**Relation to the objectives of the project:** This data directly contributed to achieving objective 4:

*To establish a forum - the Community of Resilience and Crisis Practitioners - with a lifetime that will extend beyond the end of the project, that will:*

1. *Bring together infrastructure operators, policy makers and other relevant stakeholders;*
2. *Allow them to exchange views and experiences in a dynamic, interactive and fluent way enabled by social media;*

**Re-use of existing data:** None.

**Origin of data:** Evaluation surveys.

**Data utility:** This data was used internally in the project, to improve each DCoP workshop and raise the attractiveness of becoming a DCoP member and participating at these events. Part of this data was transcribed and is presented in Deliverables 5.2, 5.3, 5.5. Tentatively, the unprocessed data could be analysed in future scientific publications.



## 4 FAIR Data Management

### 4.1 Making data findable

**Discoverability of data (metadata provision):** No metadata in the form of unprocessed data collected through pilot exercises, interviews, workshops, questionnaires and surveys (such as interview notes) will be made available due to reasons explained in the beginning of section 3. Metadata in the form of descriptions of the process and methodologies used to collect the data, in addition to the public part of all datasets, are included in the deliverables available in PDF/A format on the DARWIN project website<sup>10</sup>.

**Identifiability of data:**

- No system for unique identifiers, such as Digital Object Identifiers, has been applied to the publicly available data in this project.
- For internal organisation of confidential, anonymised metadata collected during the third DCoP workshop a Google Forms questionnaire created by WP4 was used. A number systems was used to preserve each participants anonymity and privacy while at the same time enabling tracking of responses between sessions for comparison and analysis.

**Naming conventions used:** DARWIN deliverables, which contain all publicly available data generated in the project, make use of the same persistent system for identifiers: The identifier starts with the name of the project as a prefix, followed by a "D" for deliverable, followed by the number of the WP, followed by the number of the deliverable in that WP, and ending with the full title of the document, such as: *DARWIN\_Dx.y\_Title of deliverable*.

**Approach to search keywords:** All DARWIN deliverables include search keywords on the cover page.

**Approach for clear versioning:** All DARWIN deliverables includes a table on page 3 containing clear versioning and description of document history.

**Standards for metadata creation:** No metadata will be made publicly available. Internally in the project, Excel spreadsheets were used to aggregate and organise metadata collected from different sources of evidence.

### 4.2 Making data openly accessible

**Open data:** All open data in DARWIN is included in the deliverables and the DARWIN wiki, which is all available through the project website<sup>11</sup>. The open data consists of analysis of aggregated data collected from different sources of evidence, as well as descriptions of processes and methodologies for data collection and generation.

**Closed data:** All metadata in the form of unprocessed data collected through pilot exercises, interviews, workshops, questionnaires and surveys (such as interview notes) will remain closed/confidential, due to the reasons described in the beginning of section 3. For WP1, the rationale for keeping the dataset "DS.WP1.Literature.Working.Material" closed, and only available to partners participating in the SLR, is because the data in this spreadsheet consist of interpretations of what from the scientific content of the SLR journals are relevant and useful to DARWIN. In addition, sharing data directly from this spreadsheet, parts of which are directly copied from the scientific journals themselves, would violate copyright laws.

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<sup>10</sup> <https://h2020darwin.eu/project-deliverables/>

<sup>11</sup> DARWIN Deliverables: <https://h2020darwin.eu/project-deliverables/> / DARWIN Wiki: <https://h2020darwin.eu/wiki/>





