

SAPHEDRA: Building a European Platform for evaluation of consequence models



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Concept of SAPHEDRA

The aim of SAPHEDRA is to provide relevant information concerning industrial accidents involving hazardous phenomena and the estimation of associated consequences to the population and the environment.

A web platform provides:

- A comprehensive description of the hazardous phenomena
- Data from experimental campaigns
- The evaluation procedure for models and software

Benefits of the web platform:

- For users, helpful information to assess the consequences of industrial accidents (for new technologies and emerging risks in a reliable and robust manner);
- For stakeholders, information to make better decisions on “new technologies” with objective criteria.



Starting point:

an initiative from INERIS to build a consortium with the previously presented goals.

SAF€RA ERANET offered a good opportunity to start the construction (web contents). At this stage, all these partners were included :

INERIS (with the support of INERIS Développement) // HSL // BAM // RIVM
// TNO // UniBo // Demokritos

At the end of SAF€RA project,

a Partnership Agreement has been signed by: INERIS // INERIS
Développement // HSL // TNO // UniBo // Demokritos

BAM and RIVM remain involved in the project as members of the scientific advisory board

Main features of SAPHEDRA

A new evaluation protocol for accident consequence modelling including five stages:

- Scientific assessment
- Verification
- Sensitivity and uncertainty analysis
- Validation
- User oriented assessment

An informative web site providing information on:

- Hazardous phenomena
- Experimental campaigns
- Modelling tools



Snapshot of the website (in construction):



SAPHEDRA project ▾

Base of knowledge ▾

Tool assessment and information ▾

News

Welcome on this new Website



dedicated to tools assessment

Minutes of meetings

Welcome on SAPHEDRA project website

This website has been built to provide information on the tools used or to be used for estimating the consequences of hazardous phenomena (tool assessment and information) following the release of dangerous materials.

The consortium has developed a protocol for the assessment of these tools, which is available in pdf version.

It provides also access to information about the physics of these hazardous phenomena (Base of knowledge).

This project is managed by a consortium of European organisations with a very strict and transparent governance.

Anyone can contribute to the improvement of this website by sending relevant data (text, pictures, video, tools description or tools assessment) to this e-mail adress: consortium.SAPHEDRA@ineris.fr

Website designed and developed by INERIS



INERIS

maîtriser le risque |
pour un développement durable |

Main results : Website a database maintained up-to-date

- List of tools.
- If assessed, everything is available for the users in order to make the right choice.
- Comparator of tools for each hazardous phenomenon

Available tools / comparator

An as exhaustist as possible list is given hereunder, users can have access to information on tools and quotation if available. Some criteria are proposed to filter the information : hazardous phenomena, complexity of tools,... More information are available by clicking on the name. And a link to website are proposed when it is free.

Hazardous phenomena

- Any -

Leave blank for all. Otherwise, the first selected term will be the default instead of "Any".

Computation tool level

- Any -

Leave blank for all. Otherwise, the first selected term will be the default instead of "Any".

Apply

Tool name ▲	Hazardous phenomena	Level	End users quotation	Validation quotation	Scientific quotation	Actions
ALOHA	Dispersion					Add to compare
ADAM Flash fire	Fire					Add to compare
ADAM_dispersion	Dispersion					Add to compare
ADAM_explosion	Explosion					Add to compare
API RP 521	Fire					Add to compare
Boilover Couche Mince PRIMARISK		3	3	3	4	Add to compare
Boilover PRIMARISK		1	4	3	3	Add to compare
EFFECTS	Explosion					Add to compare
FDS						Add to compare
FRED						Add to compare
INERIS Jet Fire Model	Fire	1	2	3	4	Add to compare
IT89		2	2	3	4	Add to compare
MERCURE	Dispersion	3				Add to compare
Multi Energy	Explosion	2	3	4	5	Add to compare
PHAST						Add to compare

