

Seminar Labex MS2T
“Control of Technological Systems of Systems”

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Complexity science and systems engineering

Short Bio:



Dominique Luzeaux is currently Deputy Director in the interforces directorate for defense infrastructure networks and information systems in the French Ministry of Defense.

Author of several books and publications on complex systems engineering and on systems of systems, he was president until 2013 of the French Association of Systems Engineering (AFIS).

Abstract:

Complexity sciences have interested mathematicians and physicians for more than one century, while they have been applied only recently in artificial systems.

On contrary, systems engineering has ignored from its beginnings most of complexity sciences principles. Thus, the waterfall model or the V-model are basically linear approaches of systems. Therefore, traditional models cannot a priori be so easily applied to the increasing complexity of systems that are encountered in the systems of systems or in a world more and more interconnected for example.

In this talk, we review the main principles of the complexity sciences and the models mainly used to master non-linear systems by using some illustrations of both natural and artificial systems. Next, we analyze the underlying hypothesis of systems engineering in aim to understand that these hypothesis have to be extended for facing up to the actual challenges. We conclude with some advices and with general principles which are useful in complex systems engineering.