# Mobile and Agile: Why can't they get along?

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These slides contain the following animated pieces. They will not show up in the pdf version of the slides. To see the animations, visit http://www.screencast.com/t/rj78xaJS8dlx. You can navigate to the target slide and play the video.

Slide 6: words from a user/stakeholder of a desktop app.

Slides 30-36: clips from Unity environments we are using.

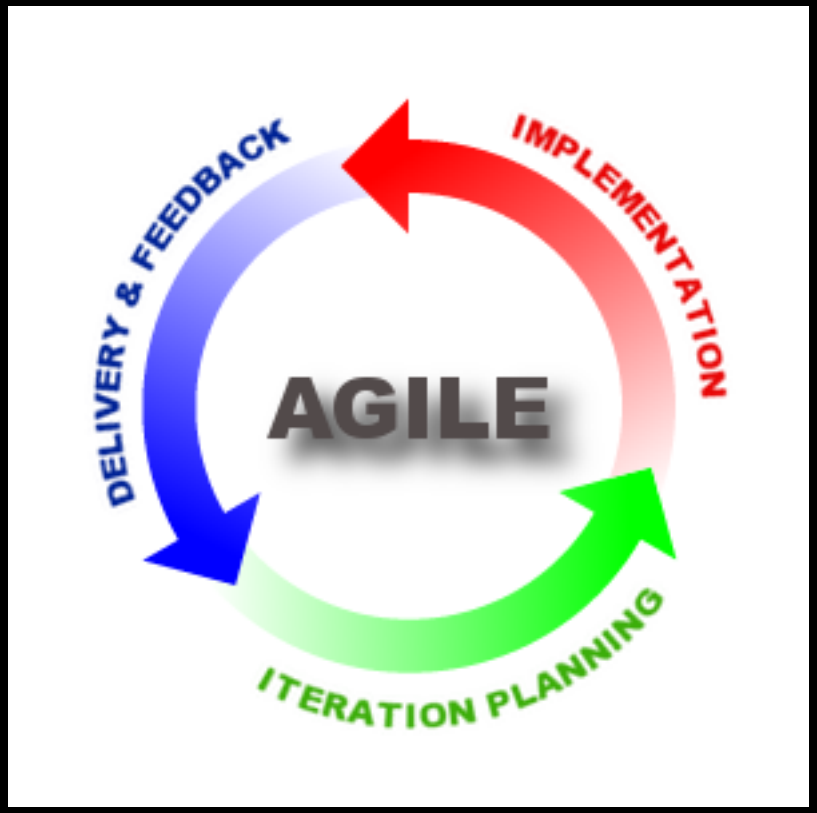
Slide 42: a Unity hospital that caught our eye. Independently, my group is also interested in apps in hospital settings and are considering our hybrid approach in this new domain.

Slide 47: using FSP/LTSA (a formal modeling tool) to derive the specs for a NPC manager in Unity.

# Talk Outline

- My group's use of Agile on desktop apps.
- New focus on mobile apps presents a roadblock.
- Promising results using *hybrid* simulation.

# My Group's Foundation




2-4 week cycles

# Social Networking Example

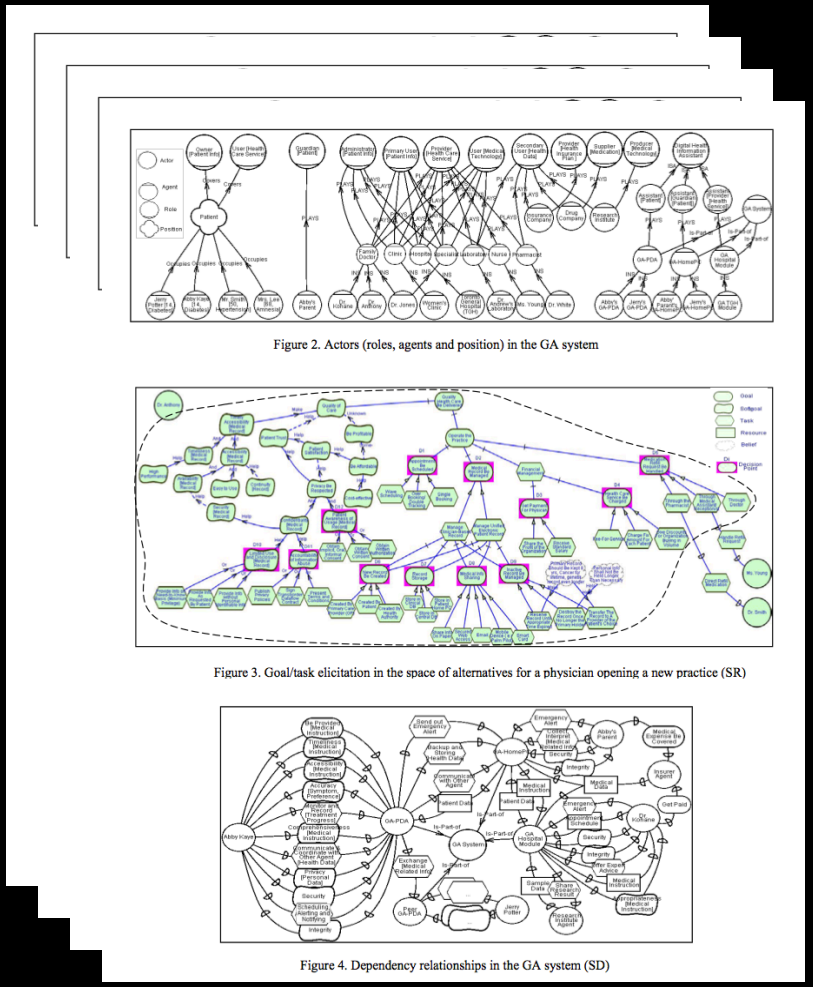
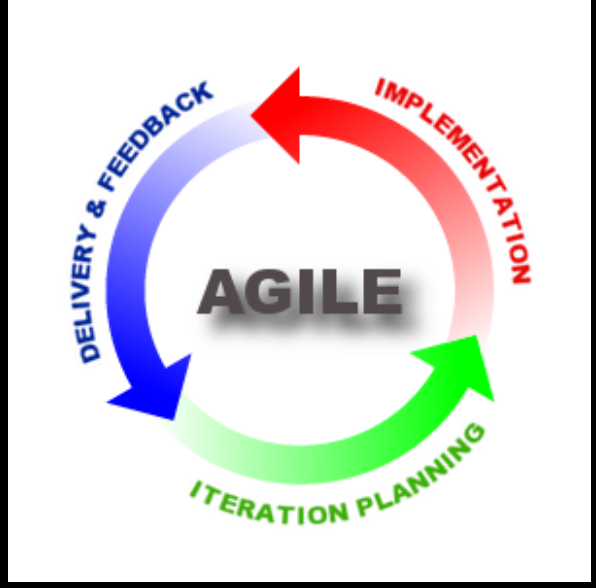
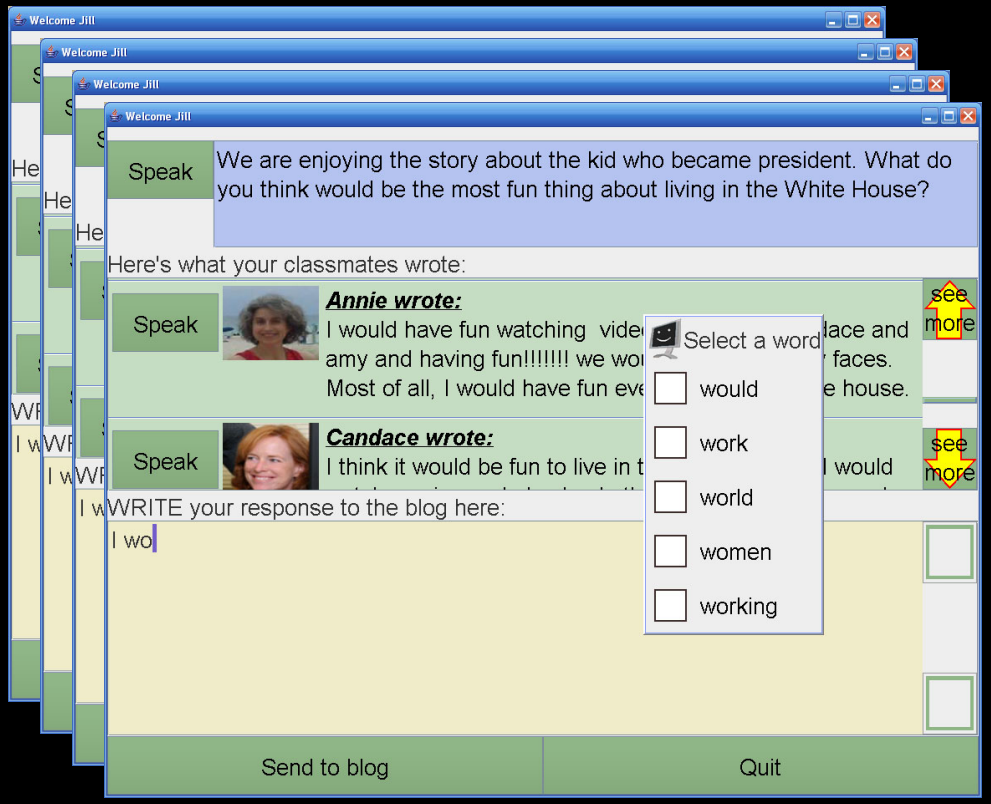


