Grant Agreement No. 718679
Safety – Sentinel for geohazard prevention and forecasting

Deliverable D.B2.1: User Assessment - Procedure

A deliverable of

Task B: User requirements and assessments

Due date of deliverable: 01/01/2017
Actual submission date: 22/02/2017

Lead contractor for this deliverable: DPC
Partners: CDPC, IGME, CNR, UNIFI

Dissemination Level		
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TN	Technical Note	X

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EXECUTIVE SUMMARY

The activities defined and performed in the Action B.2 named “User Assessment” are described in this document, which represents the second official deliverable of Task B “User requirements and assessments”.

The objective of this action is the devolvement of an assessment procedure to evaluate the progresses of the project. In particular, this procedure will be applied during the second year of the project to assess the products delivered according to the user requirements defined in the Deliverable DB.1, which are listed in the annex A, in their consolidated version.

As defined in the DOW, the procedure to assess the progresses and the results of the Safety project is the Gap analysis. The Gap analysis will be applied to the list of user requirements established for each product in order to identify existing gaps between requirements and products and identify, if needed, recovery actions to fill the gaps.

As reported in the deliverable DB.1, due to the fact that the user requirements have been defined in the first stage of the project, the list, which plays the role of guidance for the development of the products, has been reviewed to be updated with the progresses of the project accomplished during the first year. The details of the products has been discussed and clarified among the consortium and some useful inputs are derived from the partners collaboration. The list of final user requirements of the Safety project are reported in the Annex A.

For these reasons, the present document has been delivered with a delay in order to be discussed during the first annual meeting of the project.

REFERENCE DOCUMENTS

N°	Title
RD1	DoW Part B
DB.1	Technical Note. User needs and requirements
Mom	Minutes of the technical Meeting Date: 6-7 February 2017

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INTRODUCTION

This document is a technical note which describes the assessment procedure for Safety project defined to evaluate the project progress during the development and the production phases, as well as the final results.

In particular, the evaluation will be conducted in two phases:

A. The first will include the evaluation of the project progresses in terms of compliance between the user requirements and the products as developed at month 18. After this first evaluation whose results will be published in deliverable D.B2.2 the presence of gaps will be identified in order to set up a specific procedure to fill in these gaps and implement the corrective measures during the last part of the project.
B. The final evaluation will be conducted from M18 to M24 and the final assessment of project results will be presented in the document D.B2.3 at the end of the Safety activities.

In the first section of this document the products, on which the assessment will be focused, are shortly described. In the second section the tool selected for the assessment process, i.e. the Gap analysis, is described.

At the end of the document, as already reported in the summary, the Annex A presents the final list of user requirements for each Safety product. This list will be used to perform the gap analysis in the next two deliverables.

1 SAFETY PRODUCTS

The list of products is reported in Table ***1*** with a short description, the definition of type and the corresponding Acronyms

Table 1: List of Safety products

Product	Acronym	Type of product	Short Description
Deformation activity map	DAM	Map	Multi-layer map containing, for each layer, different types of information related to the level of activity of each map cell.
Geohazard susceptibility and hazard map	GSH	Map	The likelihood of a landslide occurring in an area based on local terrain conditions. A simplified hazard map will be prepared, not considering the period of occurrence of slope failures since there is no information about temporal occurrence of landslides on both test sites.
Geohazard activity map	GAM	Map	Combines deformation map and geo-hazard inventories. It consists in a map that integrates the PSI ground deformation data, the inventory of geohazard phenomena and the morphology of the area. As a result, the geo-hazard activity map will highlight hotspot areas with active instability phenomena. It will be updated according to the SAR data processing.

