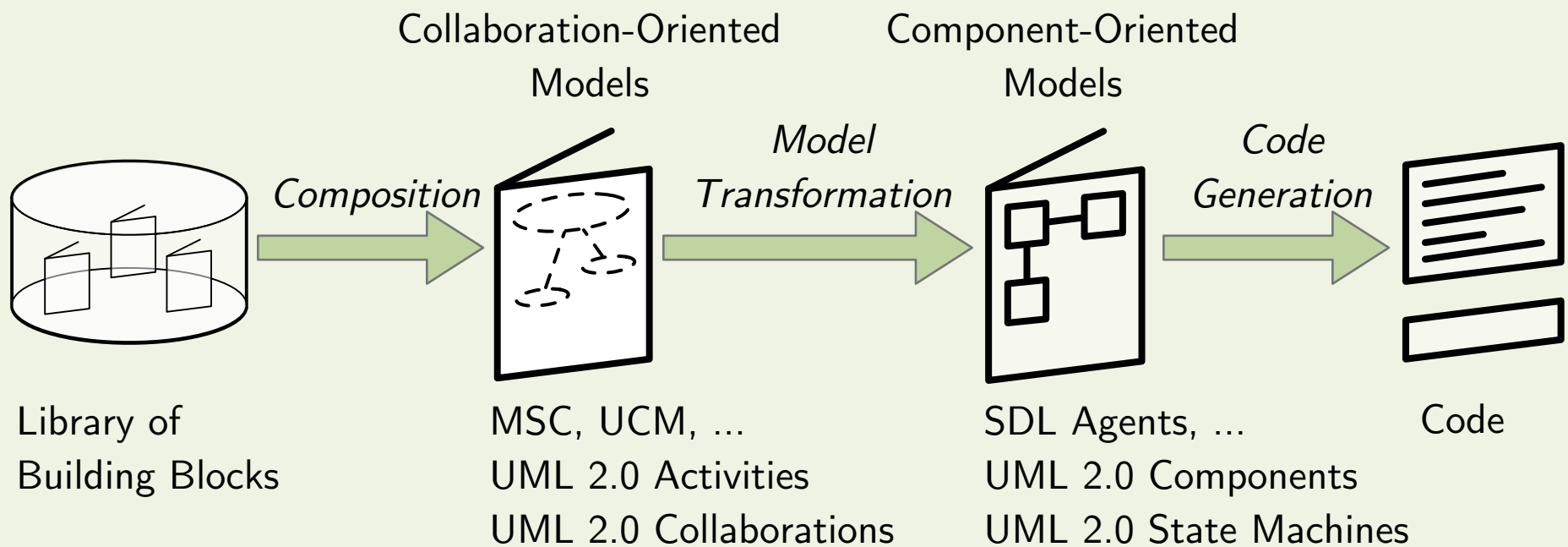


# Synthesizing Components with Sessions from Collaboration-Oriented Service Specifications

Frank Alexander Kraemer, Rolv Bræk and Peter Herrmann  
Norwegian University of Science and Technology (NTNU)

