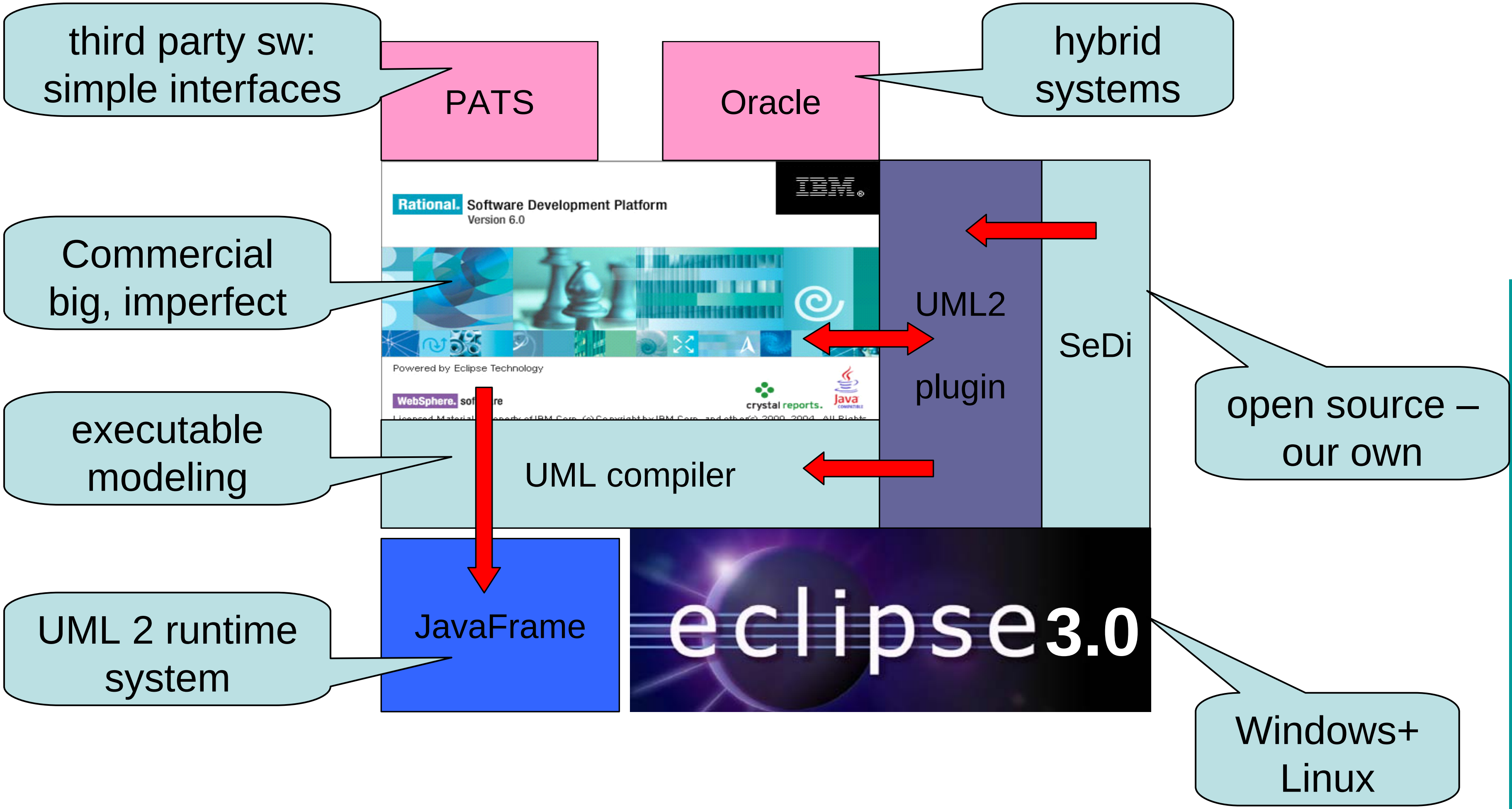
# Agile modeling – for INF5150

Version 071012

# Tools for INF5150 Autumn 2007

We are going to keep to the safe and already proven technology this time ...