Figure 2. Actors (roles, agents and position) in the GA system

Figure 3. Goal/task elicitation in the space of alternatives for a physician opening a new practice (SR)

Figure 4. Dependency relationships in the GA system (SD)

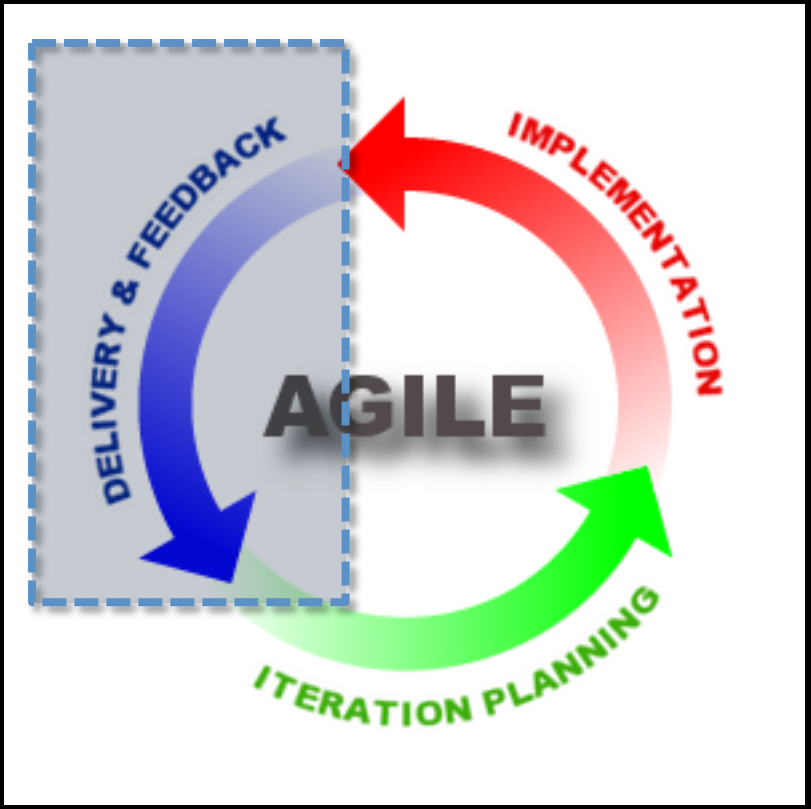


# Agile Is No Problem

1. Adequate access to end-users.

2. Controlling context is not an issue.



# All good so far

# Talk Outline

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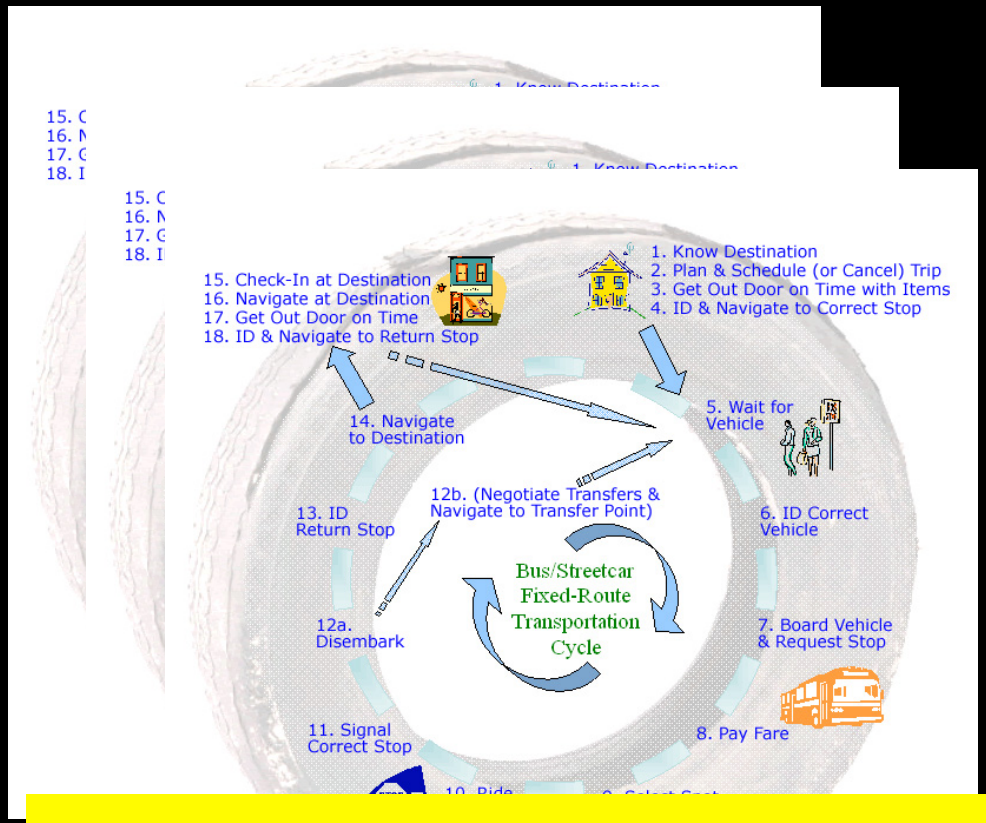
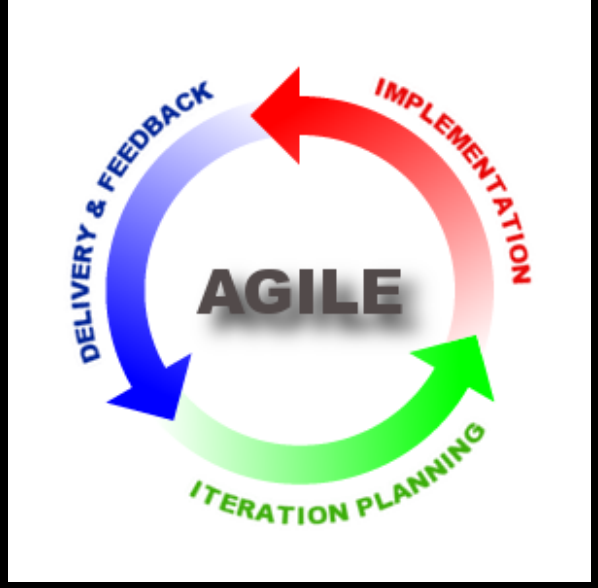
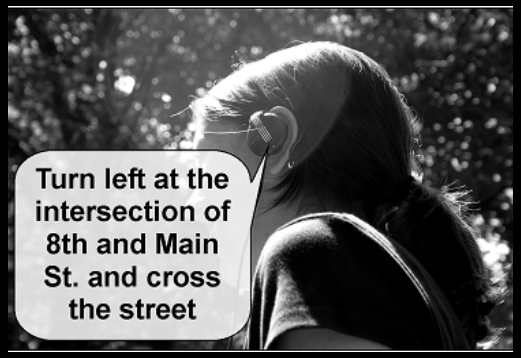
- New focus on mobile presents a roadblock.
- Promising results using *hybrid* simulation.

