

South European Systems Engineering Tour

29th to 31th of May 2017

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Agenda

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- ❑ Quick introduction to the AFIS project about the convergence of Systems Engineering and PLM¹
- ❑ What are the major PLM stakes that Systems Engineering shall address
- ❑ What are the major S.E. stakes that PLM solution shall address

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¹ : Product Life cycle Management



Convergence of PLM and S.E. Status of the AFIS project



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Considering that Systems Engineering (S.E.) and PLM

- Aims at covering the whole life cycle of respectively systems and products**
- Are both critical topics to companies**

Considering that S.E. needs more and more complete and complex workshops to manage the engineering data, supporting of course as far as possible digital continuity and collaborative engineering services.

Considering that systems engineering tools market is less perennial than PLM solution market.

AFIS and PLM Lab, a French association dedicated to PLM, started in 2015 a project dedicated to the study of the S.E. and PLM convergence.

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Enterprise architecture and information systems urbanization

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Companies are for a long time facing stakes of

- consistency,
- optimization,
- security,
- deployment

of their information systems,

- consistency,
- optimization

of their organization.

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So PLM systems are part of the urbanized information system of the companies

PLM projects are deeply structuring companies organization

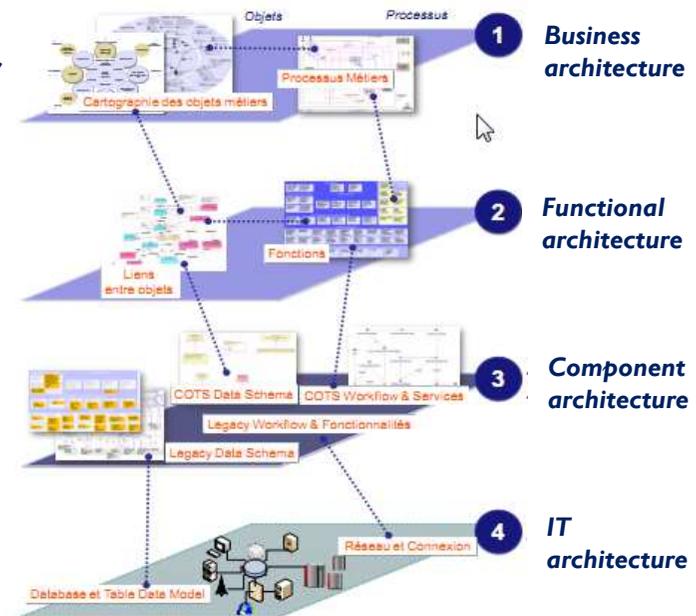
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A PLM project is more than an usual information system development and deployment: it can have major impacts on the companies businesses and competitiveness

Then, designing and deploying a PLM system mean impacting the organization and the business processes.

The design of such a system shall include:

- ❑ The identification of stakeholders and actors structured into an organization (existing, target)
- ❑ The design of the operational processes
- ❑ The design of the information system that fits the operational needs



Source :Vinci Consulting

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Companies stakes in term of S.E. and I.S. deployment



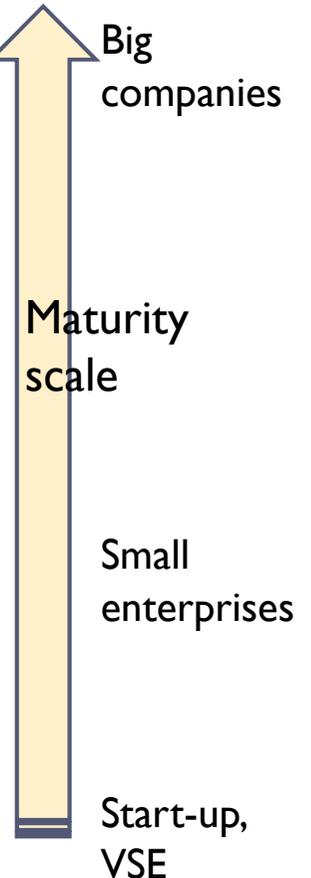
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Switching from disciplines engineering to design systems engineering
Switching from local systems engineering to collaborative systems engineering
Deploying a PLM

Define the business model of the company, locate engineering processes and associated tools
Strengthening of risks engineering, requirements engineering, traceability, configuration management
Deploying a PDM, or even the embryo of a PLM (limited to a few processes)
Exchange management
Industrialization of tests

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Cost and time engineering, risk engineering, requirements engineering, simplified configuration management
Discipline engineering, Supplier Management, Security Management
Traceability (at least tests to requirements)

