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**Software of statistical approach**

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Improved Nuclear Site characterization for waste minimization in DD operations under constrained Environment

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### Summary

Interactive presentation (web-browser based) of sampling strategies and statistical approaches Zipped folder contains source files (Rmarkdown) as well as \*.html and related \*.css, figures and javascript files. To launch the tool, just open deliverable-3.3.html (main page)

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### Approval

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**Improved Nuclear Site characterization for waste minimization  
in DD operations under constrained Environment**

Research and Innovation action  
NFRP-2016-2017-1

# **Software of statistical approach**

## **Deliverable D3.3**

Version n° 1

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**<http://www.insider-h2020.eu>**



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## Summary

The main objective of work package 3 (WP3) is to draft a sampling guide for initial nuclear site characterization in constraint environments, before decommissioning, based on a statistical approach. The first task consisted in providing an overview of available sampling design methods described in standards and guides followed by a brief presentation of the statistical methods that can be used to demonstrate meeting the objectives in the context of initial nuclear site characterization in constraint environments.

The second task aims at developing a strategy for sampling in the field of initial nuclear site characterization in view of decommissioning, with the most important goal to guide the end user to appropriate statistical methods (including, but not limited to those identified during the first task) to use for data analysis and sampling design. To aid the end user in applying this strategy, a user-friendly application for guiding the end user through the contents of the strategy and the initial characterization process is the aim of this deliverable.

Based on the deliverable 3.2 “Report on the sampling strategy development”, this website presentation has the same objectives:

- Define requirements for a statistical approach in the field of initial nuclear site characterisation in view of decommissioning combination of various non-destructive and destructive measurement results, sampling representability, multi variate analysis, overall associated uncertainties, accounting for prior knowledge)
- Help the user to select and develop an optimal statistical approach to be used in constraint environments

## 1 A web-based presentation

The D3.3 website is developed using RStudio (<https://www.rstudio.com/>). The specific R packages are:

- R Markdown (see <https://rmarkdown.rstudio.com/>)
  - Allows writing in the simple markdown format (almost text files with specific header and easy formatting)
  - Outputs are classical html files + JavaScript for an interactive website
- Flexdashboard (see <https://rmarkdown.rstudio.com/flexdashboard/>)
  - Provides a specific output format for the rmarkdown package
  - Nice html + JavaScript dashboard for interactive apps
- svgPanZoom (see <https://github.com/timelyportfolio/svgPanZoom>)
  - Wrapper for svg-pan-zoom.js (<https://github.com/ariutta/svg-pan-zoom>)
  - Easily applied to SVGs from within R through the html widgets framework (<https://www.htmlwidgets.org/>)
- Install at least these in R:
  - Install packages(c("rmarkdown", "flexdashboard", "pacman", "here"))
  - pacman should take care of the rest normally

## 2 Source files

The file structure is presented below. Input files (\*.rmd) and output files (\*.html) are at the same level. Other JavaScript and picture files are located in dedicated folders.

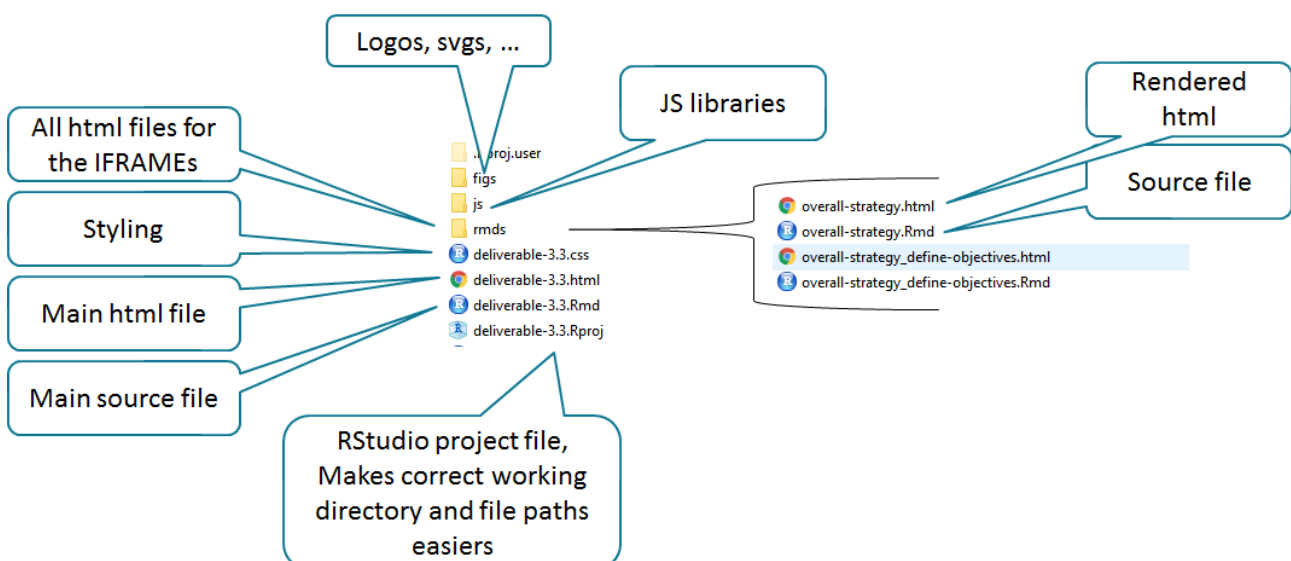


Figure 1: File structure of D3.3.

An example of source file (\*.rmd) is presented below.

The image shows a snippet of an R Markdown file with several callouts:

- Standard code chunk relating to the flexdashboard output format:** Points to the `output:` section where `flexdashboard::flex_dashboard` is defined with parameters like `logo`, `favicon`, and `css`.
- YAML header with definition of the output format, and some parameters like logo, favicon and css file:** Points to the top of the file where the title and output format are specified.
- Start of the markdown content:** Points to the `{r setup, include=FALSE}` chunk and the beginning of the text content starting with "Introduction".

Figure 2: Main \*.rmd file.

### 3 Overview of the D3.3 work and resulting website

The work consists then in the following actions:

- Convert text and tables of D3.2 report into R Markdown files
- Add links and targets to the different elements on the flow charts and Venn diagrams
- Knit/Render/Compile the \*.Rmd files to get \*.html output
- Possibly tweak some things in the resulting html files to get the desired behaviour (in particular additional JavaScript)

An example of snapshot is presented on Figure 3.

The image shows a web browser displaying the INSIDER website. The navigation menu includes "Introduction", "Strategy", and "About". The main content area features a flowchart titled "Overall strategy" and a text block explaining the strategy. The flowchart starts with "Request for initial characterization" and branches into "Define objectives" and "Define constraints". It then moves to "Select highest-priority objective" and "Gather pre-existing records/data". A decision point asks "Is data sufficient for analysis?". If not, it leads to "Perform characterization campaign". If yes, it leads to "Pre-processing", "Exploratory data analysis", "Data analysis", and "Post-processing". Another decision point asks "Can more samples be collected?". If not, it leads to "Sampling design". If yes, it leads to "Is objective achieved?". If not, it leads to "Are there more objectives?". If yes, it leads to "Report results on initial characterization".

Figure 3: General view of the website D3.3.



## **4 Availability**

Due to the large size of the project folder and the various formats of files, deliverable 3.3 is available as a zipped file at <https://app.lgi-consulting.org/mso/ecm/insider-ecm-file-14045>.

After validation, it will be put on-line for the H2020 INSIDER members.

It will be updated thanks to the different use cases of the project (feedback experience) and the resulting statistical approach guideline that will be D3.7.