# New Focus On Mobile



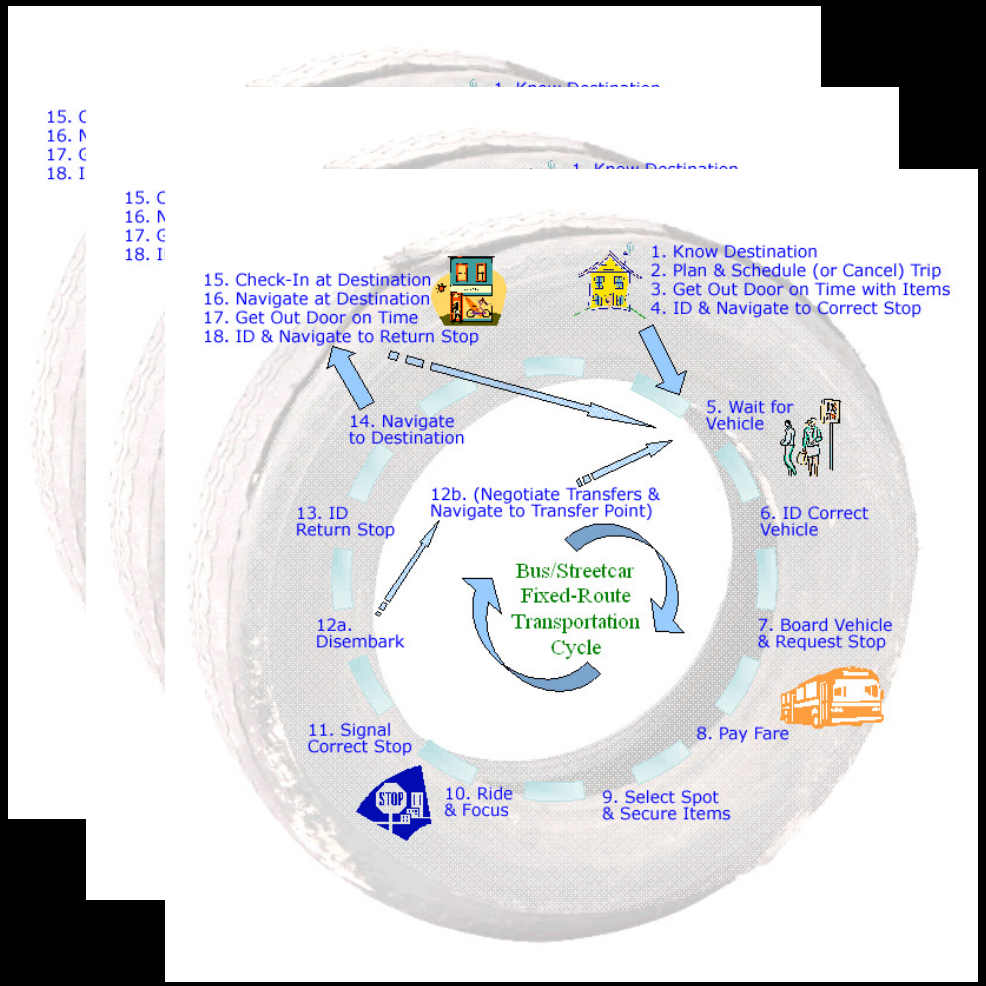

**3 years of field work to get HCI requirements!**

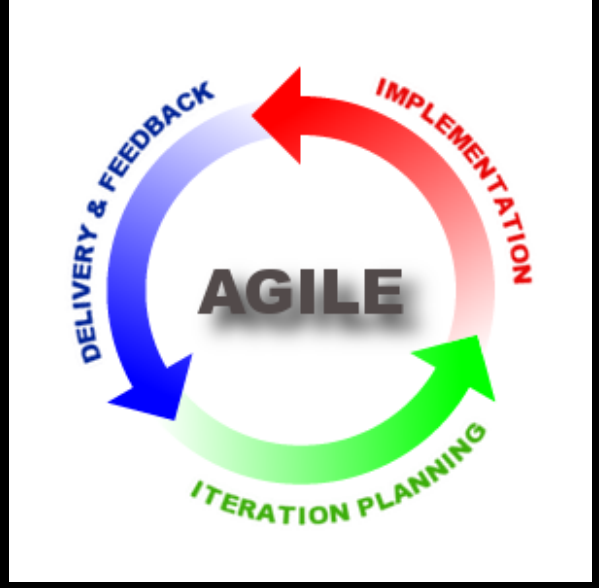
# Decision To Tackle "Trips Gone Bad"

Three problems:

a. *Memory*, e.g., forgetting where you are going.
b. *Loss of Focus*, e.g., distracted.
c. *Anxiety*, e.g., get lost and won't be able to get help.

# 3 More Years?



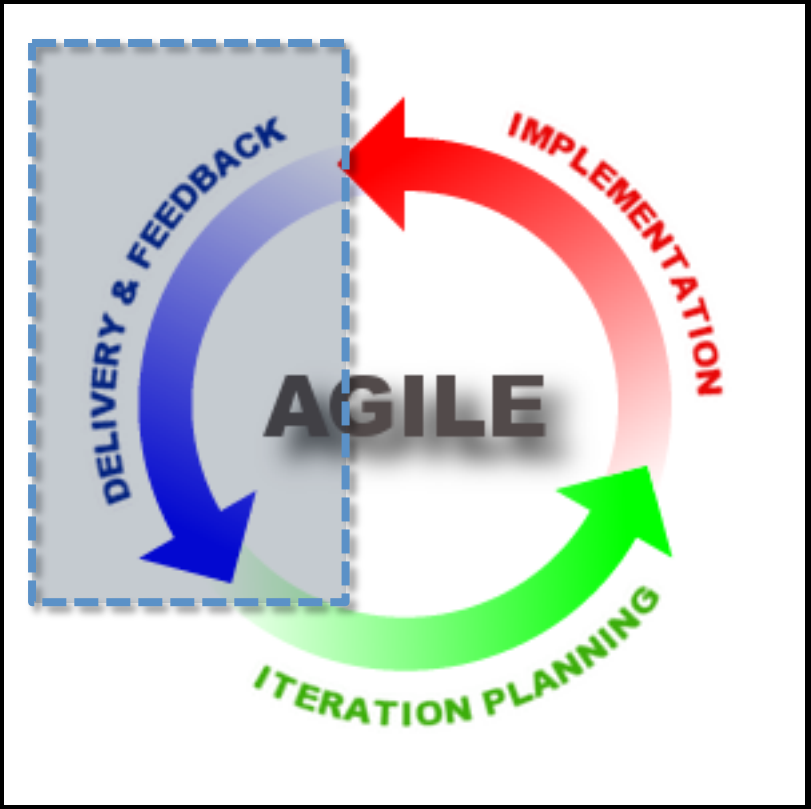




Lots of great ideas in the group on how to mitigate the 3 issues.