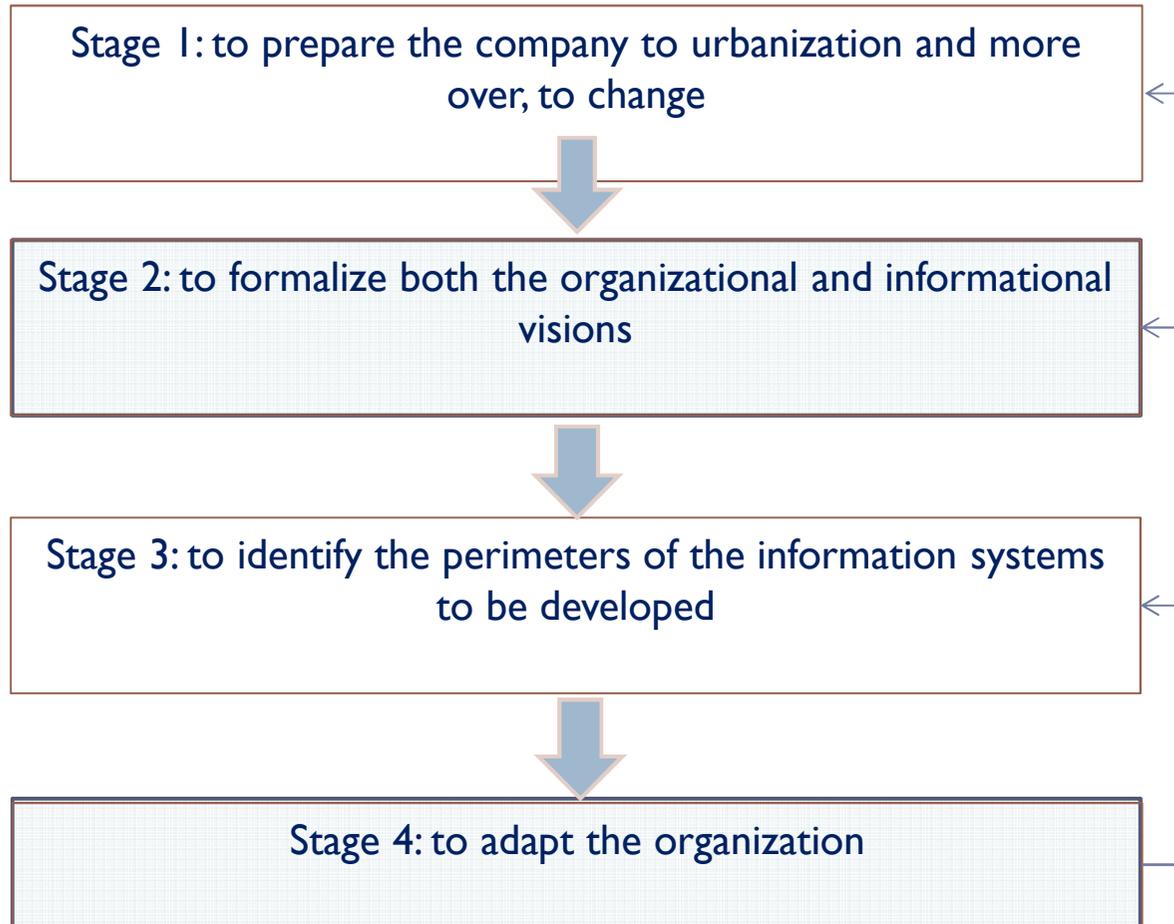


Source :AFIS

Systems engineering : "on the shelf solutions"