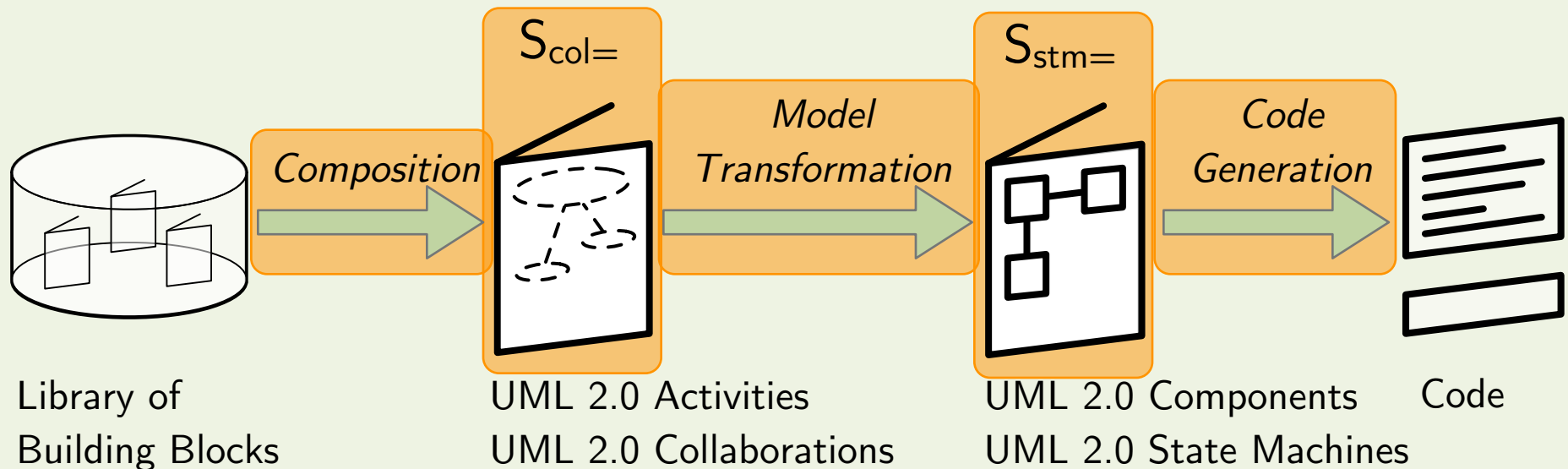
SDL Forum 2007, Paris

# Engineering Approach

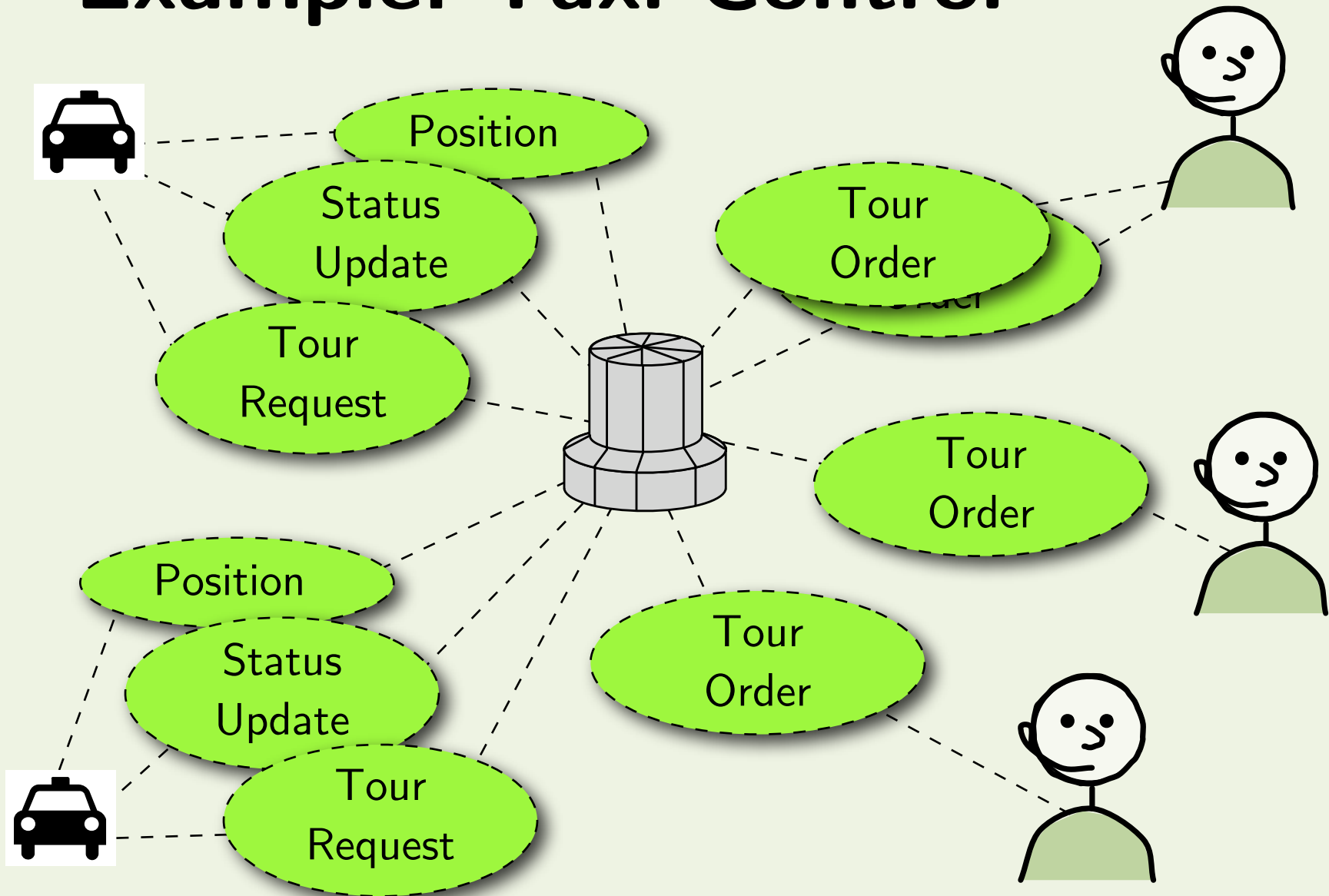


# Formal Reasoning

- compositional Temporal Logic of Actions (cTLA)
- all diagrams are cTLA processes (= TLA formulas)
- composition by joined actions
- model transformation and code generation are refinements