SAPHEDRA 2.0 : operational organization for services

A European consortium with organizations gathering experts in the field of consequence modeling, and a governance enabling independency and transparency

Steering committee, with representatives of

- Public authorities
- Partners of SAPHEDRA project
- Industry and industry associations



Management

Funding

Priorities

Scientific Advisory Board

- International Scientists



Independent scientific guidance and endorsement

SAPHEDRA Team

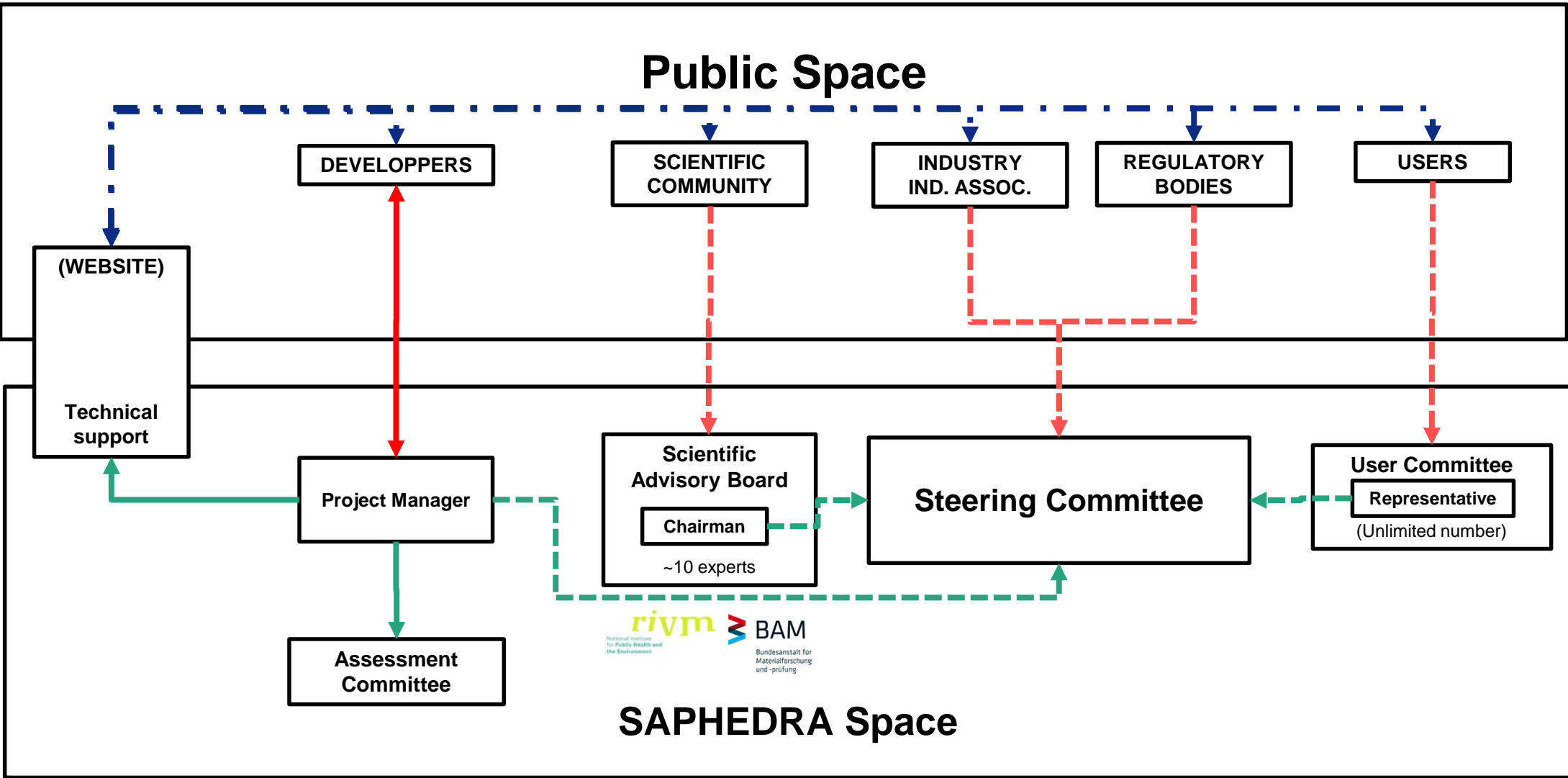
- 5 institutes / RTOs from 5 EU countries acknowledged for their expertise



