MSE Presentation 2

MultiAgent Control of Traffic Signals (MACTS)

Bryan Nehl

MSE Candidate

Agenda

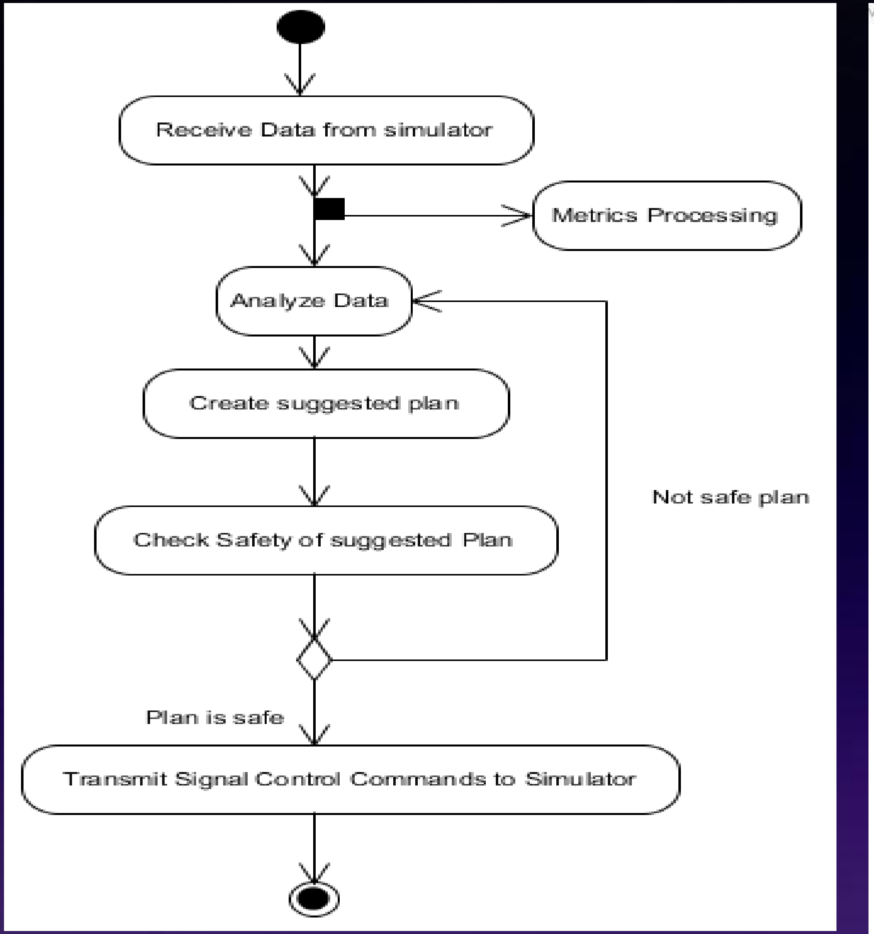
- Action Item update
- Vision Document 2.0
- Project Plan 2.0
- Test Plan
- Formal Technical Inspection Checklist
- System Architecture Design 1.0
  - Formal Requirements Specification
- Executable Architecture Prototype
- Risk Log Update