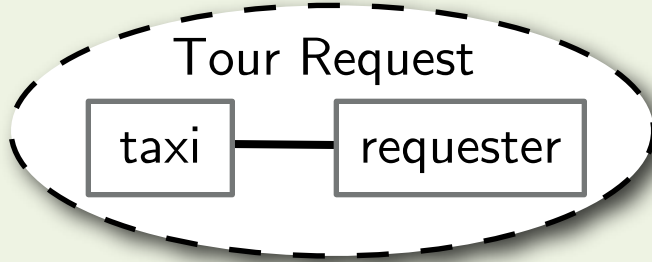


# Example: Taxi Control

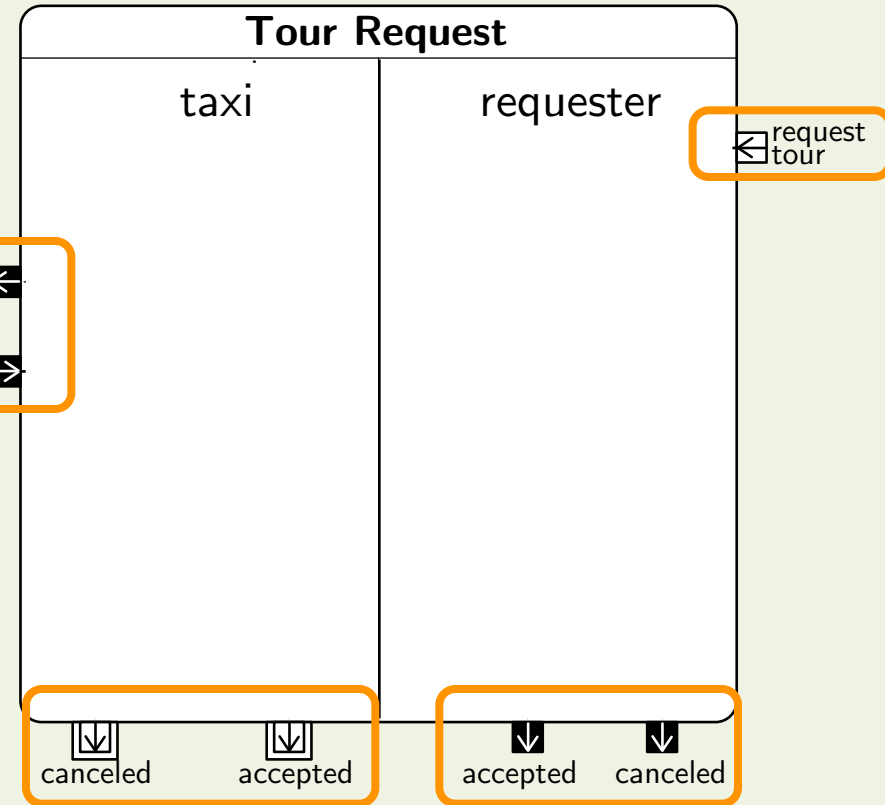


# Collaborations: Externals

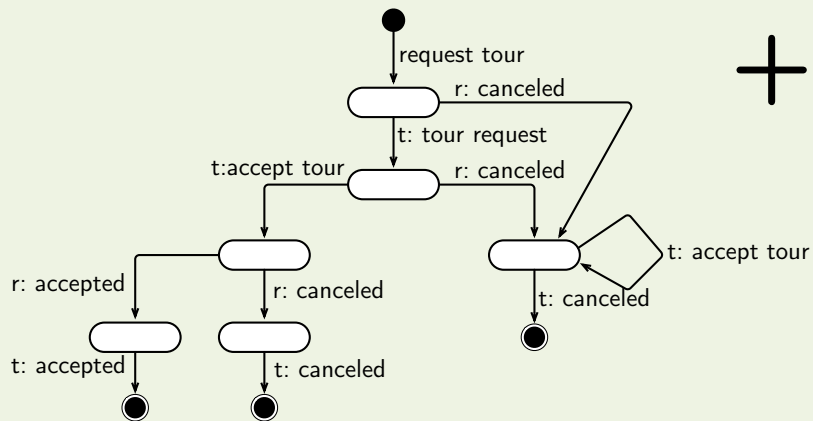
UML 2.0 Collaboration



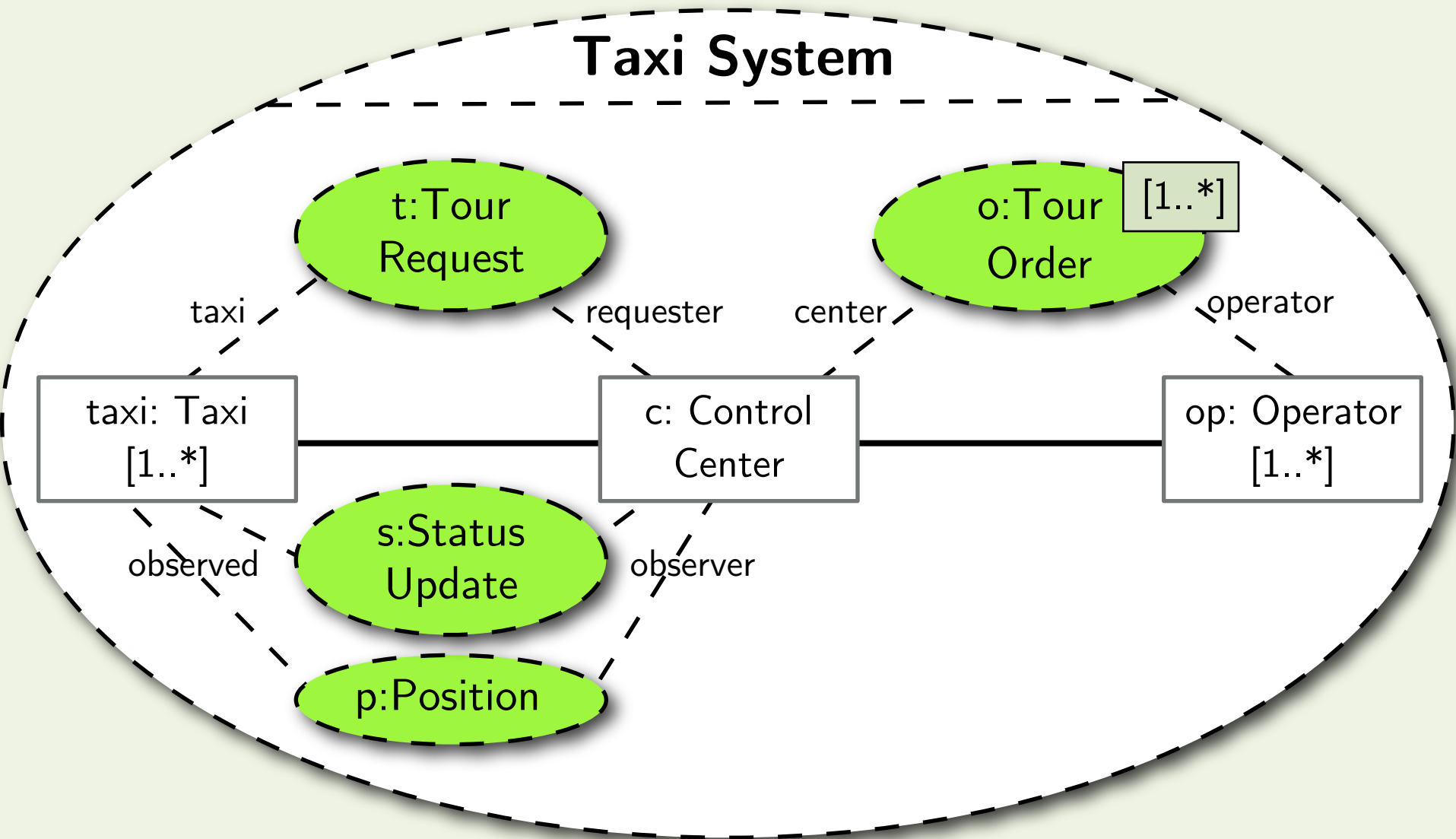
UML 2.0 Activity



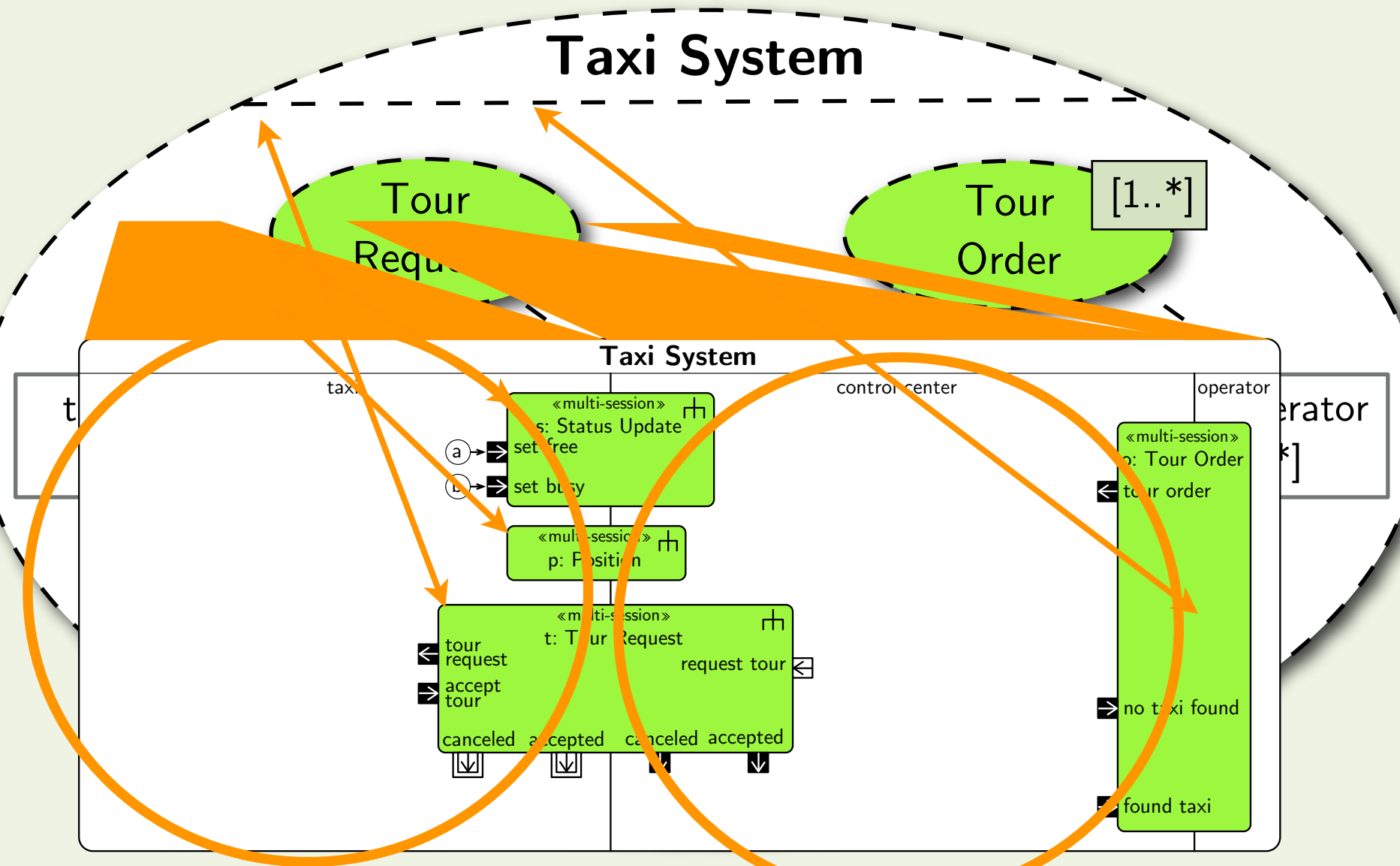