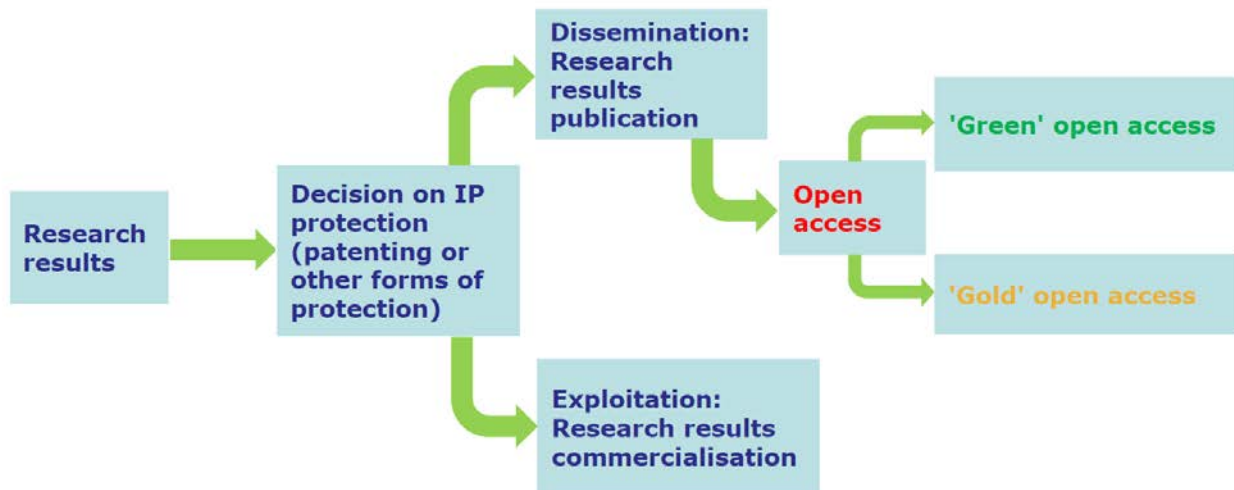
**How and where data will be made available:** All publicly available data is made available on the DARWIN project website – either in the form of PDF/A documents (deliverables), or in the DARWIN Wiki<sup>12</sup>. The DARWIN Wiki also includes an option to create and download a "book version" of its content in PDF/A format. The open research data collected in the project is archived in NSD's research data repository. NSD is one of the largest archives of its kind and used by researchers and students in Norway and abroad. Using the NSD data repository will ensure long-term and secure preservation of the data and results from the project. In addition, all deliverables are included in SINTEF's Open Research Data Repository<sup>13</sup>.

**Methods, software or tools needed to access the data:** No specific method, software or tool, other than an internet connection and internet browser, will be needed to access the publicly available data from DARWIN.

**Access restrictions:** There will be no access restriction on any open data from DARWIN. The only minor restriction is that the DARWIN Wiki and its content is subject to a Creative Commons CC-By 4.0 license, which requires the users to give credit to the DARWIN project and European Commission as funding agency when reused.

#### 4.2.1 Open access to publications

The DARWIN project has worked by the policy that any publications from the project must be available as open access (as far as practically possible). There are two main routes for providing open access publications: Green and Gold (see Figure 2). Gold open access means the article is available as open access by the scientific publisher. Some journals require an author-processing fee for publishing open access. Green open access or self-archiving and means that the published article or the final peer-reviewed manuscript is archived by the researcher in an online repository (e.g. project website and SINTEF Open research repository), in most cases after its publication. Most journals within the social sciences domains require authors to delay self-archiving to repositories to 12 months after the article first being published.



**Figure 2: Open Access routes (source: European IPR Helpdesk)**

The project has published more than 5 peer-reviewed publications. The project members strive to publish in journals where free open access is available (gold open access), as far as possible. In some occasions, priority

<sup>12</sup> Ibid.

<sup>13</sup> <https://brage.bibsys.no/xmlui/handle/11250/299122>



might be given to journals or conferences with high impact were full open access might be not available. High ranked journals are important to achieve impact in the area of science and knowledge. Details on publications, journals, conferences and updated KPIs are included in deliverable 6.7 Dissemination, exploitation and external collaborations strategy.

### 4.3 Making data interoperable

**Interoperability of data:** All publicly available data in DARWIN are made available in text formats, namely PDF/A, or in text format in the wiki. The reference list in the DS.WP1.Literature.Analysis uses the APA standard for referencing. All context specific metadata is summarised on a level that is not relevant for data pooling.

### 4.4 Increase data re-use

**Licenses:** The only data from the project subject to a license is the DARWIN wiki and its content. This is covered by a Creative Commons CC-By 4.0 license, which lets users use the wiki freely, but requires them to credit the project and the European Commission as funding agency if any data from this is referred to or reused externally. All other data are openly available and under no restrictions for re-use. For more information on IPR principles applied to other DARWIN results (e.g. simulation tool), please see deliverable 6.8 Plan for Business and Exploitation of Results (Final).