Product	Acronym	Type of product	Short Description
Impact assessment on structure and infrastructure map	IASI	Map	The impact assessment map will result in an evaluation of the impact of detected geohazards on vulnerable structures and infrastructures, such as road networks and built-up areas. The impact assessment map will be based on susceptibility and geohazard activity maps combined, in a GIS environment, with the available geo-databases of elements at risk and occurred damage. This will be elaborated by deriving their vulnerability in terms of expected loss and impact degree. The final outcome will be a simplified colour scale map implemented with the level of impact expressed as strategic vulnerability for a specific geohazard.
Radar interferometry software	RIS	Software	Software tools to process the Sentinel-1 data to obtain deformation velocity maps.

The list has been defined during the Kick off meeting of the Safety project, in agreement with all the partners. During the first annual meeting the list of the products has been confirmed.

2 USER ASSESSMENT PROCEDURE

2.1 Procedures

The main tool used for the user assessment procedure, as defined in the DOW of the project, is the Gap analysis structured for the specific project and described in section 2.2.

This procedure has been tested with very good results in other projects with similar objectives. In particular, the Gap analysis has been applied in the DORIS and LAMPRE projects (FP7). From these experiences the methodology has resulted suitable to identify gaps and set recovery actions to make the products of the projects compliant with the user requirements or to identify the steps to be implemented in the future. This close collaboration and interaction between scientist and users is a key strategy to develop solutions suitable to be applied, with a good level of confidence, in a real workflow in support to the civil protection authorities or decision makers. The development of solutions or products, in this specific sector, usually follows an iterative process because the technology is in a continuous evolution. For this reason, the gap analysis seems to be a good assessment method, and can be useful also to identify the possible evolution of the products.

In particular, the user assessment procedure conducted through the Gap analysis integrated in the existing workflow of the civil protection authorities, directly involved in the project, will be focused to verify the following aspects (Figure 1):

- The readability of the products,
- The integration between EO data and non EO data
- The format and way of the delivered products

- The potential time needed to produce the product in order to evaluate in what stage and in which phase it can be used
- The accuracy and usability of products

