Some Deficiencies of UML

According to M. Glinz, “Problems and Deficiencies of UML as a Requirements Specification Language”, IWSSD

- **Deficiency 1.** A UML use case model cannot specify interaction requirements where the system shall initiate an interaction between the system and an external actor.
  - a use case by definition describes a sequence of actor stimuli and system responses *that is initiated by an actor* ([OMG99], p.2-124). Active objects are not allowed in UML use case diagrams.

- **Deficiency 2.** UML cannot model a rich system context.
  - it forbids associations between actors ([OMG99], p. 2-121).

- **Deficiency 3.** UML can neither express structure between use cases nor a structural hierarchy of use cases in an easy and straightforward way.

- **Deficiency 4.** UML provides no adequate means for dealing with use case interaction.
  - UML allows individual use cases to be modeled as state machines. However, UML cannot model states being shared between use cases, because a state machine must be allocated to a single classifier or behavioral element, but not to a subsystem ([OMG99, p. 2-141and 2-181])

- **Deficiency 5.** A UML use case model cannot express state-dependent system behavior adequately.
  - State machines shared by a set of use cases cannot be modeled
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Deficiency 6. Modeling information flow in a system consisting of subsystems is awkward in UML.

Deficiency 7. UML cannot model the behavior of high-level system components such as subsystems.

Deficiency 8. UML cannot adequately model the decomposition of a distributed system like the TRMCS (The Teleservices and Remote Medical Care System), neither with the language element Subsystem nor with another UML language element.

Deficiency 9. UML cannot model all aspects of a composite entity like a subsystem together in a single view.

Accidental deficiencies in a language can be fixed by minor modifications that fully conform to the paradigm of the language, i.e. to its basic ideas, structures and properties. deficiencies 1 and 2

Essential deficiencies requires modifications affecting major concepts of the language. deficiencies 3,4,5,and 7

Fundamental deficiencies cannot be removed without modifying basic concepts of the language. deficiencies 6,8, and 9