Action Items Update

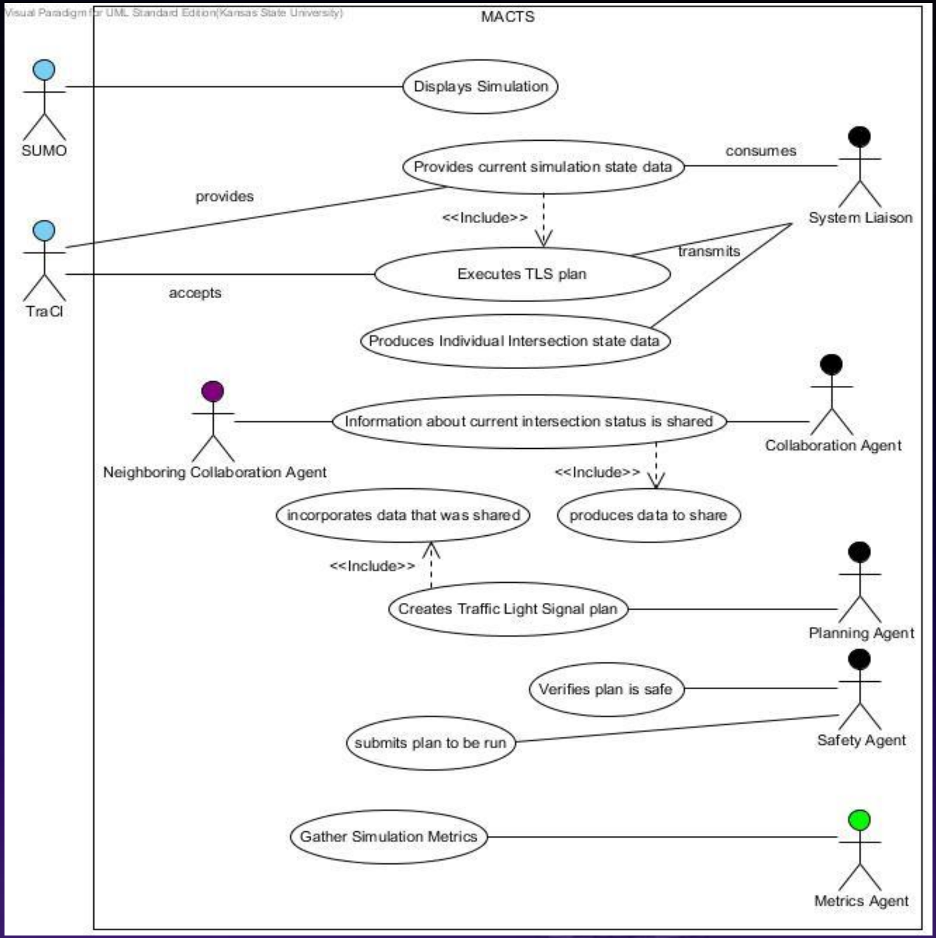
- Revise Use Case diagram
- Track SLOC (project code)
- Alternate code size estimate
  - COCOMO 6400, Me ~1500-2000
- System evaluation should include and describe comparison baseline.
- Request Technical Inspectors
- Request Project Server Space

Vision Document 2.0

- Critical Use Cases Diagram updated
- Single Iteration Diagram updated



Receive Data from simulator
Metrics Processing
Analyze Data
Create suggested plan
Not safe plan
Check Safety of suggested Plan
Plan is safe
Transmit Signal Control Commands to Simulator