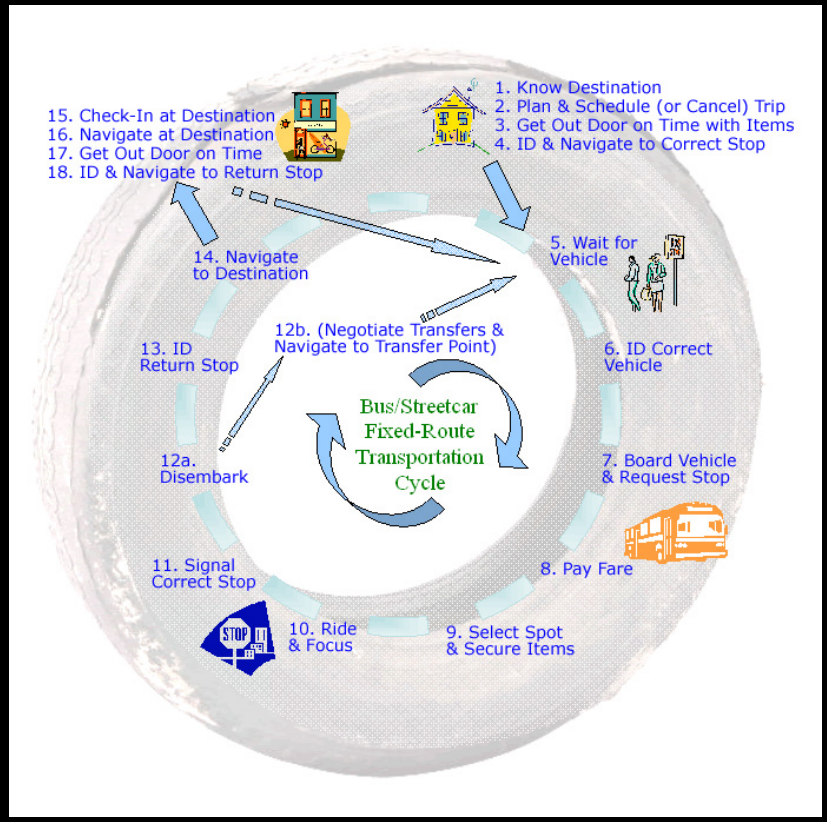
# Agile Is A Problem

1. Getting end-users to field sites is a problem.

2. Controlling testing context is a problem.



# Let me give you a context sampler of public transportation



# Stations can be chaotic

# Buses can be crowded and noisy

# Buses are delayed


# Social Distractions


**Loitering Youth Disrupt Downtown**

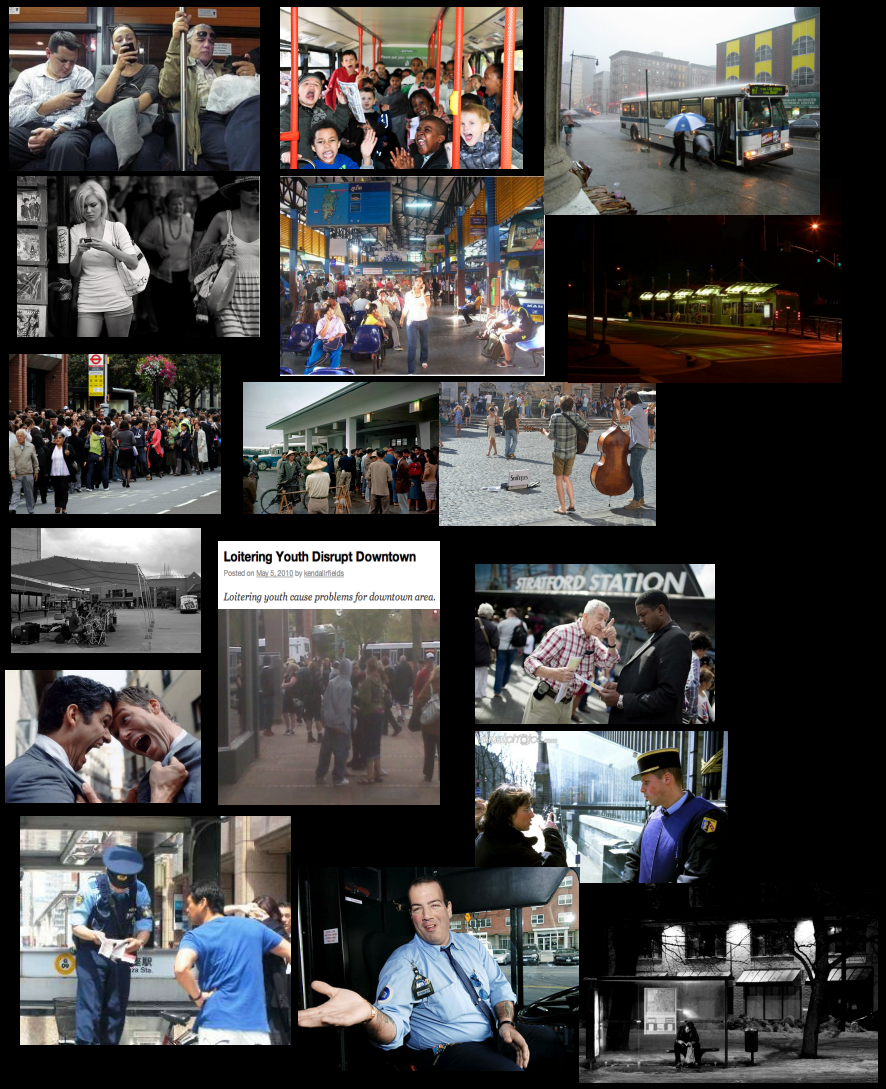
Posted on May 5, 2010 by kendallrfields

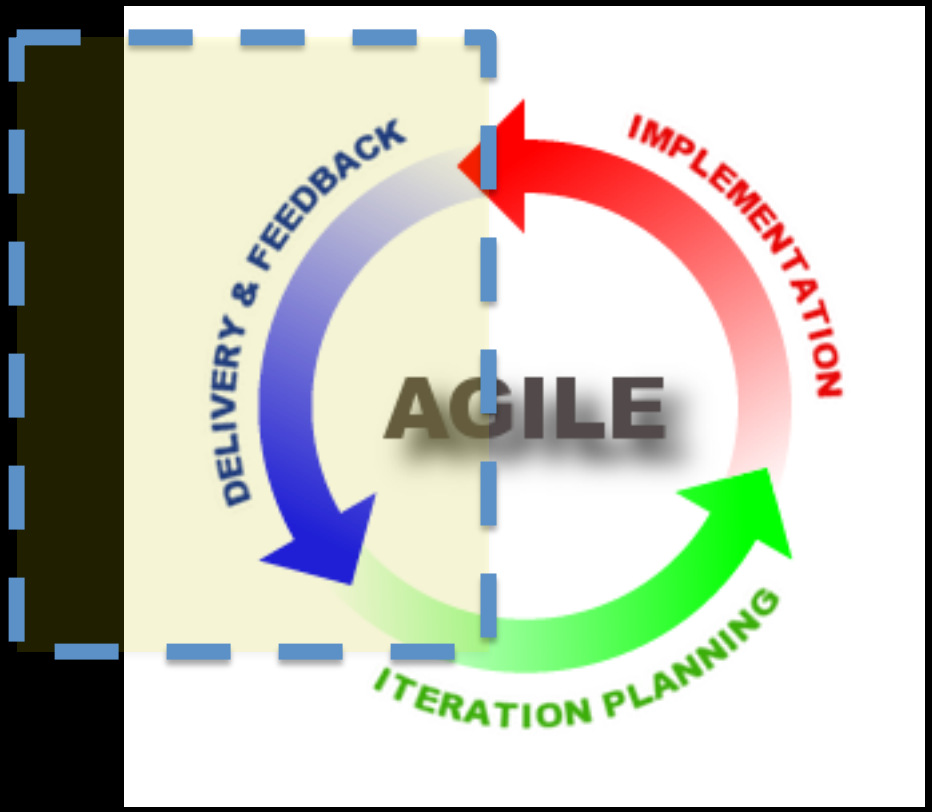
*Loitering youth cause problems for downtown area.*

# Asking For Help

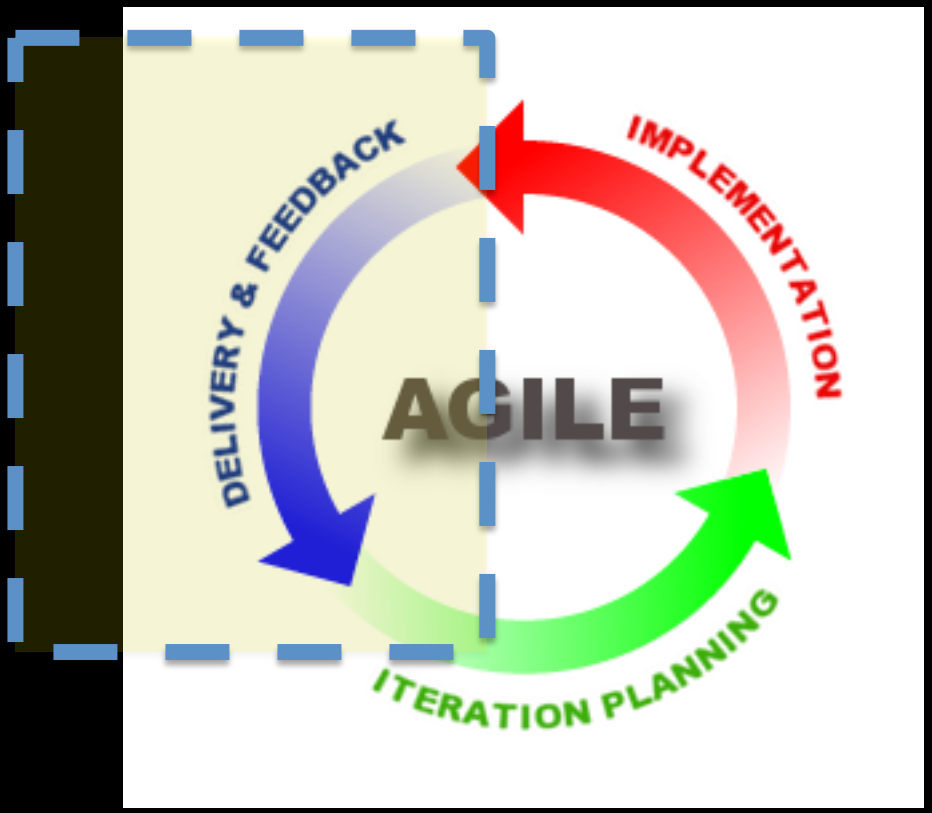
# Time of Day

# How To Control Context In Testing?



# Person-Centric As Well



# Talk Outline

- My group's use of Agile on desktop apps.

- New focus on mobile presents a roadblock.

- Promising results using *hybrid* simulation.

# Two Simulation Projects That Inspired Me

- Behavioral visualization in KAOS.
- Interactive simulation in Scenebeans.

Hung Tran Van, Axel van Lamsweerde, Philippe Massonet, Christophe Ponsard. Goal-Oriented Requirements Animation. In *Proc. RE'04: 12th IEEE International Requirements Engineering Conference*

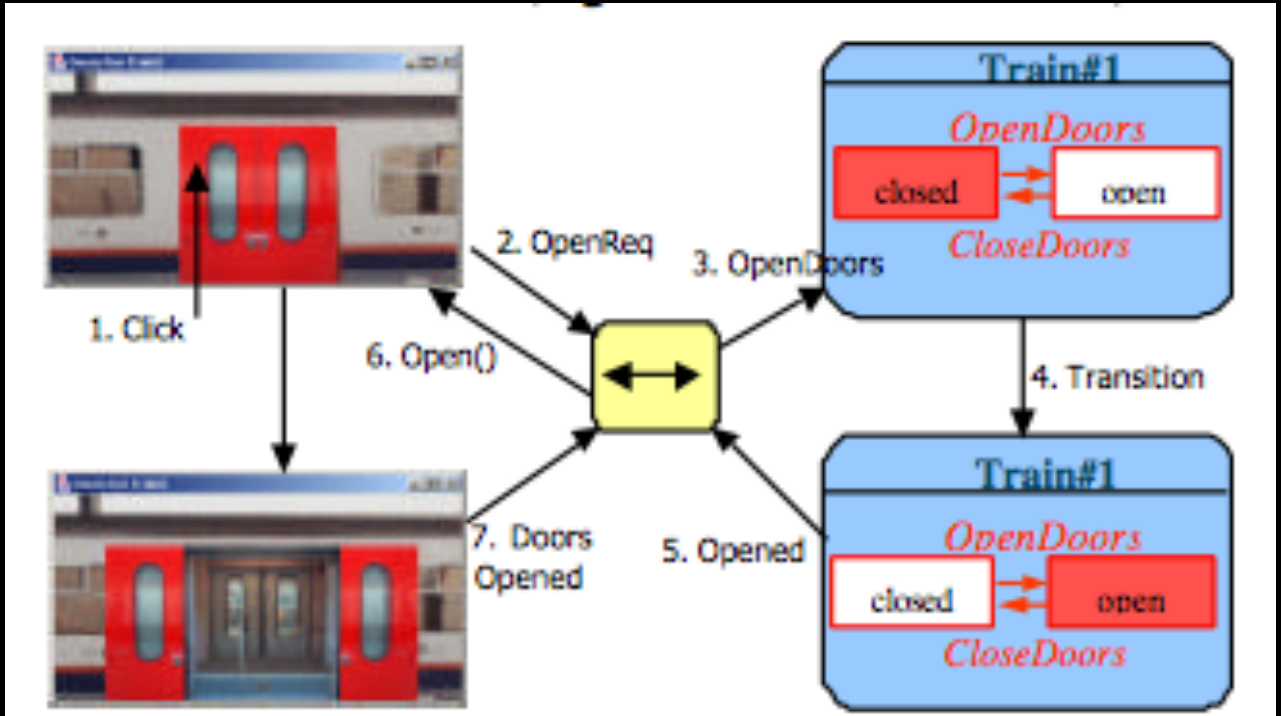



**Figure 9: Interacting with world visualizations**

Jeff Magee, Nat Pryce, Dimitra Giannakopoulou, and Jeff Kramer. Graphical animation of behavior models. In *Proceedings of the 22nd international conference on Software engineering* (ICSE 2000).