# Tools for executable modeling in INF5150



third party sw: simple interfaces

PATS

Oracle

hybrid systems

Commercial big, imperfect

UML2 plugin

SeDi

open source – our own

executable modeling

UML compiler

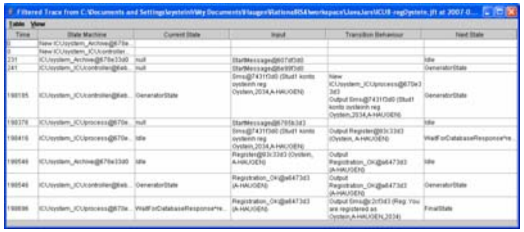
UML 2 runtime system

JavaFrame

Windows+ Linux

IBM.
Rational. Software Development Platform
Version 6.0
Powered by Eclipse Technology
WebSphere. software
crystal reports.
Java
eclipse3.0

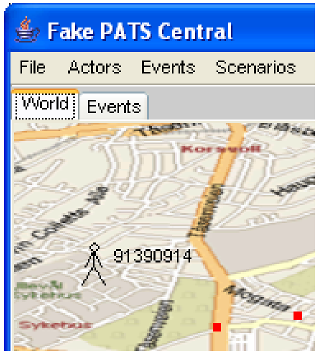
# Executing a model

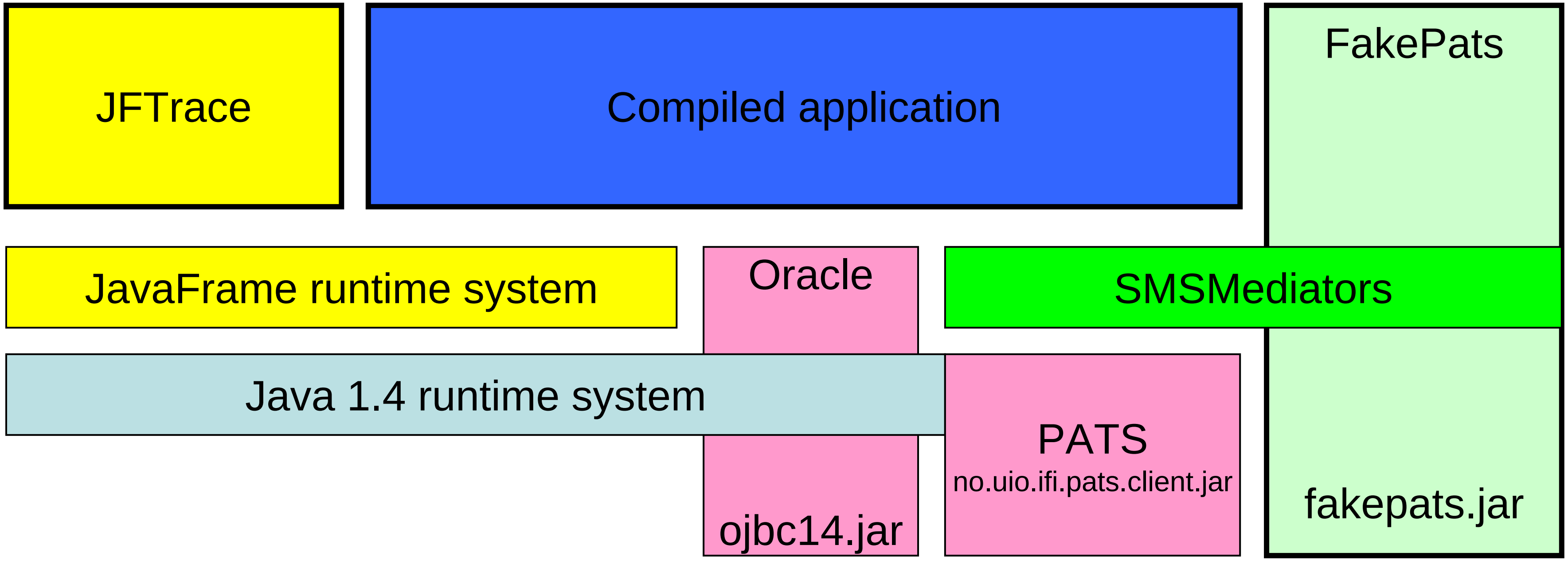


Filtered Trace from C:\Documents and Settings\oystein\My Documents\Haugen\RationalRSA\workspace\JavaJars\ICU8-regOystein.jft at 2007-0...

