



ENGINEERING & DIGITAL FOR ENERGY TRANSITION

OFFER SHEET

# MBSE

**Deployment of a Model-Based Systems Engineering (MBSE) approach to structure complex system design activities**

Use Cases

Design of complex systems (software, physical, etc.)

Identifying requirements and specification of software and organisational architectures

Capture of requirements

Capitalisation of knowledge

Process identification

Project Benefits

Standardisation of the way information is represented

Strengthening communication between stakeholders around a unified model

Improved design robustness by clarifying the scope (specification of requirements/interfaces, more exhaustive and credible verification and validation, as soon as possible)

Capture of business know-how, centralisation of information and capitalisation on the basis of models

CONTEXT & STAKES

In the context of complex systems design, the implementation of **Systems Engineering (SE)** is an important value lever, however:

- SE norms and standards prescribe the objectives to be achieved, but do not necessarily define how to carry out activities such as capturing the need, specifying requirements or designing architectures,
- There are still difficulties understanding between stakeholders, often due to a lack of common vocabulary,
- The data generated by engineering activities is usually scattered in a sea of documentation, making it difficult to maintain consistency throughout the system development phase.

New modelling approaches make it possible to take all these parameters into account **to ensure data consistency.**

THE OFFER

The MBSE approach supports SE activities by following an appropriate methodology through modelling. It involves the formalisation and standardisation of data related to systems to monitor them and ensure consistency.

Assystem's implementation of MBSE is based on the following elements:

- Definition of needs and the associated roadmap
- Structuring organisations and defining perimeters and roles within an organisation
- (Co)-building of a catalogue of appropriate processes and methodologies (Arcadia, Harmony, ...) and tooling solutions (Capella, Catia Magic, ...)
- Deployment and change management
- Integration within an ecosystem of digital tools

**SUPPORT** the deployment of systems engineering and manage complexity

**STRUCTURE** models, centralise data and capitalise on knowledge

**IMPROVE** the traceability of the need

**FORMALISE**, visualise and analyse design data via modelling

**CLARIFY** the project/system perimeters and effectively secure the interfaces

**IMPROVE** communication within projects

**REDUCE** risk, by identifying critical requirements and improving design robustness

# MBSE

## CHARACTERISTICS OF THE OFFER

Assystem's MBSE offer is based on an innovative approach to structuring complex system data within a model. This offer is based on the following fundamental principles:

- **Managing complexity** in a collaborative way using graphical elements coupled with databases. The intertwining of the methodology and the tool allows a more effective adoption of SE principles, reducing the number of documents engineers have to deal with.
- **Making sense:** The MBSE approach puts the system to be designed at the heart of the stakeholders' concerns, naturally requiring designers to ask the 'right' questions upstream, in order to find software and physical solutions adapted to the needs.
- **Improve efficiency:** As the relevant data is stored in the model, it becomes easier to generate documents (interface sheets, functional analysis, requirement repository, etc.) and to reuse building blocks for other projects (organisation patterns, functional architectures, etc.).



## CASE STUDY

### Jaitapur Nuclear Power Plant (JNPP)



Optimisation of means



Better collaboration



Faster decision-making

**Context.** Assystem's digital team was asked to deploy the MBSE approach in the context of a future construction of 6 nuclear reactors (EPR) in an international cooperation context between France and India.

**Solution.** To improve the efficiency of a complex project such as this one, the MBSE approach aids the deployment of the project's ecosystem of tools in the design phase, following 3 modelling axes:

- Organisation modelling
- Process modelling
- Product modelling

The development of these axes supports the deployment of PLM on the project.

**Client benefits.** Formalising the work processes and data used in the project. Clarifying the interfaces between engineering processes (characteristic size of the model). Centralising the information required for the mission. Clarifying the roles and responsibilities of the project actors. Increasing efficiency through the implementation of digital tools.