UML «external» State Machine



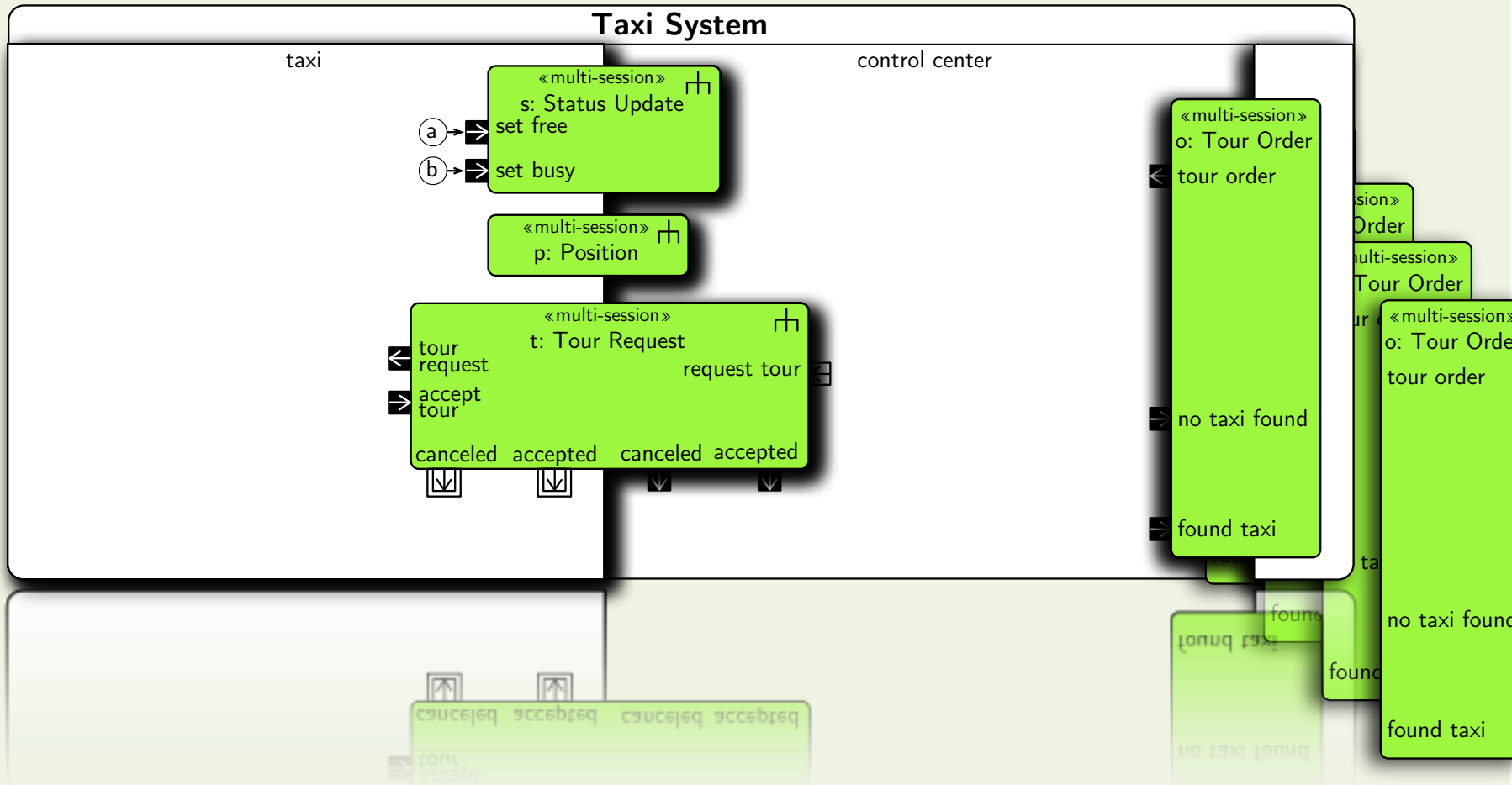
# Collaboration Composition



# Collaboration Composition

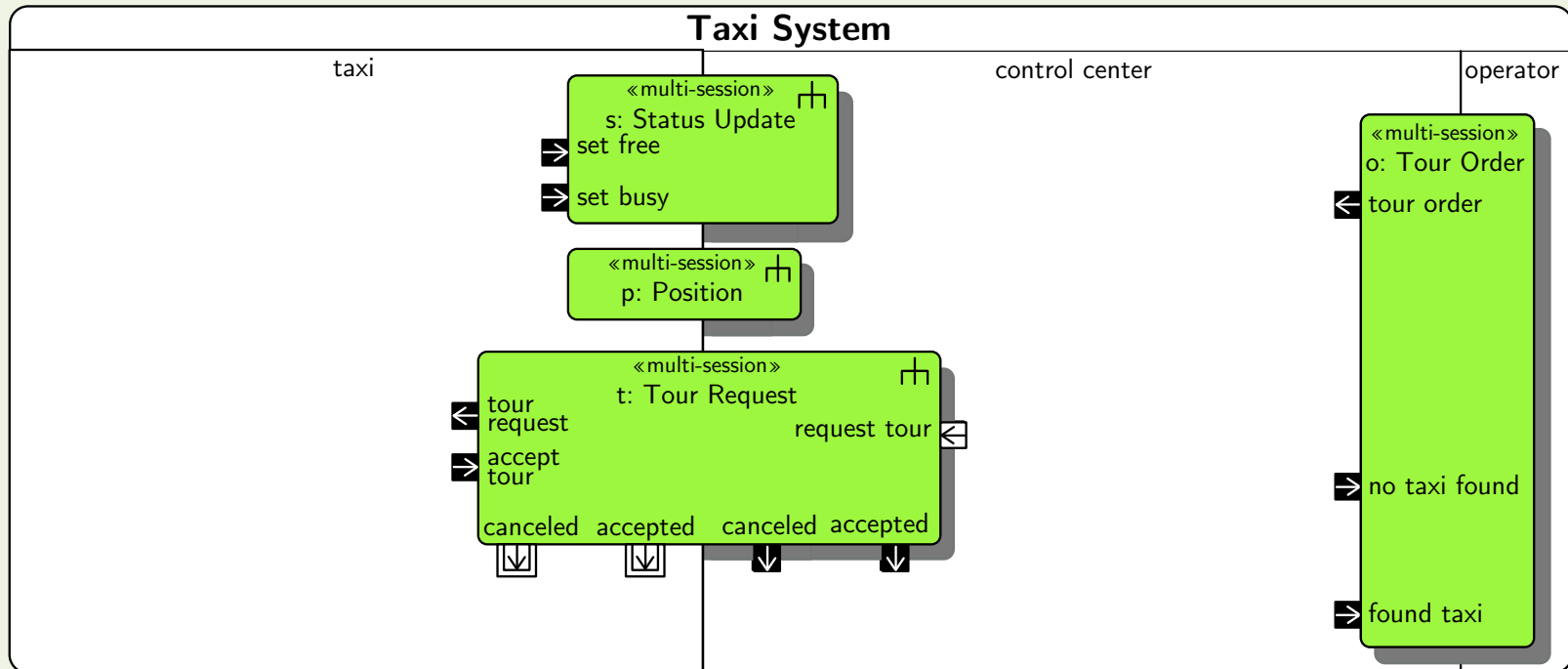


# Session Multiplicity

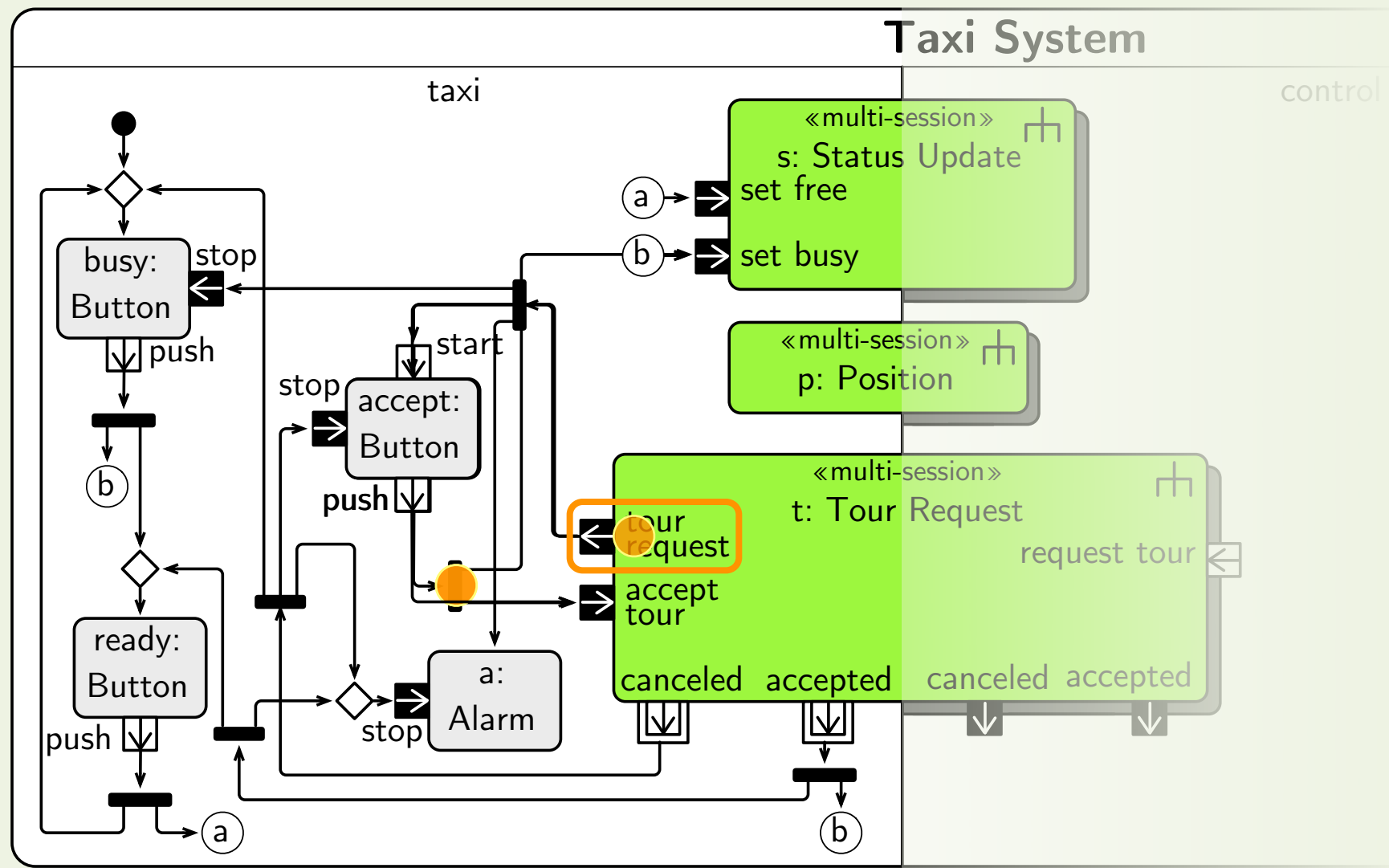




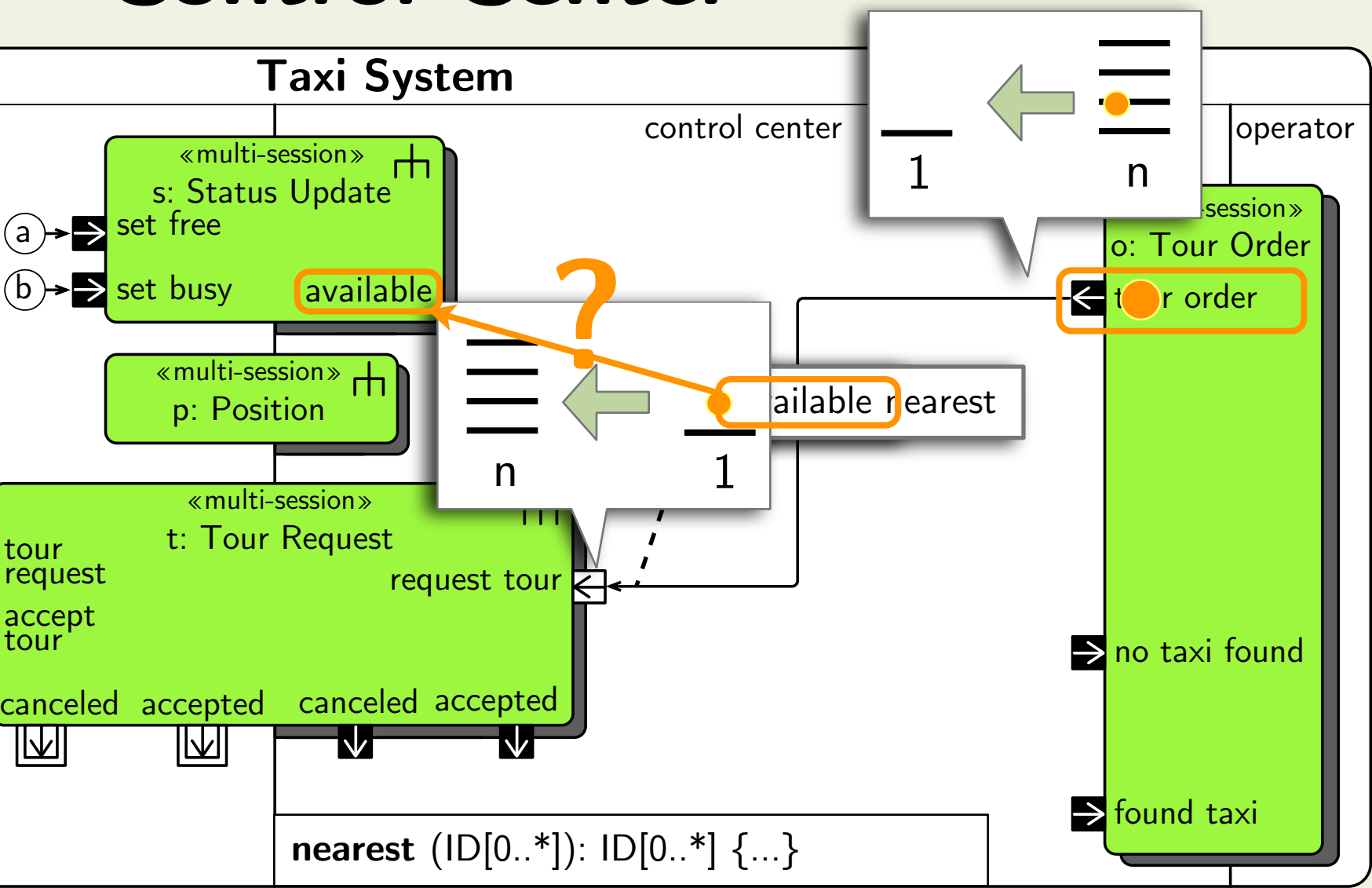