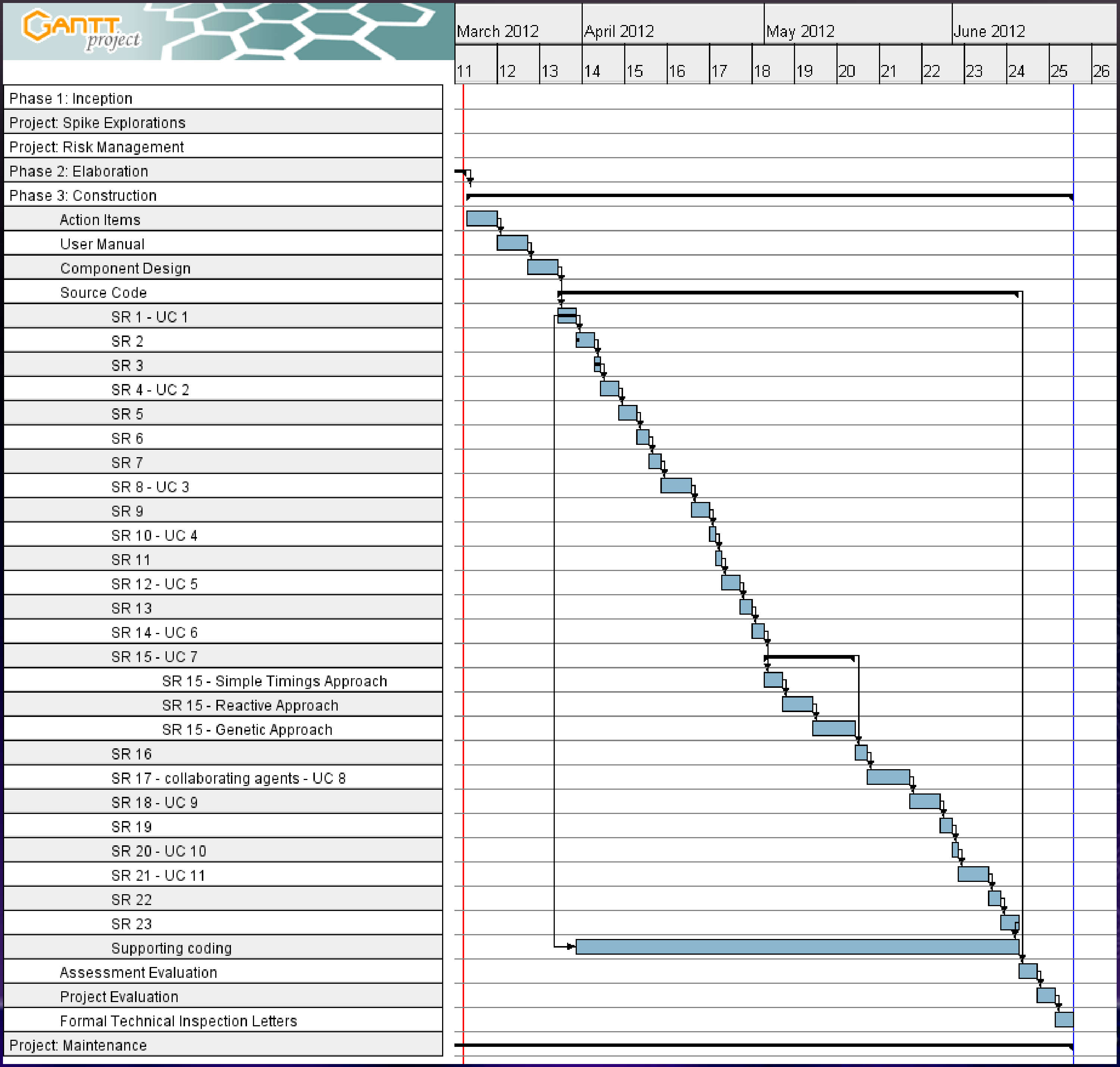


Visual Paradigm for UML Standard Edition(Kansas State University)
MACTS
SUMO
Displays Simulation
Provides current simulation state data
consumes
System Liaison
provides
<<Include>>
TraCI
Executes TLS plan
transmits
accepts
Produces Individual Intersection state data
Neighboring Collaboration Agent
Information about current intersection status is shared
Collaboration Agent
<<Include>>
incorporates data that was shared
produces data to share
<<Include>>
Creates Traffic Light Signal plan
Planning Agent
Verifies plan is safe
submits plan to be run
Safety Agent
Gather Simulation Metrics
Metrics Agent

Project Plan 2.0

- Updated with experience based estimate
  - COCOMO 6.4K
  - Experiential ~1.5K-2K

  (not including comments or test code)



- Phase 1: Inception
- Project: Spike Explorations
- Project: Risk Management
- Phase 2: Elaboration
- Phase 3: Construction
  - Action Items
  - User Manual
  - Component Design
  - Source Code
    - SR 1 - UC 1
    - SR 2
    - SR 3
    - SR 4 - UC 2
    - SR 5
    - SR 6
    - SR 7
    - SR 8 - UC 3
    - SR 9
    - SR 10 - UC 4
    - SR 11
    - SR 12 - UC 5
    - SR 13
    - SR 14 - UC 6
    - SR 15 - UC 7
      - SR 15 - Simple Timings Approach
      - SR 15 - Reactive Approach
      - SR 15 - Genetic Approach
    - SR 16
    - SR 17 - collaborating agents - UC 8
    - SR 18 - UC 9
    - SR 19
    - SR 20 - UC 10
    - SR 21 - UC 11
    - SR 22
    - SR 23
    - Supporting coding
  - Assessment Evaluation
  - Project Evaluation
  - Formal Technical Inspection Letters
- Project: Maintenance

