



# SYSTEM DYNAMICS

## ***Descriptions des Cours***

Making the right decision in a complex context is difficult. We are able to understand and resolve simple cause and effect relationships, or causal loops, without too much trouble. However, in the real world these simple causal loops have themselves relationships with other causal loops and once more than a few combine, the emergent behaviour is very often complex and non-intuitive. The world is full of examples of seemingly simple solutions to apparently clear problems that then turn out to be more complex than initially thought, resulting in unintended and sometimes disastrous consequences.

In this course, participants learn to apply systems thinking principles to interpret cause and effect relationships in different systems in order to model them. A short introduction to system dynamics modelling software enables participants to initially build and simulate simple systems in order to gain practical confidence in the use of these types tools. Following this, participants collaborate in teams, with the guidance of the instructor, in an interactive workshop in which they get to build a generic project model that is used to evaluate the effect of a number of technical project management policies on schedule and cost. The gained insights are used to make a number of key decisions and recommendations to senior management (represented by the instructor) in a public presentation.

## ***Objectifs***

- Participants understand the concept of systems thinking and can apply it.
- Participants understand the concept of causal loops and know how to represent them for simple relationships.
- Participants understand that different causal loops can relate to each other and know how to represent those relations.
- Participants understand the issues associated with non-intuitive emergent behaviour due to increasing complexity.
- Participants are able to assemble basic causal loops into larger system dynamic models.
- Participants are able to simulate and interrogate a system dynamics model to gain insight into non-intuitive emergent dynamics

## ***Pour Qui***

- Systems engineers
- System architects
- Project managers
- Product owners
- Engineering Team leaders
- Anyone with an interest in system dynamics

## ***Tarifs des Cours***

Early Bird: 2700 CHF | Regular: 3000 CHF

## ***Durée***

4 jours

## ***Enseignant***



**Marco Serra**

Marco's professional experience, built over almost 30 years of working with clients in North America, Europe and Southern Africa, spans diverse roles in the aerospace, automotive, defence and energy industries. For example, as Systems Engineer Marco was involved in the initial conceptual development and technology transfer assessment of a sample handling and analysis system intended to receive and analyse material returned to Earth on Nasa's Mars Sample Return Mission. Marco also spends significant time consulting in the Oil & Gas and Energy industries providing system and component design support, conducting failure investigations, providing technical expertise in legal disputes, validating system designs, and developing analysis methodologies for complex fluid-mechanical simulations. More recently, Marco has been working on the thermomechanical design of optical terminals for inter-satellite communications.

Marco holds a Masters Degree in mechanical engineering from the University of Pretoria, South Africa (1993). He also holds a Masters Degree in Engineering and Management from the Massachusetts Institute of Technology, USA (2002), with a focus on Systems Architecture, Systems Engineering, and System and Project Management.