# Session Multiplicity



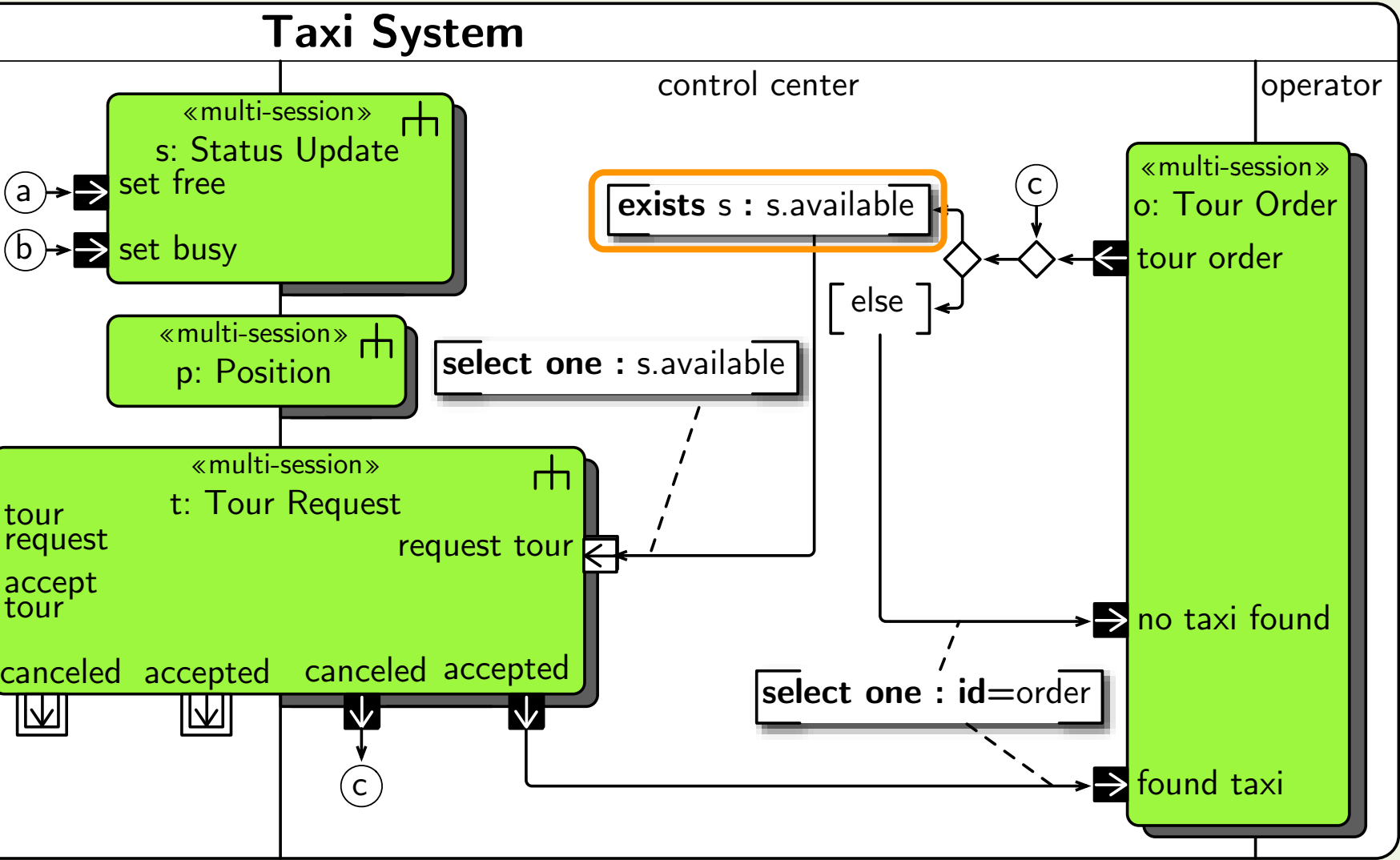
# Taxi Partition



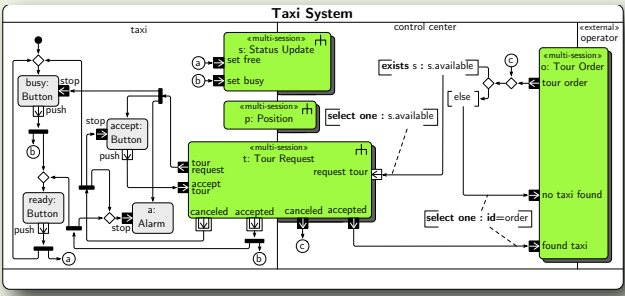
# Control Center



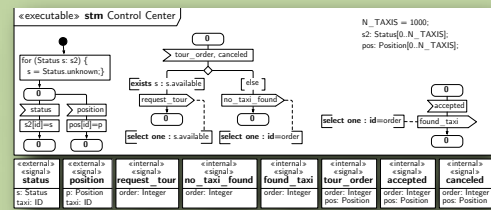
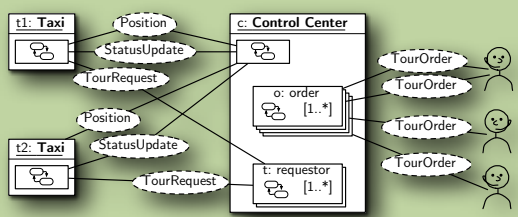
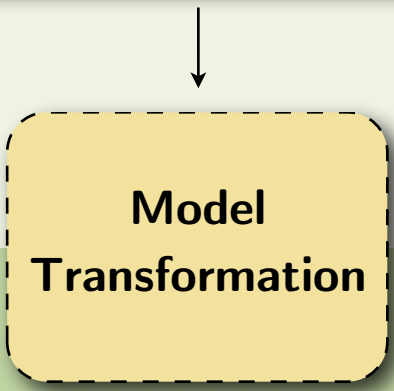