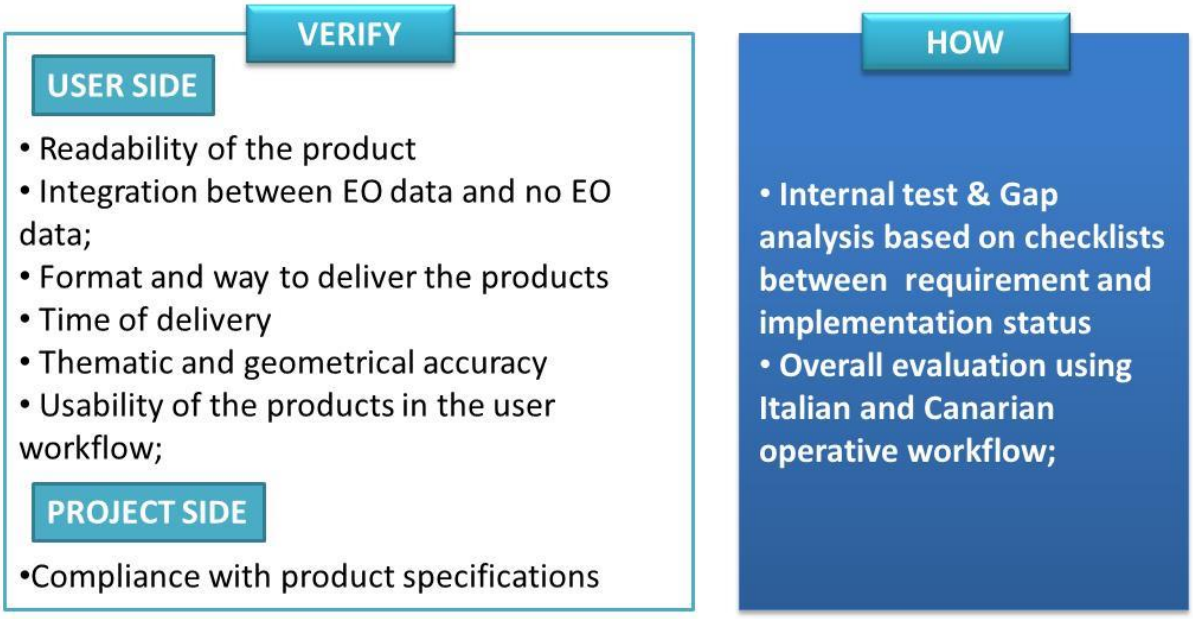


Figure 1 Products assessment - procedure and tools

assessment procedure will also be focused to verify the possibility to develop products compliant with the Inspire Directive (Figure 2). The metadata compliance seems to be easier to be achieved with respect to the spatial datasets. For the spatial dataset has been proposed a simplified schema of the INSPIRE Natural Risk Zone application to be applied to the GAM(see Deliverable D.B1).

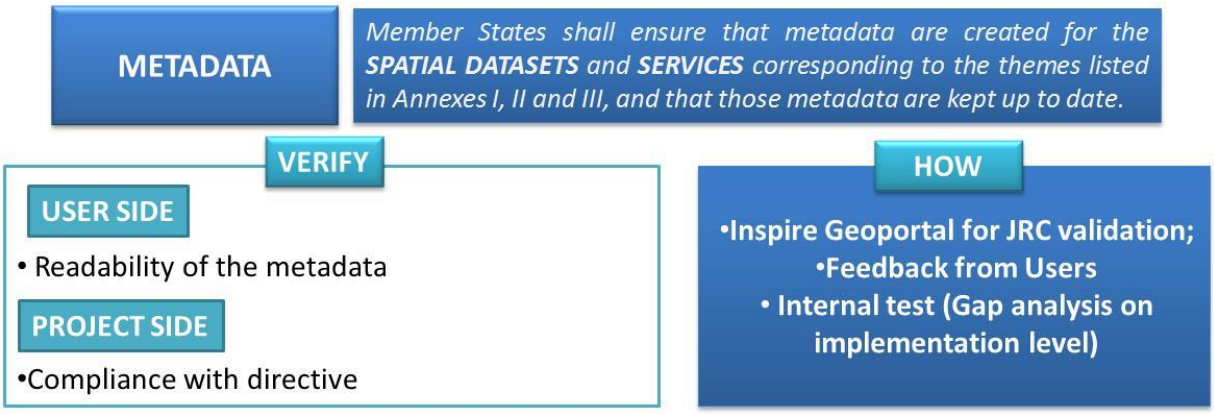


Figure 2 Metadata assessment - procedure and tools

2.2 GAP Analysis

The Gap Analysis is a comparison between the current state and the target state .It is the starting point for the implementation of a project improvement process focused to reach all the planned goals.

In the Safety project, the Gap analysis is applied to evaluate the development levels of the project in terms of compliance with the requirements and the Inspire Metadata, where applicable.

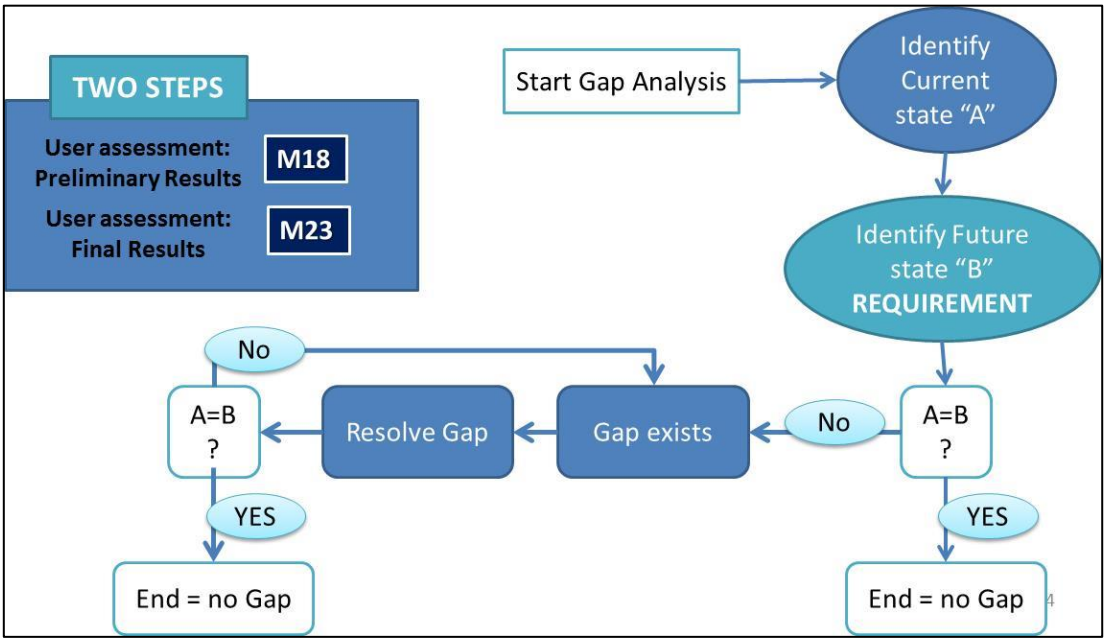
In particular the key worlds (underlined in the definition above) for the Safety project are the following:

- current state → version of the product under assessment
- target state → requirement (capacity and project)
- project improvement process → recovery action or next development of the product to be compliant with the requirement
- goals planned → compliance with requirements

First of all, identifying gaps does not mean that the results are not achieved but it involves an evaluation of the systemic factors that contributed to the current state and the identification of the best way to fill the gaps.

The first step requires to identify the gaps using specific indicators and in case of change in the needs define additional indicators, or to revise existing, during the project progress.

Starting from the indicators of the existing gaps a specific improvement strategy will be developed and applied for each situation that needs to be improved. It is important to clarify that not all gaps are equal or need to be solved to assure the project success. For these reasons the most critical gaps should be highlighted using a colour scale.



The Gap analysis for all the stage of the project is conducted filling in the following table

ASPECT TO BE ANALYSED- TIME OF GAP ANALYSIS							
ID	**CURRENT STATE**	**TARGET STATE**	**GAP EXISTS**	**GAP RESOLUTION/ IMPROVEMENT STRATEGY**	**GAP RESOLVED DATE**	**COMMENTS / ATTACHMENTS**	**COLOR SCALE: LEVEL OF GAP**
code	Description	Description	**YES/NO**	Description	**date**	Description	**colour**

In the first line of the table "Aspect to be analysed" is reported the aspect under concern, below the description of the content of each column:

- "ID": requirement code;
- "Current State": all the functionalities or processes or anything that can be analysed using the gap analysis, in Safety the implementation status of the specific requirement;
- "Target state": objective of the project for the aspect analysed, requirement;

- “Gap Exists?” when current state and target state doesn’t perfectly match up then Gap Exists = “Yes”;
- “Gap Resolution”: description of how the Gap will be resolved including the action to do to improve the aspect under concern;
- “Gap Resolved Date”: mention the date (month of the project) when the Gap is resolved (probably);
- “Comments/Attachments”: mention additional details to better explained the gap or the improvement strategy;
- “Colour scale: level of gap”: RED the gap have to be close; ORANGE can be useful if the gap will be closed; GREEN the gap is close or it is not relevant for the success of the project, GREY: potential gap or aspect to discuss with project partners.

ANNEX A

USER REQUIREMENTS – final version

For each product, defined by the project team, specific user needs are established to handle the main necessities of CPAs that represent the users of the project. The user needs identified as relevant to make the project results useful to be integrated in the activities of the CP authorities are here listed as requirements. The version listed the following tables, is the final release and it will be assessed during the next year of the project.

The main modifications with respect to the previous release are listed below:

- The total number of Capacity requirements is 23 instead 25 since the requirements on the products delivered at the “best scale” was jointed with the requirements of the “best resolution”.
- The number of Project requirement is the same. The requirements about the web services will be verified due to the fact that at this stage it is not possible to be sure that a web portal will be developed.