Table View

| Time | State Machine | Current State | Input | Transition Behaviour | Next State |
|---|---|---|---|---|---|
| 0 | New ICUsystem_Archive@678a... | | | | |
| 0 | New ICUsystem_ICUcontroller... | | | | |
| 231 | ICUsystem_Archive@678a33d0 | null | StartMessage@607df3d0 | | Idle |
| 241 | ICUsystem_ICUcontroller@6eb... | null | StartMessage@6e99f3d0 | | GeneratorState |
| 198185 | ICUsystem_ICUcontroller@6eb... | GeneratorState | Sms@7431f3d0 (Stud1 konto systemh reg Oystein,2034,A-HAUGEN) | New ICUsystem_ICUprocess@670e33d3<br>Output Sms@7431f3d0 (Stud1 konto systemh reg Oystein,2034,A-HAUGEN) | GeneratorState |
| 198378 | ICUsystem_ICUprocess@670e... | null | StartMessage@6795a3d3 | | Idle |
| 198416 | ICUsystem_ICUprocess@670e... | Idle | Sms@7431f3d0 (Stud1 konto systemh reg Oystein,2034,A-HAUGEN) | Output Register@93c33d3 (Oystein, A-HAUGEN) | WaitForDatabaseResponse*re... |
| 198546 | ICUsystem_Archive@678a33d0 | Idle | Register@93c33d3 (Oystein, A-HAUGEN) | Output Registration_OK@a6473d3 (A-HAUGEN) | Idle |
| 198546 | ICUsystem_ICUcontroller@6eb... | GeneratorState | Registration_OK@a6473d3 (A-HAUGEN) | Output Registration_OK@a6473d3 (A-HAUGEN) | GeneratorState |
| 198696 | ICUsystem_ICUprocess@670e... | WaitForDatabaseResponse*re... | Registration_OK@a6473d3 (A-HAUGEN) | Output Sms@c2cf3d3 (Reg: You are registered as Oystein,A-HAUGEN,2034) | FinalState |