**Re-use:** All deliverables are available for download and re-use on the DARWIN project website as soon as possible after being submitted to the European Commission. All public/open deliverables include a description in section 1 of the intended readership of each deliverable. This outlines who the deliverable might be useful for outside the project consortium and provides guidance to external readers on whether the content of the deliverable is relevant and interesting for them to re-use. Non-public data from the project will remain available to the consortium partners only after the end of the project.

**Restrictions on re-use and data embargo periods:** No data embargo period will be applied to the open deliverables from the DARWIN project. The DARWIN wiki is currently closed in that a user account login is required to access the data. All the members of the DCoP have access to the wiki through such user accounts. On October 15<sup>th</sup> 2018 the user account restrictions will be removed and the DARWIN Wiki will be openly available to anyone who visits the project website. There is no time-limit on the availability of the open data from the DARWIN project; it will be available on the project website, in the NSD archives, and in the SINTEF data repository for an unlimited time-period. No restrictions on re-use, apart from the license mentioned above, applies to the open data from DARWIN.





## 5 Data security

The coordinating organisation of the DARWIN project, SINTEF, is subject to the laws and guidelines that are relevant for this project in Norway, which at the beginning of the project were Personal Data Act *LOV 2000-04-14 nr 13* and the Ethical guidelines for Internet Research 14. As of June 20<sup>th</sup> 2018 this law was replaced by *LOV-2018-06-15-38*, which updates the Personal Data Act to implement the EU's Privacy Policy (GDPR) in Norway and makes it Norwegian law. The Norwegian Data Inspectorate is an independent administrative body that ensures the enforcement of the new Personal Data Act. The Norwegian Social Science Data Services (NSD) is its partner for implementation of the statutory data privacy requirements in the research community. At the beginning of the project SINTEF reported all planned studies to NSD. This means that specific efforts have been taken towards ensuring the privacy of participants who take part in DARWIN studies, regardless of whether they live in Norway or in any other partner-country. Other partners have similarly been bound by local<sup>14</sup> and EU-level legislation<sup>15</sup> as well as following their own in-house ethical procedures in association with research projects (e.g. BGU for example submits research conducted by the university personnel to an Internal Review Board committee that has independent authority, and the studies are conducted only after approval has been provided in writing).

As mentioned in section 2, the project has taken steps to assure that the handling and storing of data is in accordance with EU law, in particular the GDPR. All personal data has been stored (if required in encrypted format) on secure, password/ token-protected servers.

During the project period, personal data has been de-identified; i.e. name and other characteristics that could identify a person has been removed and replaced by a number, which refers to a separate list of identifiable data. Once the project has finished, data will be completely anonymized, meaning links to lists of names and contact-information will be deleted and the anonymisation will be irreversible. No personal data will be stored after the end of the project period.

All open research data from DARWIN will be documented and archived in the NSD's research data repository<sup>16</sup>, and thus placed at the disposal of colleagues who want to re-use or elaborate on its findings<sup>17</sup>.

We ensure that personal data is kept securely. Any publications, including publications online, neither directly or indirectly lead to a breach of agreed confidentiality and anonymity<sup>18</sup>.

The research outcomes is reported without contravening the right to privacy and data protection. (Reference to Deliverable 7.4 *Ethical Approvals*, section 2, Requirement ER7, regarding FOI and KMC practices concerning personal data).

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<sup>14</sup> <https://www.etikkom.no/Forskningsetikk/Etiske-retningslinjer/Samfunnsvitenskap-jus-og-humaniora/Internett-forsking/>

<sup>15</sup> [http://ec.europa.eu/justice/data-protection/index\\_en.htm](http://ec.europa.eu/justice/data-protection/index_en.htm)

<sup>16</sup> <http://www.nsd.uib.no/cms/nsd/english/archive.html>

<sup>17</sup> Aligning with guidelines for good research practice in

[http://www.esf.org/fileadmin/Public\\_documents/Publications/Code\\_Conduct\\_ResearchIntegrity.pdf](http://www.esf.org/fileadmin/Public_documents/Publications/Code_Conduct_ResearchIntegrity.pdf)

<sup>18</sup> [http://ec.europa.eu/research/participants/data/ref/fp7/89867/social-sciences-humanities\\_en.pdf](http://ec.europa.eu/research/participants/data/ref/fp7/89867/social-sciences-humanities_en.pdf)



EXPECT THE UNEXPECTED AND KNOW HOW TO RESPOND

[WWW.H2020DARWIN.EU](http://WWW.H2020DARWIN.EU)