Test Plan

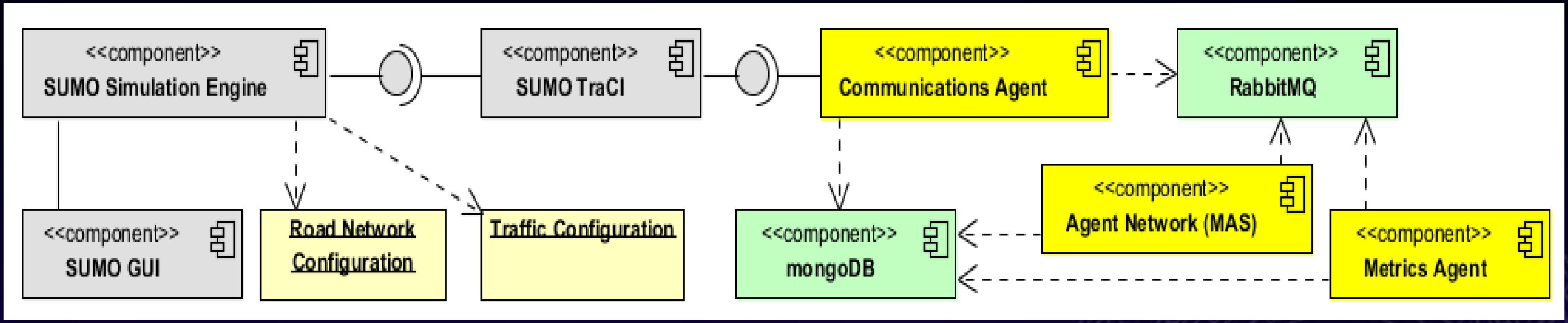
- Inspections
- Feature / Requirement Testing
- Scenario Comparisons

Formal Technical Inspection Checklist

- System Architecture Document
  - Diagrams
  - Interactions
  - Clarity and Consistency
  - USE/OCL
- Inspectors
  - Denise Case
  - Sindhu Thotakura