JFTrace

Compiled application

FakePats

JavaFrame runtime system

Oracle

SMSMediators

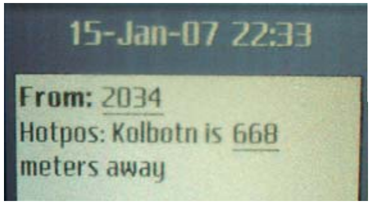
Java 1.4 runtime system

PATS

no.uio.ifi.pats.client.jar

ojbc14.jar

fakepats.jar



15-Jan-07 22:33

From: 2034

Hotpos: Kolbotn is 668 meters away

# IBM Rational Modeler

Software Development Platform
Version 6.0

Powered by Eclipse Technology

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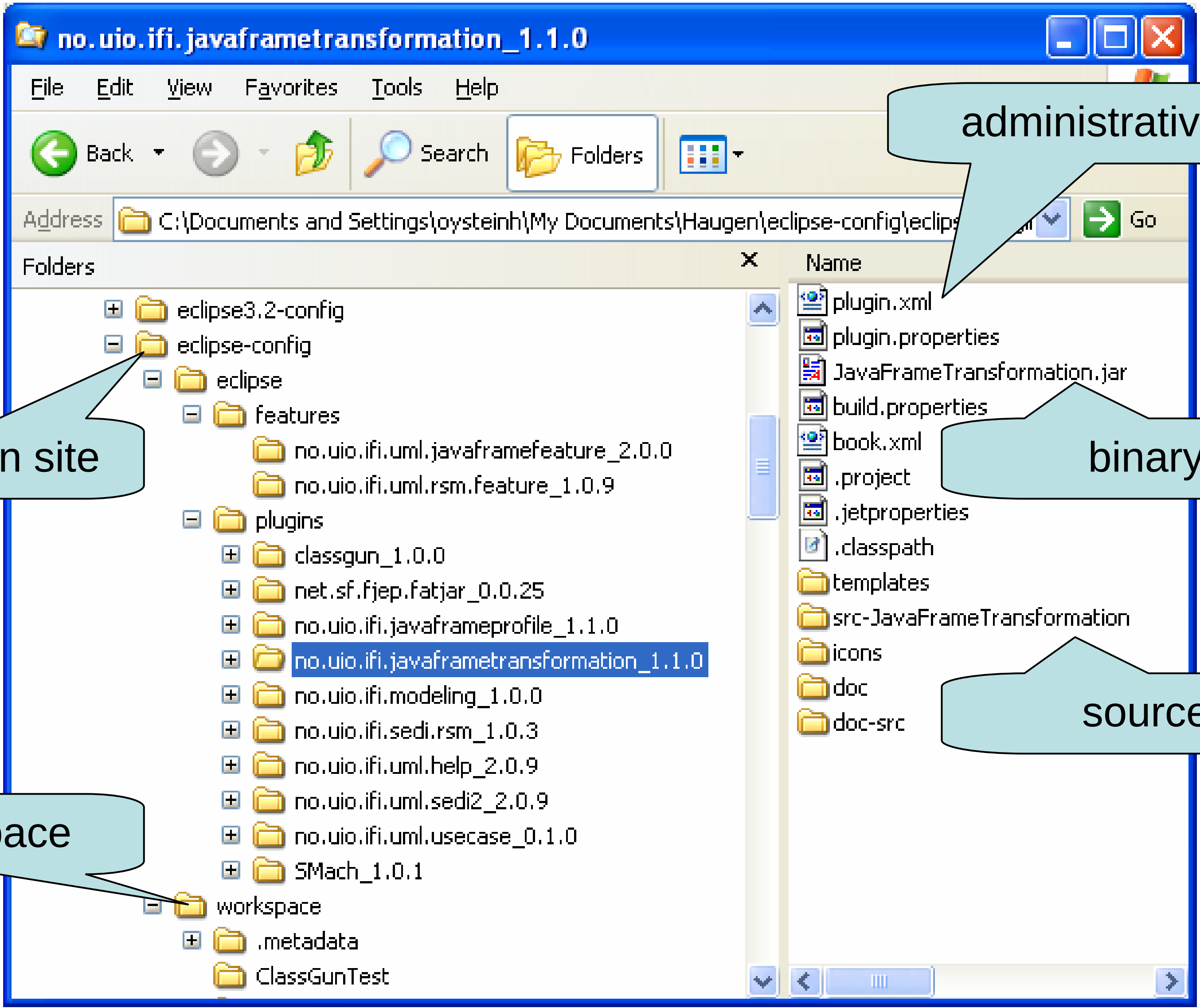
# RSM at Ifi 2007 (Versjon 6.0.1.1)

- Linux
  - rsm&
- Windows XP
  - download from protected area reachable from the course homepage
    - executing this make an ”image”
    - continue the installation from there
  - Execute software update!!
    - This does take time! Do it overnight!
- Set up extension location
  - where plugins og features specially for you will be placed
  - This is how one can add special functionality without being an administrator!

# Extension Location

- Creating an extension location works under both the 3.0.x and 3.1.x releases of eclipse, under both linux and windows (and I assume all others). The steps to accomplish this under linux are as follows:
- As root, I install eclipse to /opt/eclipse
- As myuser, I create the directories
  - ~/eclipse-config
  - ~/eclipse-config/eclipse
  - ~/eclipse-config/eclipse/features
  - ~/eclipse-config/eclipse/plugins
  - ~/eclipse-config/workspace
- I edit ~/eclipse-config/eclipse/.eclipseextension to contain: name=My Eclipse Configuration id=my.eclipse.configuration version=1.0.0
- As myuser I install plugins/feature to ~/eclipse-config/eclipse (manually or through eclipse update mechanism after step 6 completed)
- As myuser, I start eclipse like "/opt/eclipse/eclipse -data /home/conway/eclipse-config/workspace -vmargs -Xmx512M"
- In Help->Software Updates->Manage Configuration... I "Add an Extension Location" to ~/eclipse-config/eclipse. The setting for this ends up being stored in ~/.eclipse

# The extension site



no.uio.ifi.javaframetransformation_1.1.0

Address: C:\Documents and Settings\oysteinh\My Documents\Haugen\eclipse-config\eclips

- eclipse3.2-config
- eclipse-config
  - eclipse
    - features
      - no.uio.ifi.uml.javaframefeature_2.0.0
      - no.uio.ifi.uml.rsm.feature_1.0.9
    - plugins
      - classgun_1.0.0
      - net.sf.fjep.fatjar_0.0.25
      - no.uio.ifi.javaframeprofile_1.1.0
      - no.uio.ifi.javaframetransformation_1.1.0
      - no.uio.ifi.modeling_1.0.0
      - no.uio.ifi.sedi.rsm_1.0.3
      - no.uio.ifi.uml.help_2.0.9
      - no.uio.ifi.uml.sedi2_2.0.9
      - no.uio.ifi.uml.usecase_0.1.0
      - SMach_1.0.1
  - workspace
    - .metadata
    - ClassGunTest