In the tables the following acronyms are used (explained in the DB1)::

- SAF identifies the SAFETY project (for compatibility with other similar projects);
- UR User Requirement;
- CAP Capacity Requirement
- PRR Project Requirement;
- NUM is the progressive number of the requirement.

DEFORMATION ACTIVITY MAP (DAM) E2					
Capacity Requirement			**Project Requirement**		
Requirement CODE	**Description of corresponding User Need**	**Comment/suggestion for implementation and compliance**	**Requirement CODE**	**Description of corresponding User Need**	**Comment/suggestion for implementation and compliance**
SAF-UR-CAP-1	SAFETY will provide DAM in the following format: - vector: shp - raster: geotif, geojpg, geopdf and ASCII		**SAF-UR-PRR-1**	SAFETY will provide DAM using Inspire spatial data services (wms, ogc, wfs….) (view, download…)	To be confirmed if a web portal will be developed
SAF-UR-CAP-2	SAFETY will provide DAM with a description of input data used (type, resolution, source, etc.)	It can be included in the metadata or in a specific section or layout	**SAF-UR-PRR-2**	SAFETY will provide DAM completed with metadata INSPIRE compliant	See Annex B of D.B1 for the schema
SAF-UR-CAP-3	SAFETY will provide DAM with an evaluation of the quality and uncertainty of the map	It can be included in the metadata or in a specific section or layout	**SAF-UR-PRR-3**	SAFETY will provide DAM in a specific layout ready to be printed for the field activity and using the format as proposed by the Copernicus operative service, or a new one optimised for the project	See Annex A of D.B1 for a proposal of the layout schema
SAF-UR-CAP-4	SAFETY will provide DAM at the best scale/resolution				
SAF-UR-CAP-5	SAFETY will provide DAM as values or deformation and as category class if possible defined on the basis of specific thresholds	The thresholds and the category classes have to be clearly reported in the legend of the map in the specific section of the layout			

GEOHAZARD SUSCEPTIBILITY MAP (GSM)					
Capacity Requirement			**Project Requirement**		
Requirement CODE	**Description of corresponding User Need**	**Comment/suggestion for implementation and compliance**	**Requirement CODE**	**Description of corresponding User Need**	**Comment/suggestion for implementation and compliance**
SAF-UR-CAP-6	SAFETY will provide GSM in the following format: - vector: shp - raster: geotif, geojpg, geopdf and ASCII		**SAF-UR-PRR-4**	SAFETY will provide GSM using Inspire spatial data services (wms, ogc, wfs….) (view, download…)	To be confirmed if a web portal will be developed
SAF-UR-CAP-7	SAFETY will provide GSM with a description of the modelling approach	It can be included in flayer developed for the product	**SAF-UR-PRR-5**	SAFETY will provide GSM completed with a database INSPIRE-compliant	See Annex B of D.B1 for a proposal of the database compilation following the INSPIRE Directive
SAF-UR-CAP-8	SAFETY will provide GSM with a description of input data used for its preparation	It can be included in the metadata or in a specific section or layout	**SAF-UR-PRR-6**	SAFETY will provide GSM associated with metadata INSPIRE-compliant	See Annex B of D.B1 for the schema
SAF-UR-CAP-9	SAFETY will provide GSM with an evaluation of the quality and uncertainty	It can be included in the metadata or in a specific section or layout	**SAF-UR-PRR-7**	SAFETY will provide GSM in a specific layout ready to be printed for in field activity and using the format as proposed by the Copernicus operative service, or a new one optimised for the project	See Annex A of D.B1 for a proposal of the layout schema
SAF-UR-CAP-10	SAFETY will provide GSM at the best possible scale/resolution depending on input data				

GEOHAZARD SUSCEPTIBILITY MAP (GSM)					
Capacity Requirement			**Project Requirement**		
Requirement CODE	**Description of corresponding User Need**	**Comment/suggestion for implementation and compliance**	**Requirement CODE**	**Description of corresponding User Need**	**Comment/suggestion for implementation and compliance**
SAF-UR-CAP-11	SAFETY will provide GSM represented as values (e.g. probability value as %) and category class (e.g. n. classes...)				