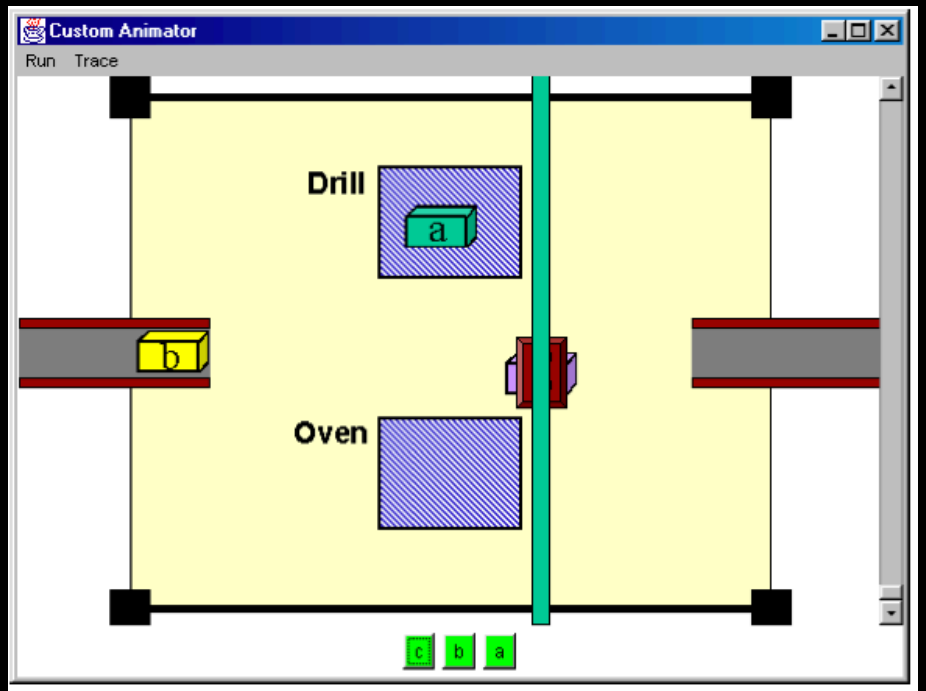



**Figure 7 – Flexible Production Cell animation.**

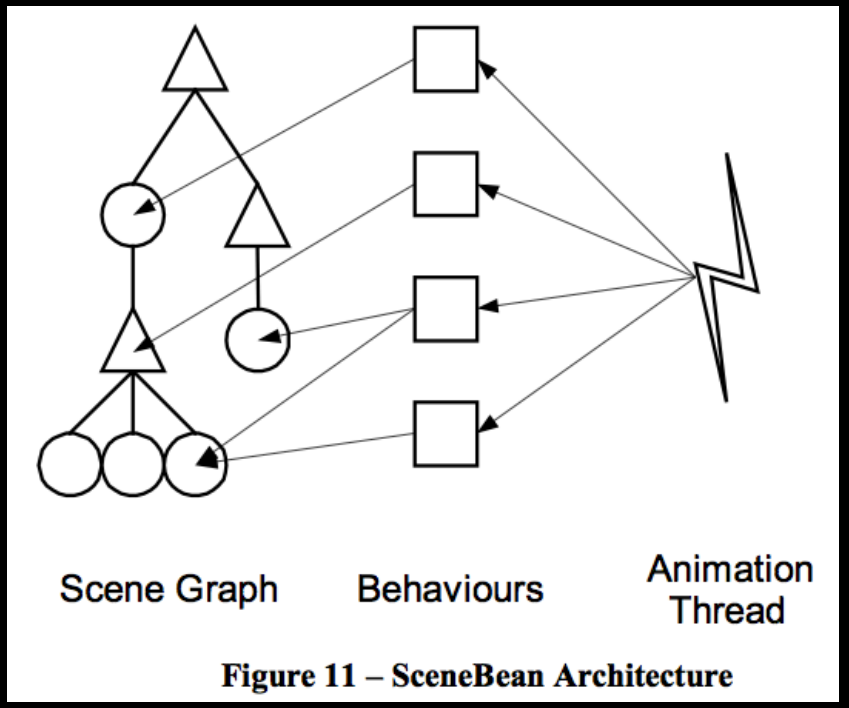



**Figure 11 – SceneBean Architecture**

# Our Approach: Hybrid Simulation


User explores space

Guides user

Sensor data (simulated)

# We can drop the user into context of our choosing.

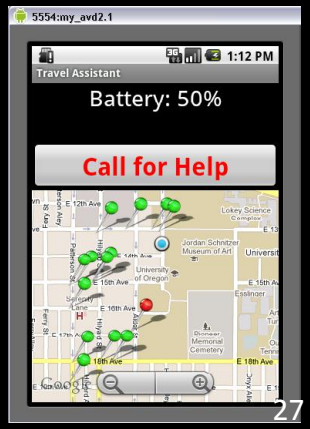
# Our Goal: Build up simulated Eugene context

Test our apps in 3 areas:

a. *Memory*, e.g., forgetting where you are going.

b. *Loss of Focus*, e.g., distracted.

c. *Anxiety*, e.g., lost and don't know what to do.

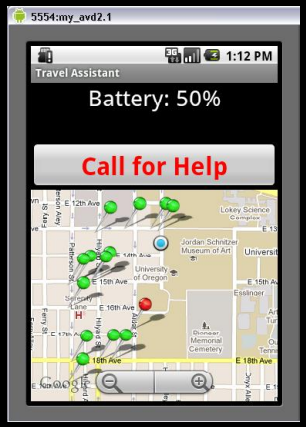



# First Attempts Using Google Street View


Google Street View


Segue to Bus Simulator

GPS Feeds





Bus Simulator

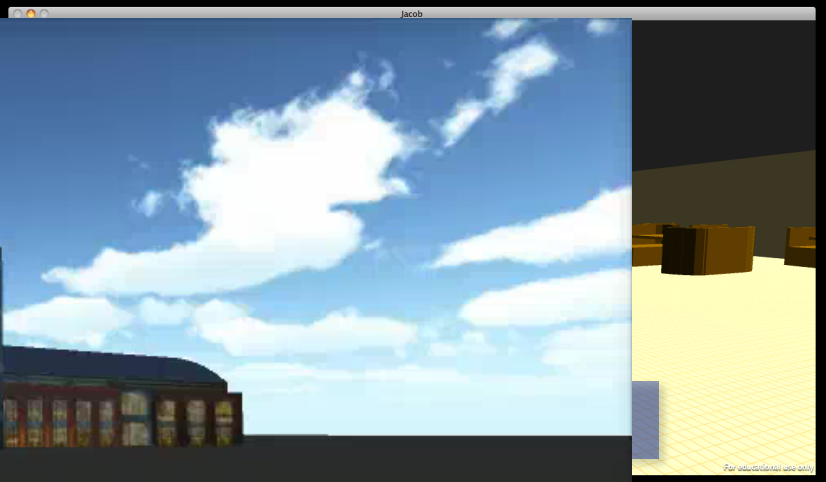
# Switched To Game Engine






# Building Infrastructure






# Controlling Time Of Day



2 by 3
Static
Default
19.15359
MoveBus

# Distractors


Sources

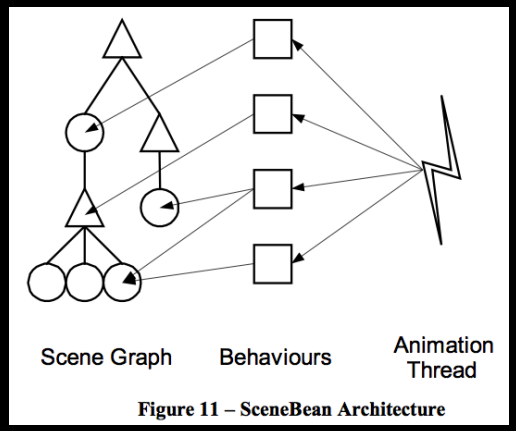
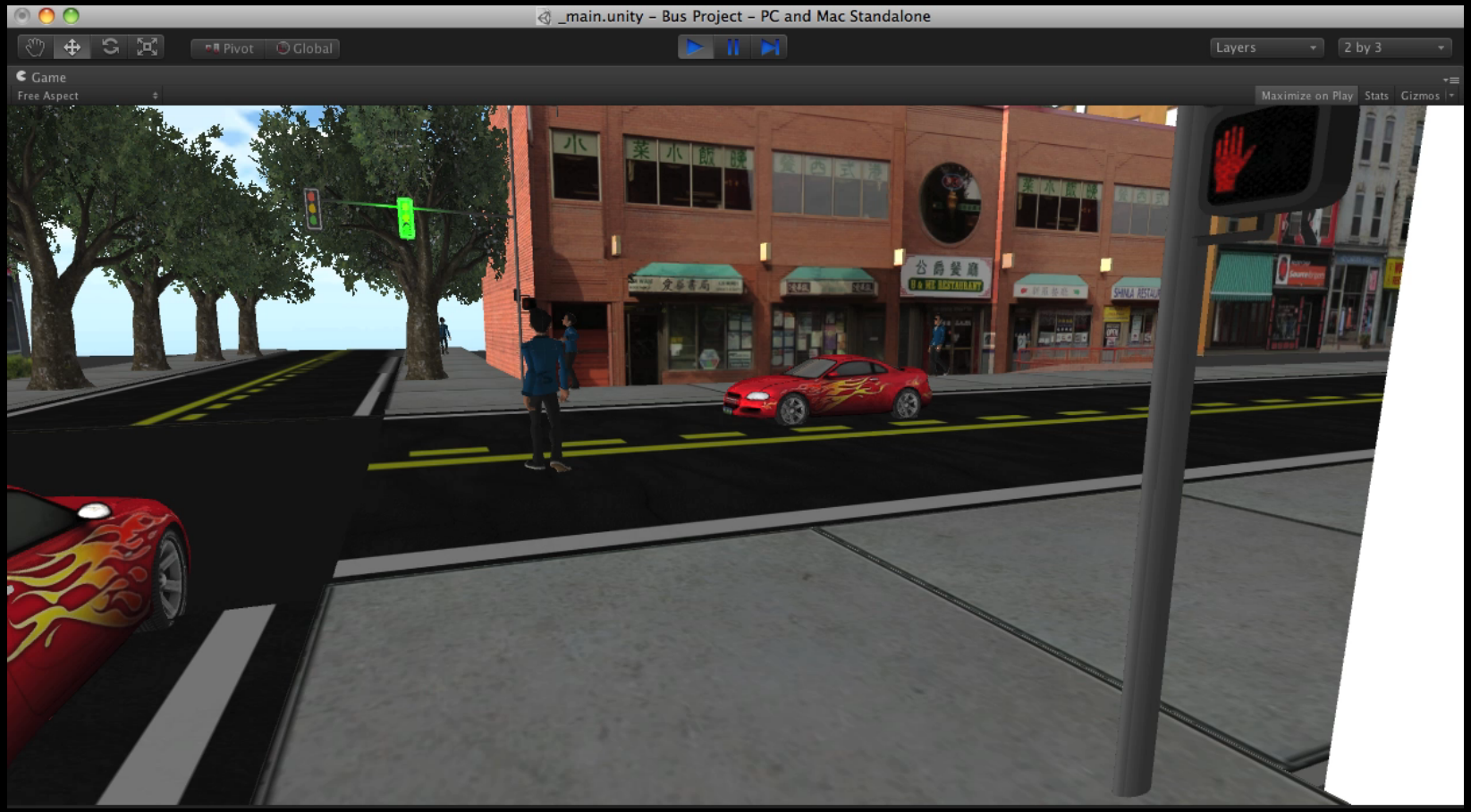