System Architecture Design 1.0

- Includes Formal Requirements Specification



Project Risks and Spikes

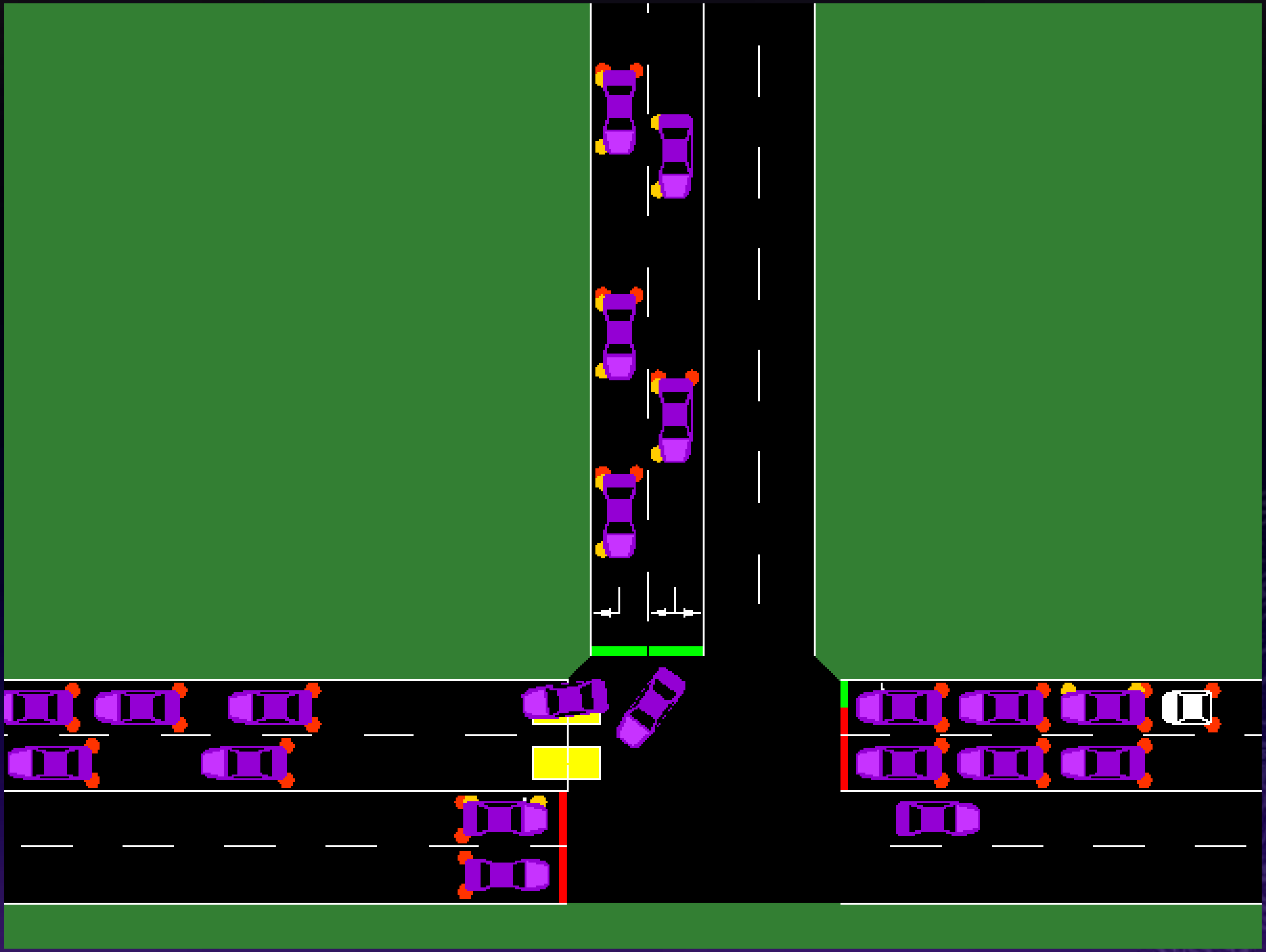
Risks

- Python
- SUMO
- Time/Scope
  - Collaboration Agents
  - Genetic Agent

Spikes

- SUMO
  - Network Load
  - Network Double T
  - Read from TRACI
  - Send to TRACI
  - Network Metrics
  - Read Sensors
  - Add Sensors

Demonstration Interaction with SUMO



Phase III Deliverables

- Action Items from Phase II
- Graph of project SLOC progress
- Graph of project Rework effort
- Project materials on gForge server
- User Manual
- Component Design
- Source Code
- Assessment Evaluation
- Project Evaluation
- References
- Formal Technical Inspection Letters
- Phase III Presentation
- Time Log
- Risk Log Update

Questions and Comments

?

References

- SUMO, “Simulation for Urban MObility,” Sep. 2011; http://sourceforge.net/apps/mediawiki/sumo/index.php?title=Main_Page.
- T. Masterton and D. Topiwala, “Multi-Agent Traffic Light Optimisation and Coordination,” white paper, Thales Group, Reference VCS081002, Issue 2, 2008.
- W. Royce, Software Project Management: A Unified Framework, Addison-Wesley,1998, p. 34, pp. 265-281.
- B. Boehm et al., “Cost Models for Future Software Processes: COCOMO 2.0,” Annals of Software Eng., Vol. 1, 1995, pp. 57-94.
- K-State Master of Software Engineering web site, “MSE Portfolio Requirements,”
- November 28, 2011; http://mse.cis.ksu.edu/portfolio.html.
- Center for Systems and Software Engineering web site, “COCOMO II,” December 4, 2011: http://sunset.usc.edu/csse/research/COCOMOII/cocomo_main.html.
- The Code Project web site, “Software Project Cost Estimates Using COCOMO II Model,” December 4, 2011: http://www.codeproject.com/KB/architecture/cocomo2.aspx.
- Naval Postgraduate School web site, “COCOMO II - Constructive Cost Model,” December 4, 2011: http://diana.nps.edu/~madachy/tools/COCOMOII.php.
- Center for Software Engineering, USC, COCOMO II: Model Definition Manual Version 2.1, 2000.
- The Code Project web site, “Calculating Function Points,” December 4, 2011: http://www.codeproject.com/KB/architecture/Calculate_Function_Point.aspx.
- USC Center for Software Engineering website, “COCOMO II Affiliates,” December 4, 2011: http://csse.usc.edu/csse/affiliate/private/COCOMOII_Driver+Calc_Ss/SpreadSheet-COCOMOII.html.

References 2

- IEEE Std. 730-1998, IEEE Standard for Software Quality Assurance Plans, IEEE 1998.
- IEEE Std. 730.1-1995 IEEE Guide for Software Quality Assurance Planning, IEEE, 1995.
- Python Software Foundation, “PEP 8 -- Style Guide for Python Code”, Python, 24 Sep. 2011; http://www.python.org/dev/peps/pep-0008/.
- Python Software Foundation, “PEP 257 – Docstring Conventions”, Python, 24 Sep. 2011; http://www.python.org/dev/peps/pep-0257/.
- K. Hill, “GMoDS-based Runtime Agent Role Interpreter SQA Plan 1.0”, People, 15 Sep. 2011; http://people.cis.ksu.edu/~kylhill/phase_1/sqa_plan.pdf.
- B. Nehl, “Multiagent Control of Traffic Signals Project Plan 1.0”, People, 26 Sep. 2011; http://people.cis.ksu.edu/~bnehl/repos/macts.git/.
- W. Royce, Software Project Management; Addison-Wesley, 1998, pp. 290-291.