GEOHAZARD ACTIVITY MAP (GAM)					
Capacity Requirement			**Project Requirement**		
Requirement CODE	**Description of corresponding User Need**	**Comment/suggestion for implementation and compliance**	**Requirement CODE**	**Description of corresponding User Need**	**Comment/suggestion for implementation and compliance**
SAF-UR-CAP-12	SAFETY shall provide GAM in the following format: - vector: shp - raster: geotif, geojpg, geopdf and ASCII		**SAF-UR-PRR-8**	SAFETY will provide GAM using Inspire spatial data services (wms, ogc, wfs….) (view, download…)	To be confirmed during the next year of the project if a web portal will be developed
SAF-UR-CAP-13	SAFETY will provide GAM with a description of the modelling approach used to prepare it	It can be included in flayer related to the project	**SAF-UR-PRR-9**	SAFETY will provide GAM completed of database INSPIRE-compliant	see Annex B of D.B1 for a proposal for the database compilation following the INSPIRE Directive
SAF-UR-CAP-14	SAFETY will provide GAM with a description of input data used for its preparation	It can be included in the metadata or in a specific section or layout	**SAF-UR-PRR-10**	SAFETY will provide GAM associated with metadata INSPIRE-compliant	see Annex B of D.B1 for the schema

GEOHAZARD ACTIVITY MAP (GAM)					
Capacity Requirement			**Project Requirement**		
Requirement CODE	**Description of corresponding User Need**	**Comment/suggestion for implementation and compliance**	**Requirement CODE**	**Description of corresponding User Need**	**Comment/suggestion for implementation and compliance**
SAF-UR-CAP-15	SAFETY will provide GAM with an evaluation of the hotspot quality and uncertainty	It can be included in the metadata or in a specific section or layout	**SAF-UR-PRR-11**	SAFETY will provide GAM in a specific layout ready to be printed in the field activity and using the format as proposed by the Copernicus operative service, or a new one optimised for the project	See Annex A of D.B1 for a proposal of the layout schema
SAF-UR-CAP-16	SAFETY will provide GAM at the best scale/resolution possible depending on the input data				
SAF-UR-CAP-17	SAFETY will provide GAM represented as values (e.g. probability value as %) and category classes (e.g. number of classes...)				

IMPACT ASSESSMENT ON STRUCTURE AND INFRASTRUCTURE MAP (IASI)		
Capacity Requirement		
Requirement CODE	**Description of corresponding User Need**	**Comment/suggestion for implementation and compliance**
SAF-UR-CAP-18	SAFETY will provide a description of the methodology used to perform the IASI	It can be included in flayer developed for the product
SAF-UR-CAP-19	SAFETY will provide the IASI in a geolocalised structure (eg. Shp file of structure and infrastructure and related level of impact)	It can be included in flayer developed for the product
SAF-UR-CAP-20	SAFETY will provide IASI represented as values or category class if possible defined based on specific thresholds	It can be included in flayer developed for the product or in a metadata if a .shp can be produced

RADAR INTERFEROMETRY SOFTWARE (RIS)		
Capacity Requirement		
Requirement CODE	**Description of corresponding User Need**	**Comment/suggestion for implementation and compliance**
SAF-UR-CAP-21	Safety will provide a free prototype of RIS and organize training session to deploy the SW on the CPA involved in the project	
SAF-UR-CAP-22	Safety will provide a prototype software compatible with windows, GNU/Linux and Mac OS operating systems	As starting point, we provide the compilation only for Cygwing platform. However, it will possible for different compilations compatible to other plattforms.
SAF-UR-CAP-23	Safety will provide a prototype software for regional landslide susceptibility modelling and zonation with on-line help, tutorial and user manual	

REFERENCES

- http://www.doris-project.eu/
- http://www.lampre-project.eu/