Figure 11 – SceneBean Architecture

Behavior

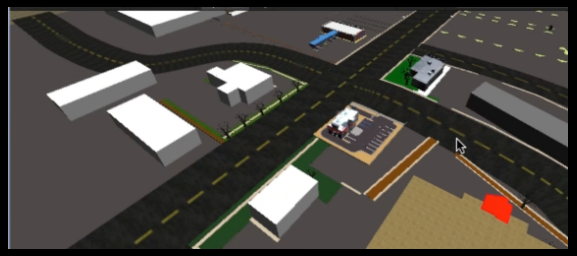
# Getting To The Bus

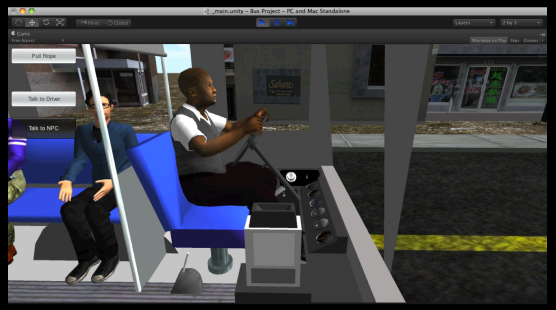


# At The Station

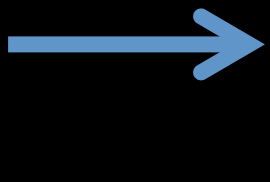
# Bus Weirdness

# Simulating Sensor Data







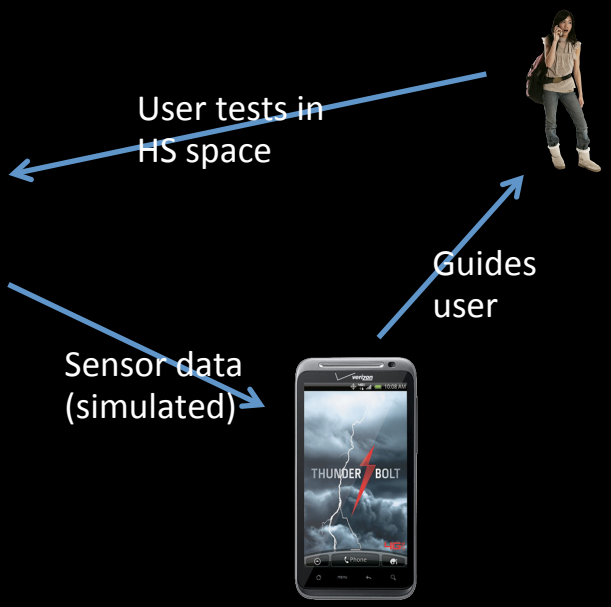

GPS and time-of-day: no problem.

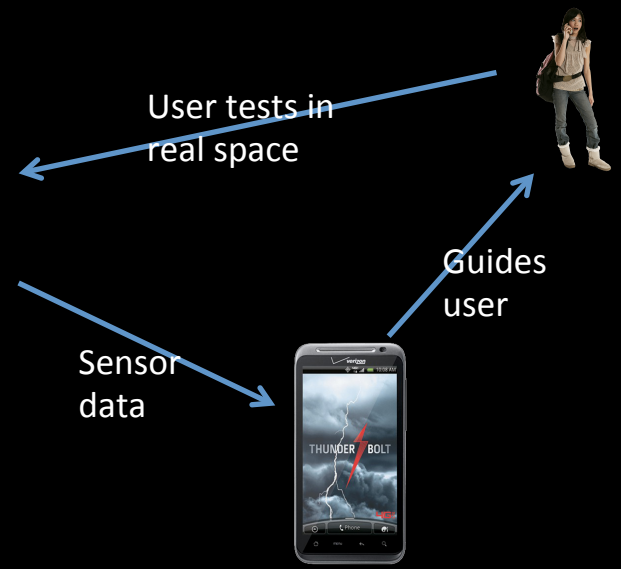
Accelerometer: working on it. Focus on sit-down and stand-up.

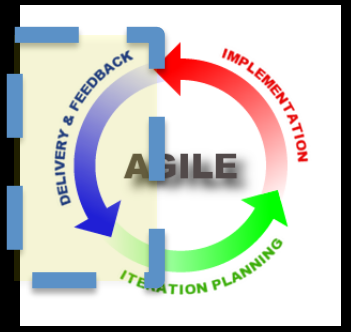
Ambient noise: no problem.

Photo capture: thinking about it.

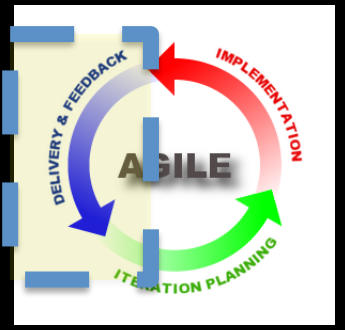
# The Hard Question

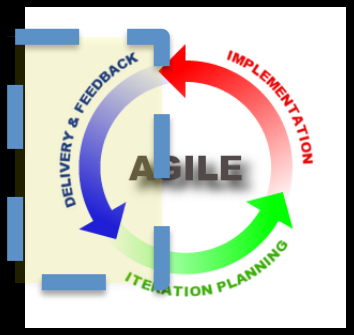



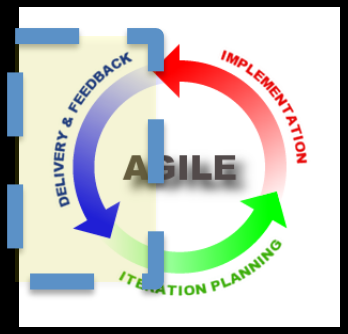

Same?



# 3 Studies So Far




Same?




1. Explore real and virtual *without* phone. Memory test at end. Rough equivalence.

2. Follow erroneous directions in real and virtual *without* phone. Analyze performance. Differentiated equivalence.

3. Disembark bus using phone reminders. Preliminary results are promising in HS.

4. To Do: rerun one or more of 3 year field studies in HS. Compare results.

# Good News Mixed With Bad News

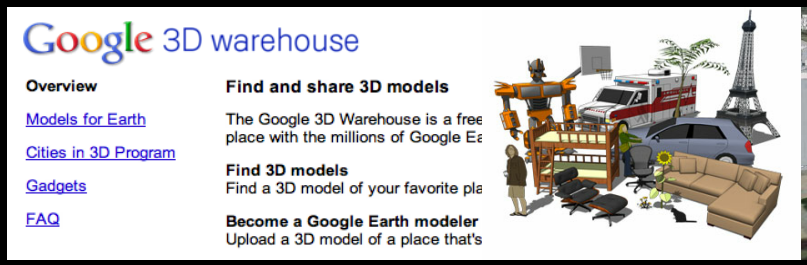
Physical exertion is missing (including heat/humidity).

Would like more natural dialog system.

HS is (too) safe:

- More likely to carry out dangerous activities in HS, e.g., ignore traffic.
- Less anxious about getting lost in HS.