Tools assessment

Website





- Transparency : all rules will be available on the website
- Independency : criteria for assessment are available and assessors must be independent for each assessment (no link with developers)
- Some tools will be chosen by the consortium (industry or public authorities in the steering committee with the agreement of the Advisory Board)

Example of information collected on the tools / models

Stage		Description
A0 – Contact data		Name of Tool/model Version of the tool References of the last evaluation Model developer contact information and references
A1 - Scientific assessment	General Tool description	A.1.1 Description of scope of application
		A.1.2 General flowchart of the tool and identification number of models
		A.1.3 General description of database
		A.1.4 Input and output visualization process
	Detailed Tool description	A.1.5 Detailed description of the theoretical approach of the models
		A.1.6 Detailed description of models calibration
		A.1.7 Description of the mathematical approaches for all the model
A2 - verification		A.2.1 Description about development under quality assurance
		A.2.2 Description about mesh consistency tests
		A.2.3 Management of interfaces between models
		A.2.4 Tests about numerical approach for the N models
		A.2.5 Tests about comparison between numerical approach for the N models versus analytical solution

Example of information collected on the tools / models

A4 – Valida	A.4.4 Description of the translation of experimental parameters into input data for the model (and how completed).
	A.4.5 Description of qualitative and quantitative comparison between experimental and numerical results
	A.4.6 Explanation of the validity of the tool when there are no data to compare (information recorded during accident or/and numerical data)
	A.4.7 Synthesis of all the comparisons
A5 - user-oriented assessment	A.5.1 Description of user-oriented documentation
	A.5.2 Description and analysis of ergonomic criteria
	A.5.3 Analysis of clarity and flexibility of output results
	A.5.4 Description of assistance in the input data setting, computational aspects

Different steps of assessments

As written in the governance and rules, the assessment procedure could be used both by users (developers) or by the evaluation committee.

The evaluation protocol is intended to be used within one of the 3 following levels:

1. Self description of a tool

In this case, one can use a template to fill it. An example of filled template is given for the tool "Flumilog". The third party send the document to the consortium (consortium.SAPHEDRA@ineris.fr) which will check the receivability of the document. This verification will be done with payment... Documents will be uploaded in the tools comparator. No scoring will be done at this stage by the consortium.

