Abstract

This presentation explains the basic philosophy behind the SEMA course. The SEMA course in the first place is a course that provides an approach to architectural reasoning. Core to architectural reasoning is the ability to make conceptual models and to use them in conjunction. The course discusses how to make conceptual models, how to get input, and how to use them for analysis. Modeling is put in broader perspective, such as model evolution, simulation, and validation.
You will mostly be working!

One Case during the course and the home work assignment
Work in teams if possible
Select a case close to your day-to-day practice

Learning by Doing
Some theory, apply on case

Case = System of interest + developing organization + some innovative change

Choice of case is critical!
Our Primary Interest

developing organization
architect

system of interest
Context, Zoom-out and Zoom-in

- customer organization
- developing organization
- architect
- supplier organization
- super system
- system of interest
- subsystems
Adding the Time Dimension

past  current  future

- customer organization
- developing organization
- architect
- supplier organization

past super system  super system  future super system
past system of interest  system of interest  future system of interest

knowledge  innovation
past subsystems  subsystems  future subsystems

Based on TRIZ
Challenges

past  current  future

customer organization  heterogeneity  ambiguity
architect  size & complexity

past subsystems  past system of interest  system of interest

knowledge  innovation

subsystems  uncertainties
past super system  super system

legacy constraints

based on TRIZ
From Theory to Practice

Theory: typical SE workflow: V-model, requirements management, “top-down”

- **verification**
  of result against specification

- **needs**
- **specification**
- **system design**
- **subsystem design**
- **component design**
- **component realization**
- **component test**
- **subsystem test**
- **system test**
- **verification**
- **validation**

- **requirements**
  specification as input to the design, documented

- **SMART**
  Specific, Measurable, Acceptable, Realistic, Traceable

- **requirements engineering**
  the flow down of the requirements through the V.

Practice: Finite knowledge and wisdom causes late disruptions

Innovation and new territory require learning, e.g.
experimenting, exploring, failing, discovering
complement with “bottom-up”

- size & complexity
- heterogeneity
- ambiguity
- unknowns
- uncertainties
- legacy constraints
Recommendations as Red Thread

**principles**
- use feedback
- work incremental
- work evolutionary
- be explicit
- make issues tangible

**objectives**
- support communication
- facilitate reasoning
- support decision making
- create understanding
- maintain insight overview

**recommendations**
- Time-box
- Iterate
- Quantify early
- Measure and validate
- Multiple levels of abstraction
- (Simple) mathematical models
- Analysis of accuracy and credibility
- Multi-view
- System and its context
- Visualize

**help to achieve**

**translate into**

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MAOrecommendations
Final Delivery: Presentation to Top Management

societal
trends
opportunities
problems
needs

business/market
trends
opportunities
problems
needs

customers
stakeholders
key drivers
concerns
applications

product project
system
functions
key performance

design and concepts
functional, physical
quantified

specific aspects
functional, physical
quantified

technology
critical or new

business quantification
risk analysis

summary how
solution answers
needs

conclusions
and
recommendations

summary and conclusions
why choices are appropriate

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