

# Part I

# Model-Based Systems Engineering Introduced

This book focuses on conceptual systems modeling with OPM—Object-Process Methodology, and SysML—Systems Modeling Language. SysML is an accepted de-facto standard of the Object Management Group (OMG) since 2006, while OPM has become ISO 19450 publically available specification in 2014. Leaving theoretical background and discussions to Part II and detailed technical specifications to Part III, this first part introduces OPM and SysML via a running case study of a car automatic crash response system that we model step-by-step, exposing modeling principles and practices as we go. Chapter 1 starts right away with a description of the system to be modeled and an initial, gentle OPM model. In Chap. 2 we enhance the model with text and animated simulation. Chapter 3 introduces links that connect things in the model. In Chap. 4 we pause modeling the automatic crash response system with OPM and move to introducing and using SysML's first three diagrams: Use case, block, and state machine diagrams. Resuming modeling the system with OPM, Chap. 5 will expose us to in-zooming—the most powerful refinement mechanism that enables managing the complexity of systems. The dynamic, behavioral, time-dependent aspect of the system is the topic of Chap. 6. In Chap. 7, we are exposed to specifics of controlling the system's behavior. Deepening our knowledge about abstraction and refinement mechanisms as means to manage complexity is the focus of Chap. 8, the last one in Part I.