# Will This Work For You?







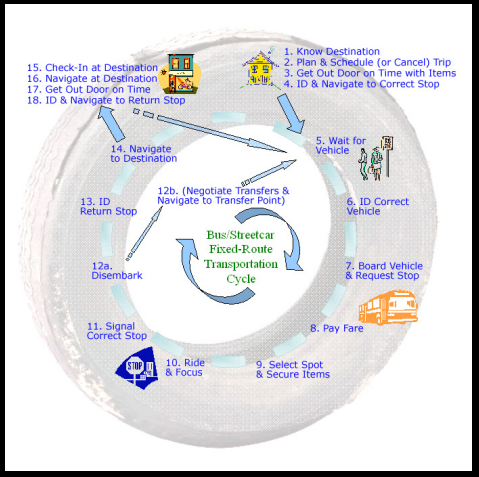
We have no graphics artist in the group. Rely on Google Warehouse and mixamo.

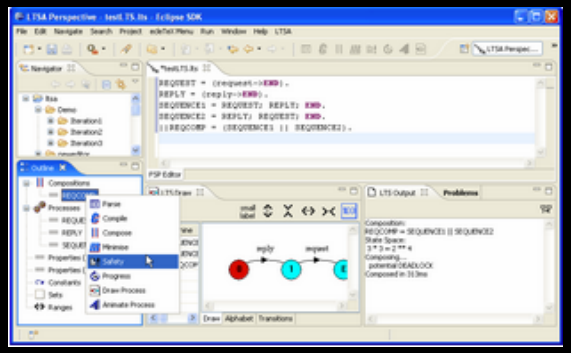
We paid for an on-site Unity workshop – 1 day at $1500.

We have one Java/Javascript programmer in charge of the Unity-HS + Android interface.

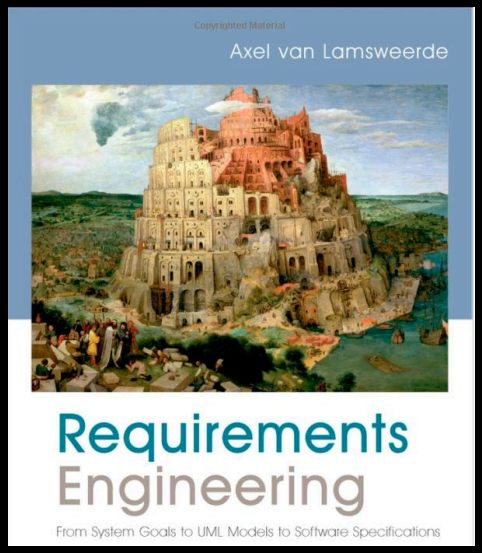
# If You Happen To Have Some Graphic Art Resources

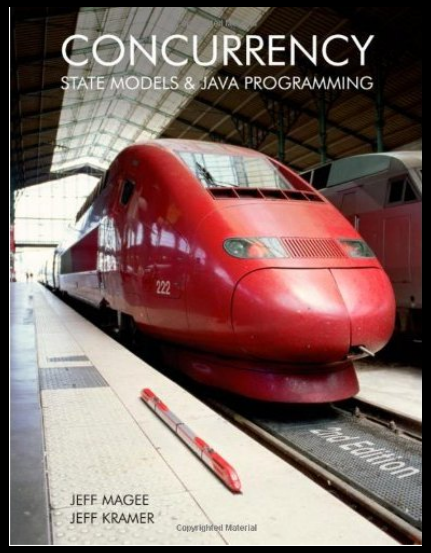
# Quick Excursion



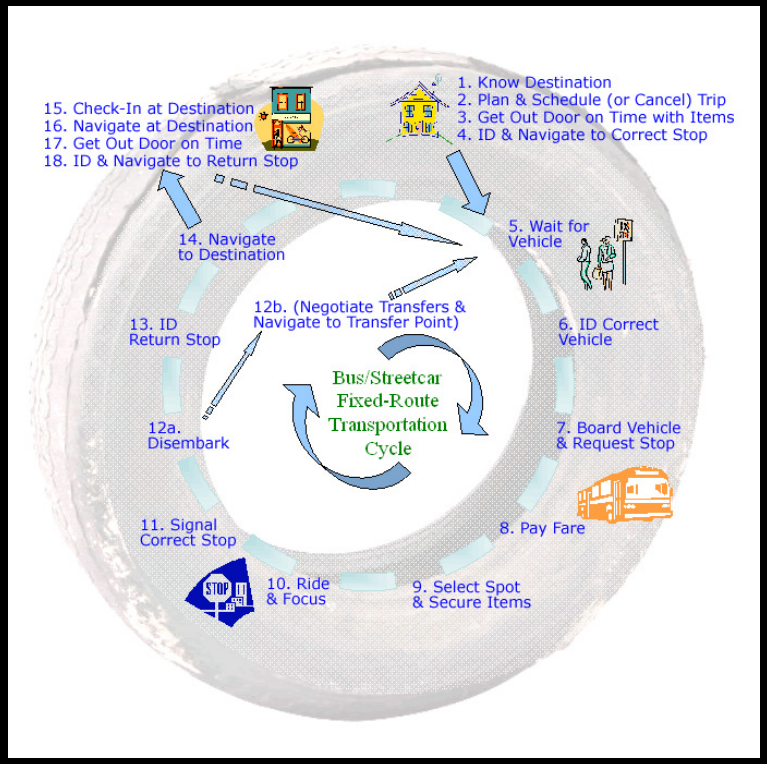



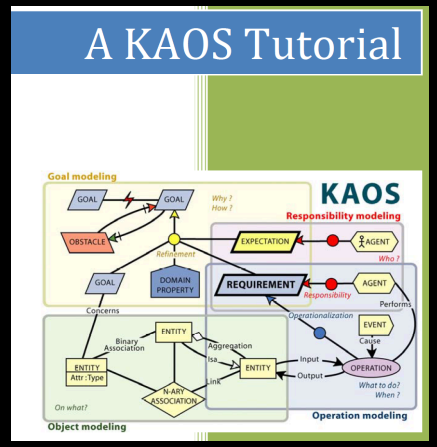
```
var url : String = "http://sites.google.com/site/jedcis199/home/dialogues.xml";
var xml : TextAsset;
var setupOnStart : boolean = true;

function Start() {

    if (setupOnStart) {
    SetupDialogues();
    }

}

function SetupDialogues() {
    var parser = JedsSimpleXMLParserv2();

    var dialogueWWW : WWW = WWW(url);
    yield dialogueWWW;
    //var root : NodeXML = parser.ParseXML(dialogueWWW.text);
    var root : NodeXML = parser.ParseXML(xml.text);

    var dialogueNodes = root.GetChildren();
    var conversers : InitiateConversation[] = FindObjectsOfType(InitiateConversa

    var temp : Dialogue;
    for (node in dialogueNodes) {
    temp = Dialogue(node);
    print("checking dialogue with name = " + temp.Name());
    for (converser in conversers) {
        if (converser.id == temp.Id()) {
        print("found converser with id = " + converser.id);
        converser.SetDialogue(temp);
        }
```




# Formalizing Obstacles



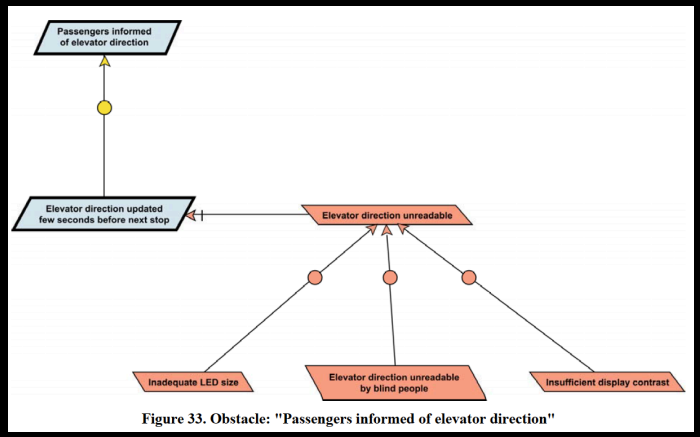
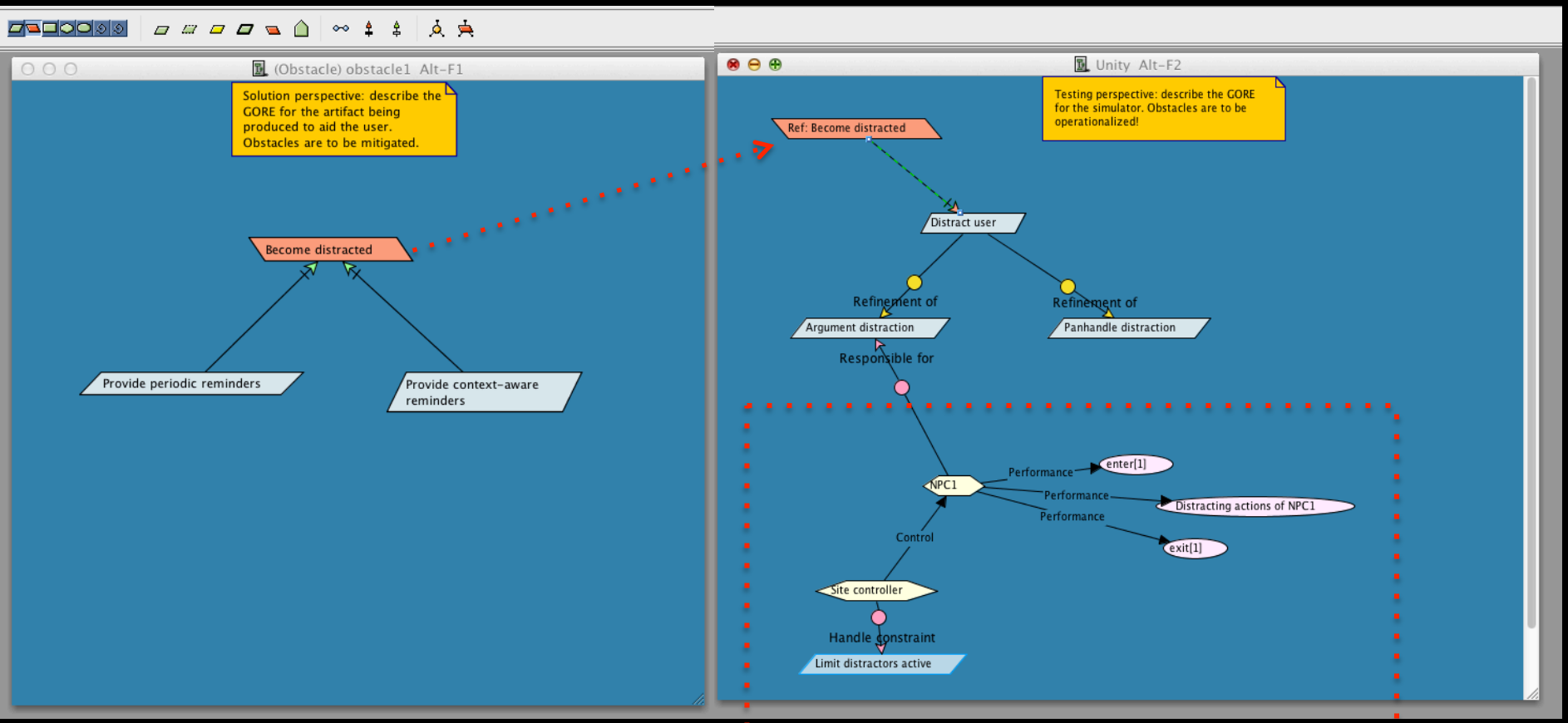