# Control Center



# Model Transformation



- token movements map to state machine transitions
- token markings map to control states



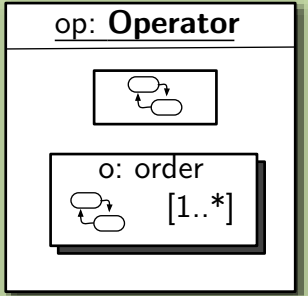
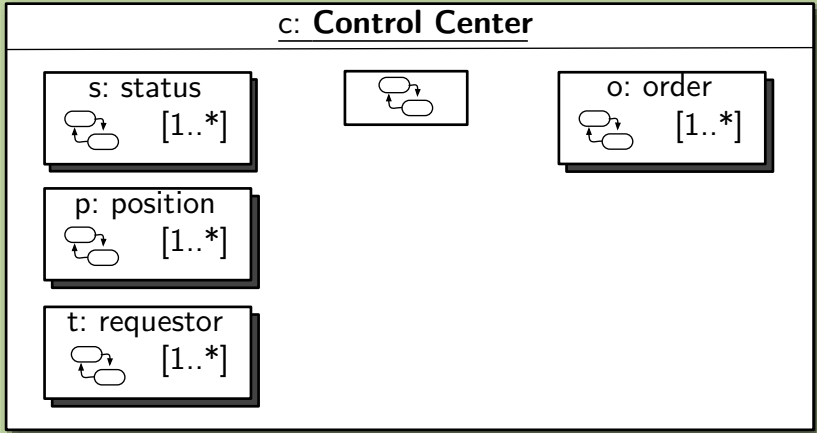
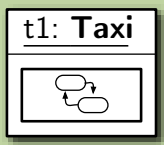
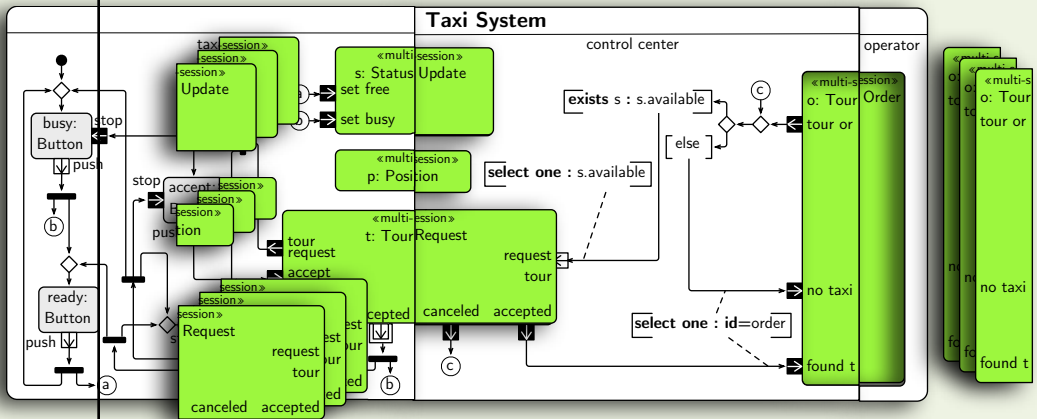
Frank Alexander Kraemer and Peter Herrmann.  
**Transforming Collaborative Service Specifications into Efficiently Executable State Machines.**  
 In Proceedings of the 6th International Workshop on Graph Transformation and Visual Modeling Techniques (GT-VMT 2007), volume 7, 2007.