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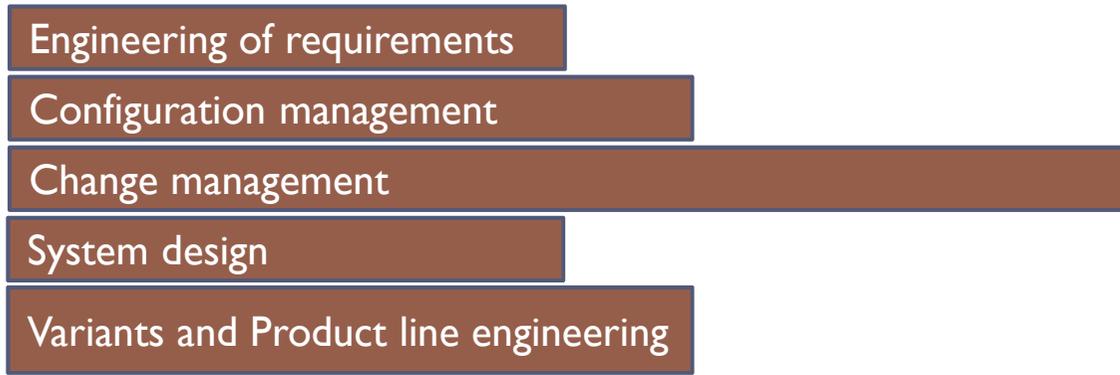
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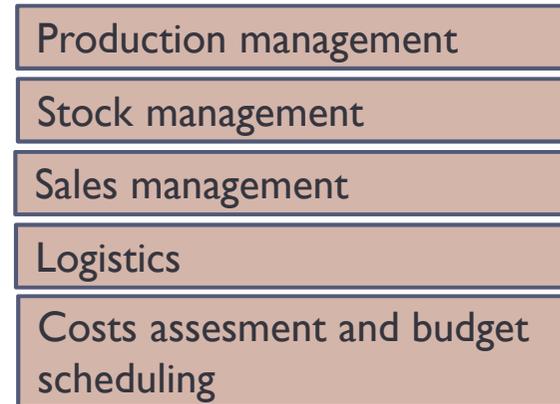
Source : Henri Chelli

Urbanization : an example

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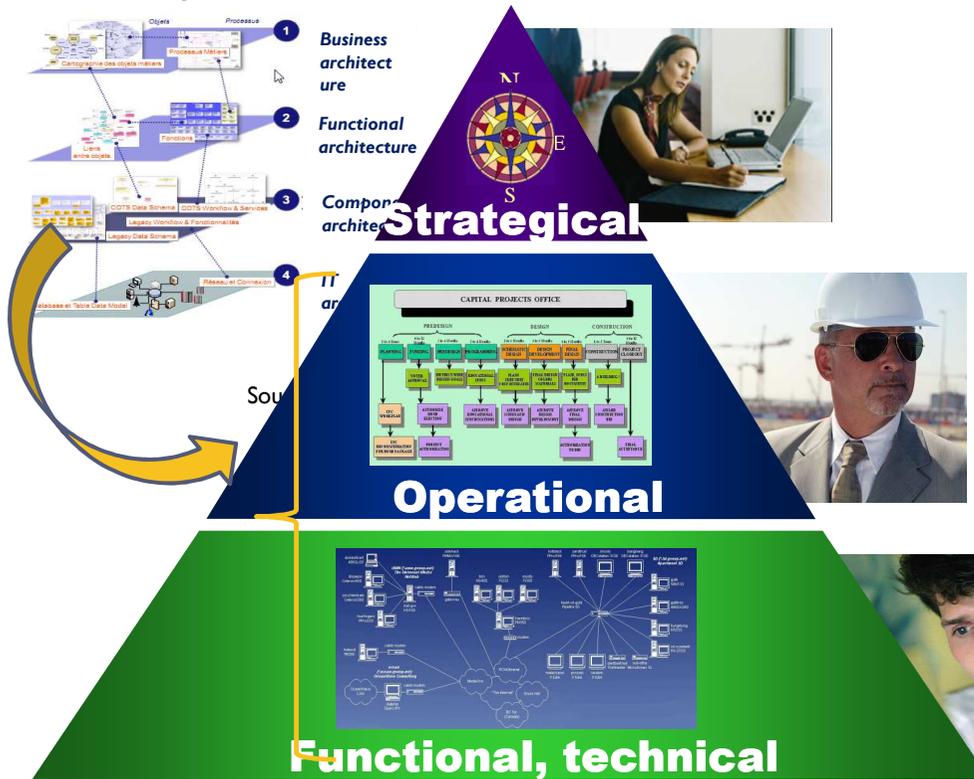