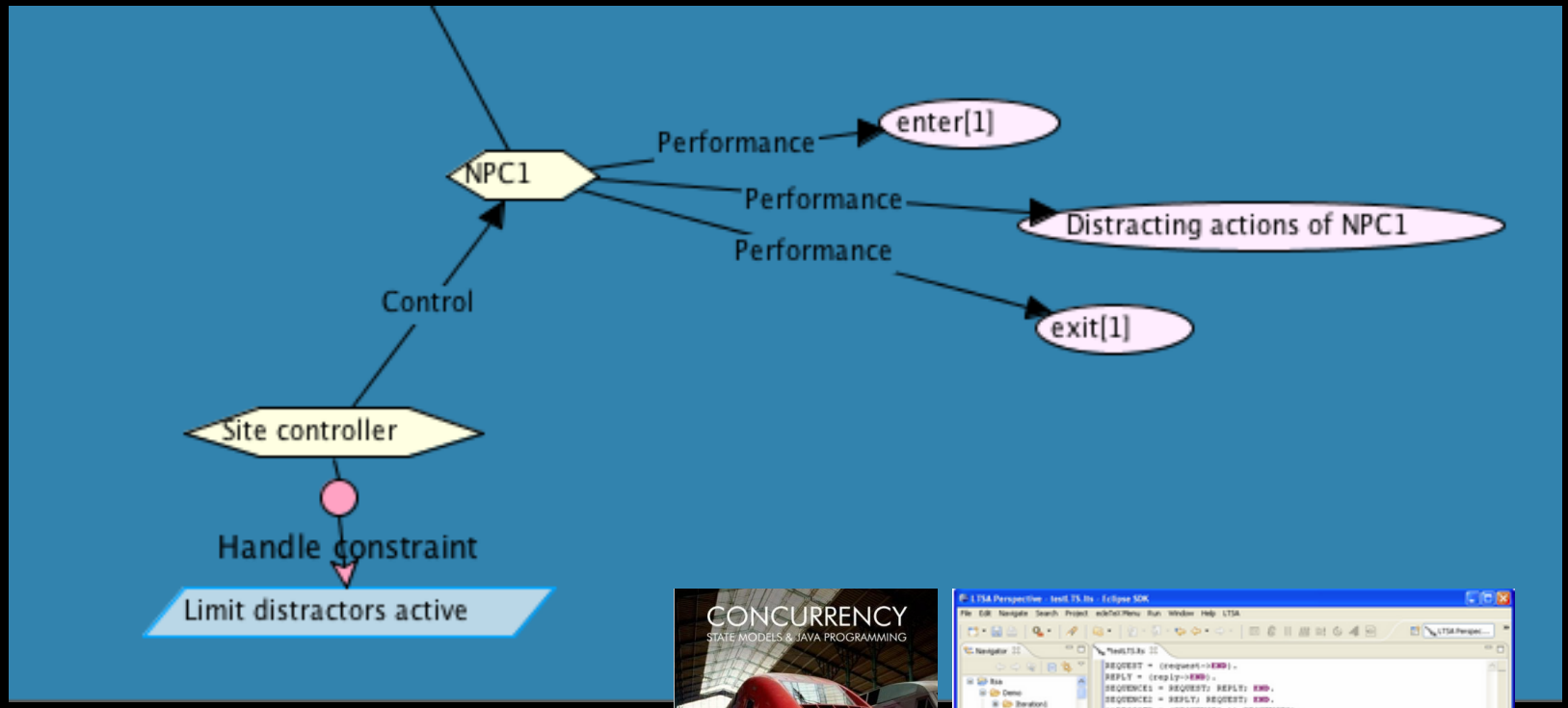
Figure 33. Obstacle: "Passengers informed of elevator direction"

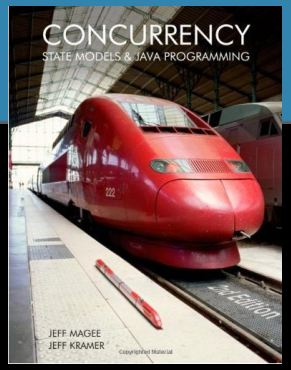
A. van Lamsweerde, E. Letier Handling Obstacles in Goal-Oriented Requirements Engineering *IEEE Transactions on Software Engineering*, Vol. 26 No. 10, October 2000, 978-1005.

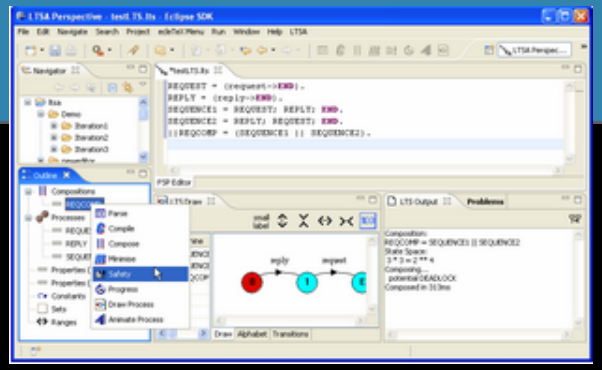
# From Obstacles In Solution Space To Goals in HS Space



# From Kaos To Operational Specs



# Formalizing Behavior

# Patterns Seem Promising

LTSA – bus_stationv4.lts

File Edit Check Build Window Help Options

SITE_SYSTEM

Edit Output Draw Manual Alphabet

```
const T = 1
const K = 3      //Number of NPC to draw from
const N = 2      //Max on stage at any one time

SITE_MANAGER = (open -> close -> SITE_MANAGER).

CONTROL = (open -> OPEN[0]),

    OPEN[i:0..N] =  (when (i<N) enter[1..K]->OPEN[i+1] |
                     when (i>0) exit[1..K]->OPEN[i-1] |
                     when T  close->CLOSED[i]),

    CLOSED[i:0..N] =(when (i>0) exit[1..K]->CLOSED[i-1] |
                     when (i==0) allAreOut -> CONTROL).

NPC1 = (enter[1] -> npc1_distraction_actions -> exit[1] -> NPC1).
NPC2 = (enter[2] -> npc2_distraction_actions -> exit[2] -> NPC2).
NPC3 = (enter[3] -> npc3_distraction_actions -> exit[3] -> NPC3).

||ACTORS = (NPC1 || NPC2 || NPC3).

||SITE = (ACTORS || SITE_MANAGER).

||SITE_SYSTEM = (SITE || CONTROL).

fluent IN[j:1..K] = <enter[j],exit[j]>

assert SITE_IS_EMPTY = [](allAreOut -> !IN[1..K])
```

```
1
2  var url : String = "http://sites.google.com/site/jedcis199/home/dialogues.xml";
3  var xml : TextAsset;
4  var setupOnStart : boolean = true;
5
6  function Start() {
7
8      if (setupOnStart) {
9      SetupDialogues();
10     }
11
12 }
13
14 function SetupDialogues() {
15     var parser = JedsSimpleXMLParserv2();
16
17     var dialogueWWW : WWW = WWW(url);
18     yield dialogueWWW;
19     //var root : NodeXML = parser.ParseXML(dialogueWWW.text);
20     var root : NodeXML = parser.ParseXML(xml.text);
21
22     var dialogueNodes = root.GetChildren();
23     var conversers : InitiateConversation[] = FindObjectsOfType(InitiateConversa
24
25     var temp : Dialogue;
26     for (node in dialogueNodes) {
27     temp = Dialogue(node);
28     print("checking dialogue with name = " + temp.Name());
29     for (converser in conversers) {
30         if (converser.id == temp.Id()) {
31         print("found converser with id = " + converser.id);
32         converser.SetDialogue(temp);
33         }
```

# Bibliography

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# Thanks