# Model Transformation

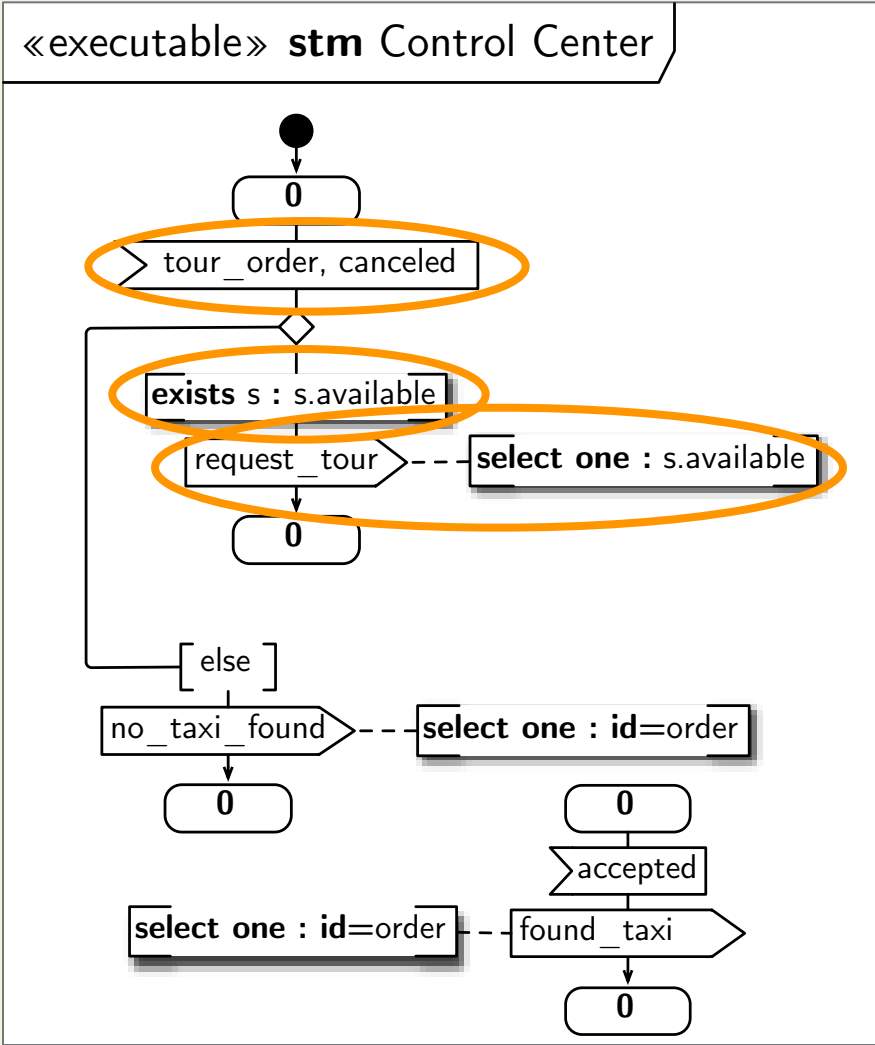
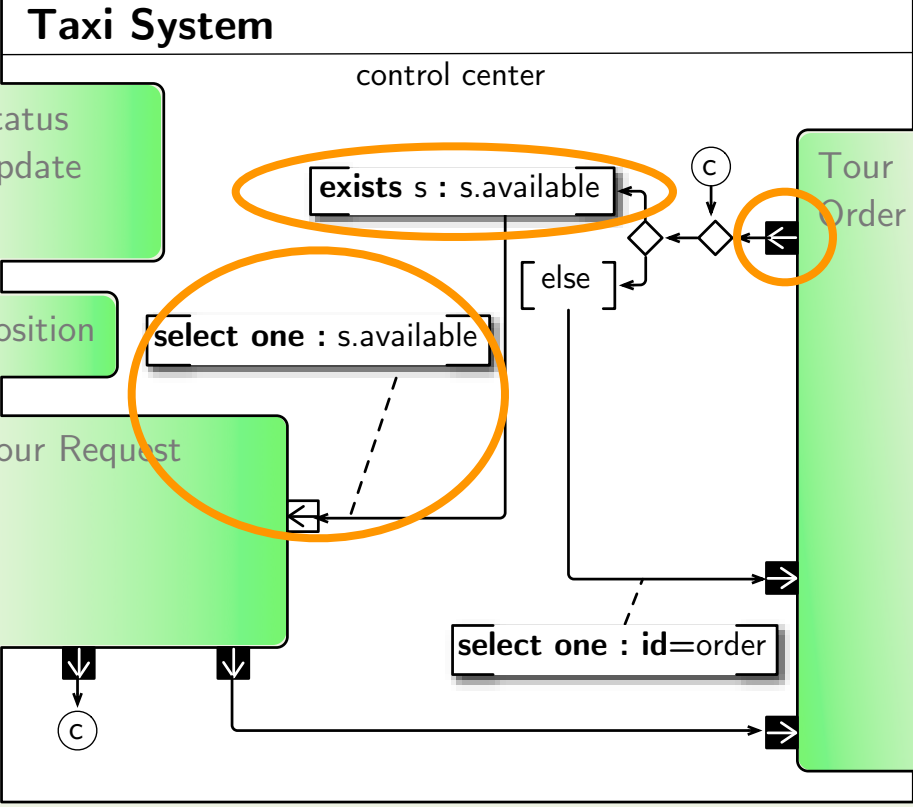
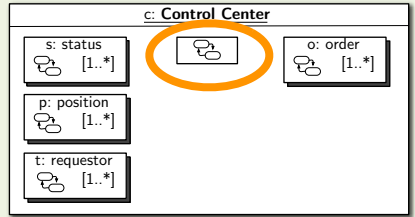
Taxi

Control Center

Operator

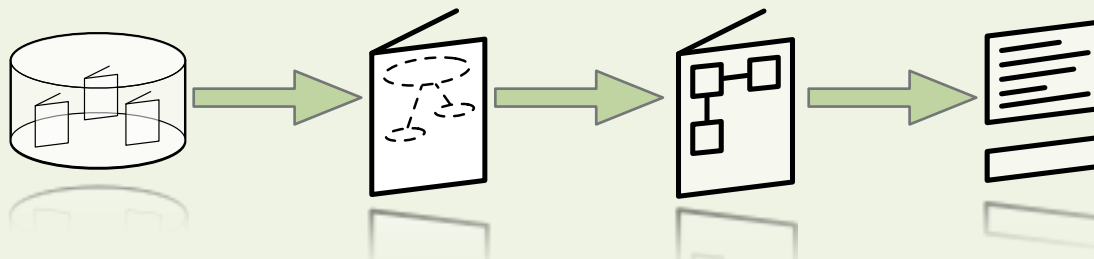


# Model Transformation



# Conclusions

- approach still under development
  - collaborations and their compositions as the primary manual specification
  - components and code are synthesized
  - model-checking on the collaborations (not shown here)
- application of the approach in practice
  - 4 years R&D project “ISIS”
  - funded by the Research Council of Norway (RCN)
  - Ericsson, Telenor, Tellu, NTNU, HiA
  - test and advancement of method, notations and tools





# Tool Support