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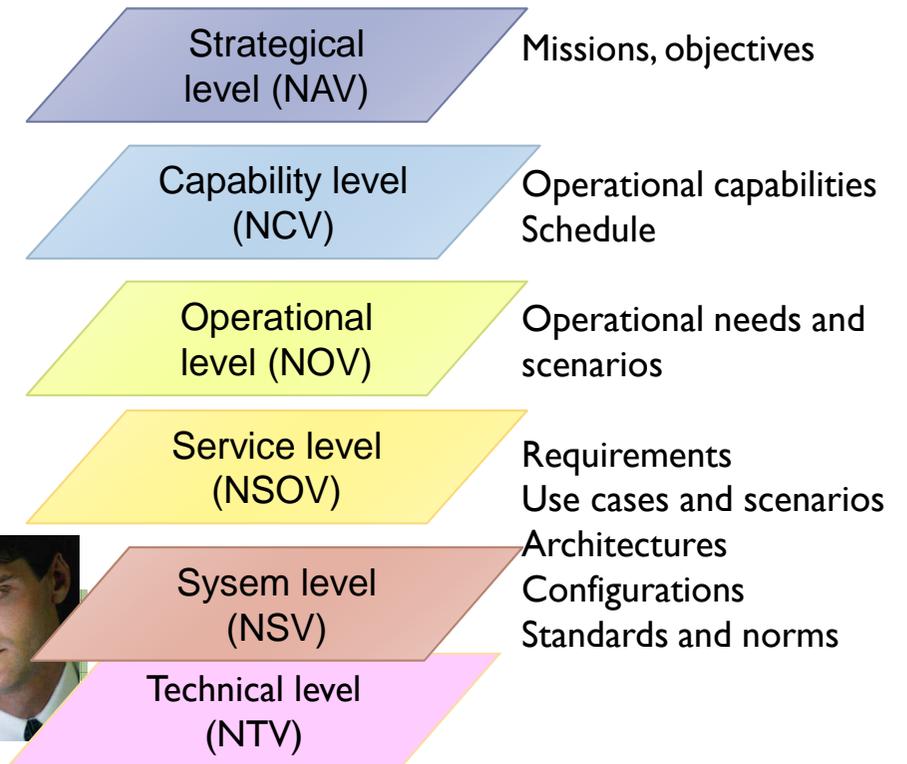


Source :Vinci Consulting

Architecture frameworks bring all the concepts required.



Architecture frameworks levels of architecture



SE and PLM convergence : PLM needs

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S.E. is providing the methodologies and tools that enable the design of information systems (I.S.).

It can also provide process and organizational models that can be adapted by the I.S. community.

However, some hard points of the PLM, for example the consideration of large series and variants:

- ❑ Either are not addressed,
- ❑ Either addressed but not in line with the complexity of the questions raised by the I.S. community.

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On the other hand, we also need to ensure that S.E. best practices are applied to small entities.

SE and PLM convergence : S.E. needs

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In addition, S.E. needs more and more sophisticated workshops to answer the challenges highlighted by the complexity of some systems and the huge need of collaborative engineering (digital continuity).

The solutions deployed for PLM systems are well placed to provide answers to these challenges, but:

- ❑ Are they enough mature to handle the systems engineering of complex systems or system of systems ?
- ❑ Can we consider that this engineering shall be performed with other frameworks, PLM solution bringing a storage capability of all the engineering data ?

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If we go more into detail:

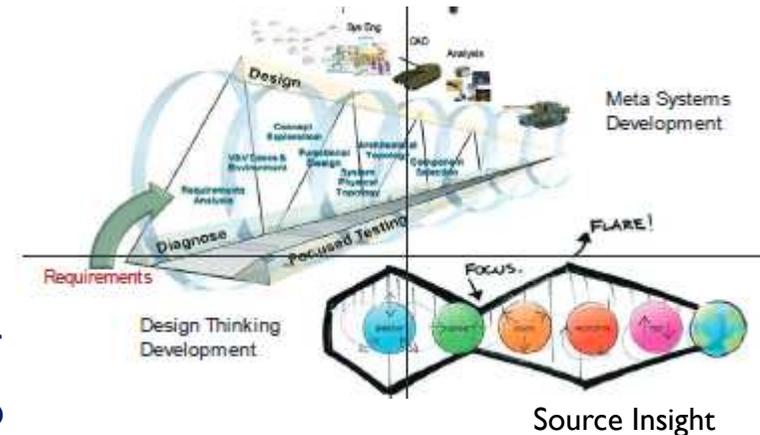
- ❑ Can PLM solutions support the complexity of modeling, configuration management, and concurrent engineering inherent to complex systems?
- ❑ What are the limitations on overall consistency management of engineering data across all life cycles?
- ❑ Interoperability of models (standards of data and model exchange, efficiency of these standards: standardization versus simplicity, sustainability of standards)?
- ❑ Model Transformation
- ❑ Control of rights: rigorous access control must be adopted and the corresponding rights must be managed: PLM and its functions allow it today, but the challenge lies in the complexity of customization / adaptation according to project needs, guidelines Quality, programmatic constraints, etc.

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Do we consider that the current definition of S.E. processes is enough mature to handle the needs of companies in terms of:

- ❑ Creativity
- ❑ Innovation
- ❑ Agility

Indeed, now the main challenges are to design systems able to support the regular adjustments of companies so as to cope the market needs and to integrate, as soon as possible, the innovations driven by the constant evolution of our society.



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