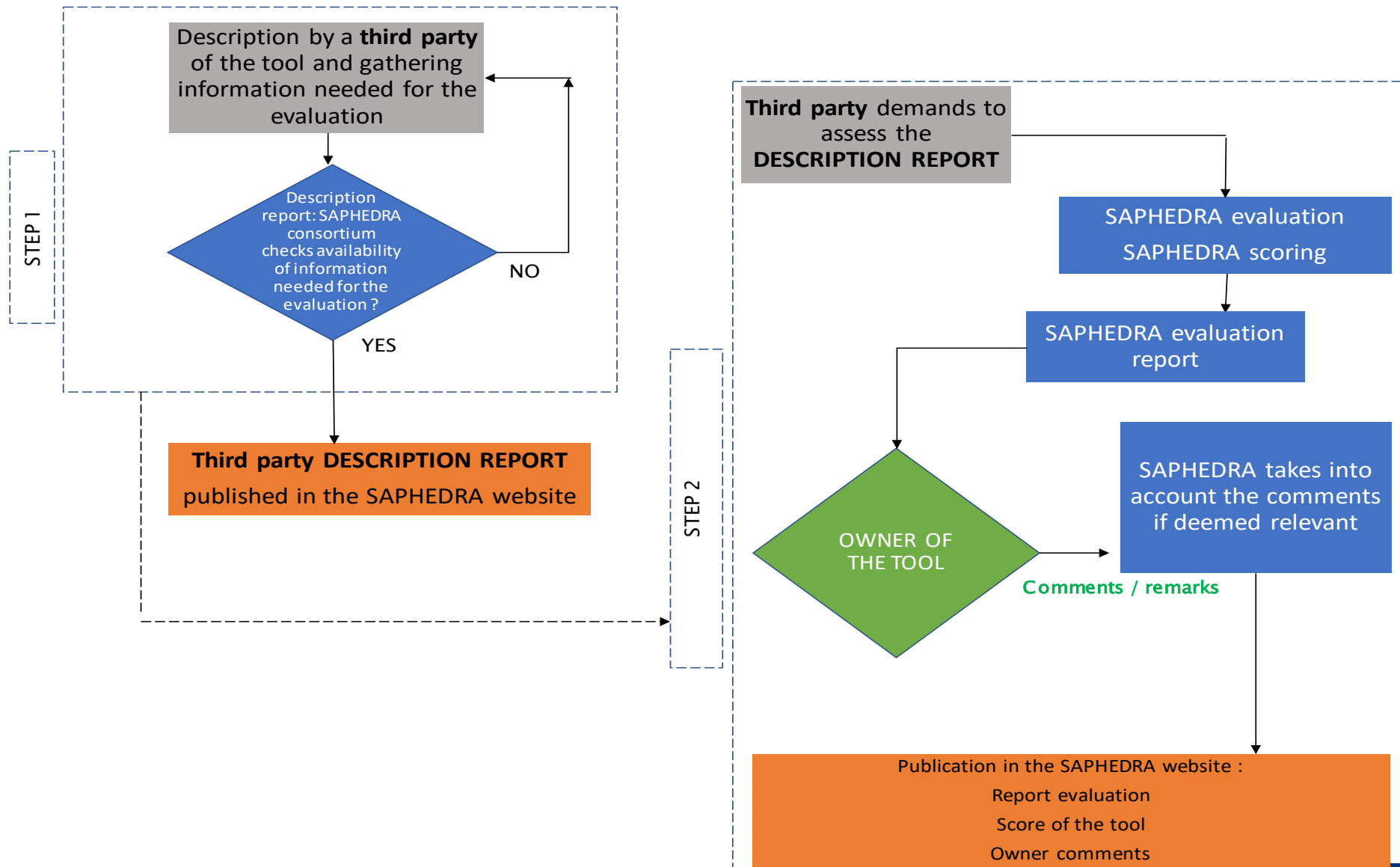
2. Assessment of the self-description report

Someone asks for the **assessment of the self-description report** available on the website (consortium.SAPHEDRA@ineris.fr). He will pay for this assessment and the consortium will publish a report in the tools comparator after following all the steps described in the governance and rules of assessment. An example is given for the tool "Flumilog".

3. Full assessment of a tool

Someone asks for the **full assessment of a tool**, including description and scoring of the tool by the consortium (consortium.SAPHEDRA@ineris.fr). He will pay for the full assessment and the consortium will publish a report in the tools comparator after following all the steps described in the governance and rules of assessment. An example of full assessment is given for "SLAB".

Summary of the evaluation procedure





SAPHEDRA:

- initiated in the context of SAF€RA
- is a platform to elevate the level of understanding and quality for accident modeling
- is operated by independent and acknowledged experts
- wishes interactions with public authorities, industry, scientific community

Acknowledgment

In addition to the contribution from the partners, the initial project received funding from:

- French Ministry for ecology, sustainable development, transport and energy (MEDDE)
- Italian Workers' Compensation Authority (INAIL)