Name:

- plugin.xml
- plugin.properties
- JavaFrameTransformation.jar
- build.properties
- book.xml
- .project
- .jetproperties
- .classpath
- templates
- src-JavaFrameTransformation
- icons
- doc
- doc-src

administrative files

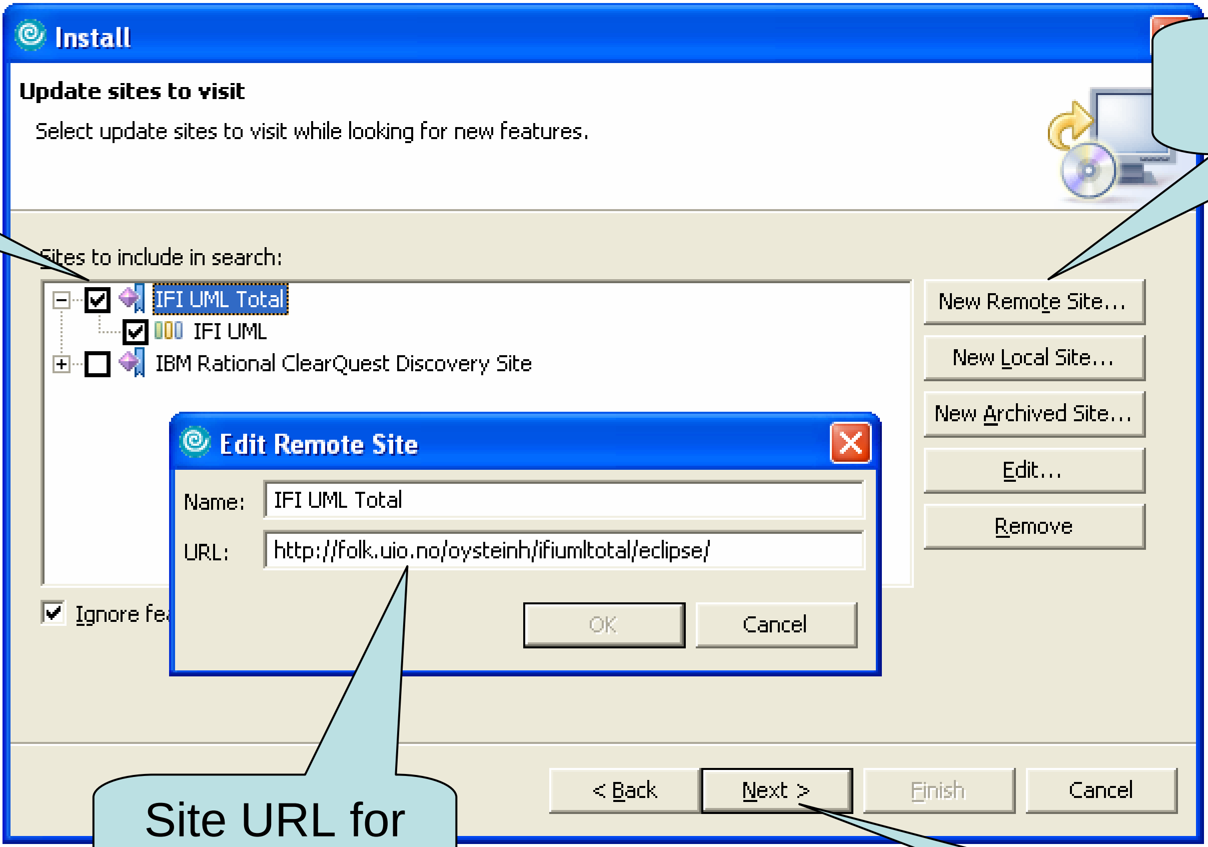
extension site

binary files

source files

workspace

# Update Site



Install

**Update sites to visit**

Select update sites to visit while looking for new features.

Sites to include in search:

- ☑ IFI UML Total
  - ☑ IFI UML
- □ IBM Rational ClearQuest Discovery Site

☑ Ignore fe

Edit Remote Site

Name: IFI UML Total

URL: http://folk.uio.no/oysteinh/ifiumltotal/eclipse/

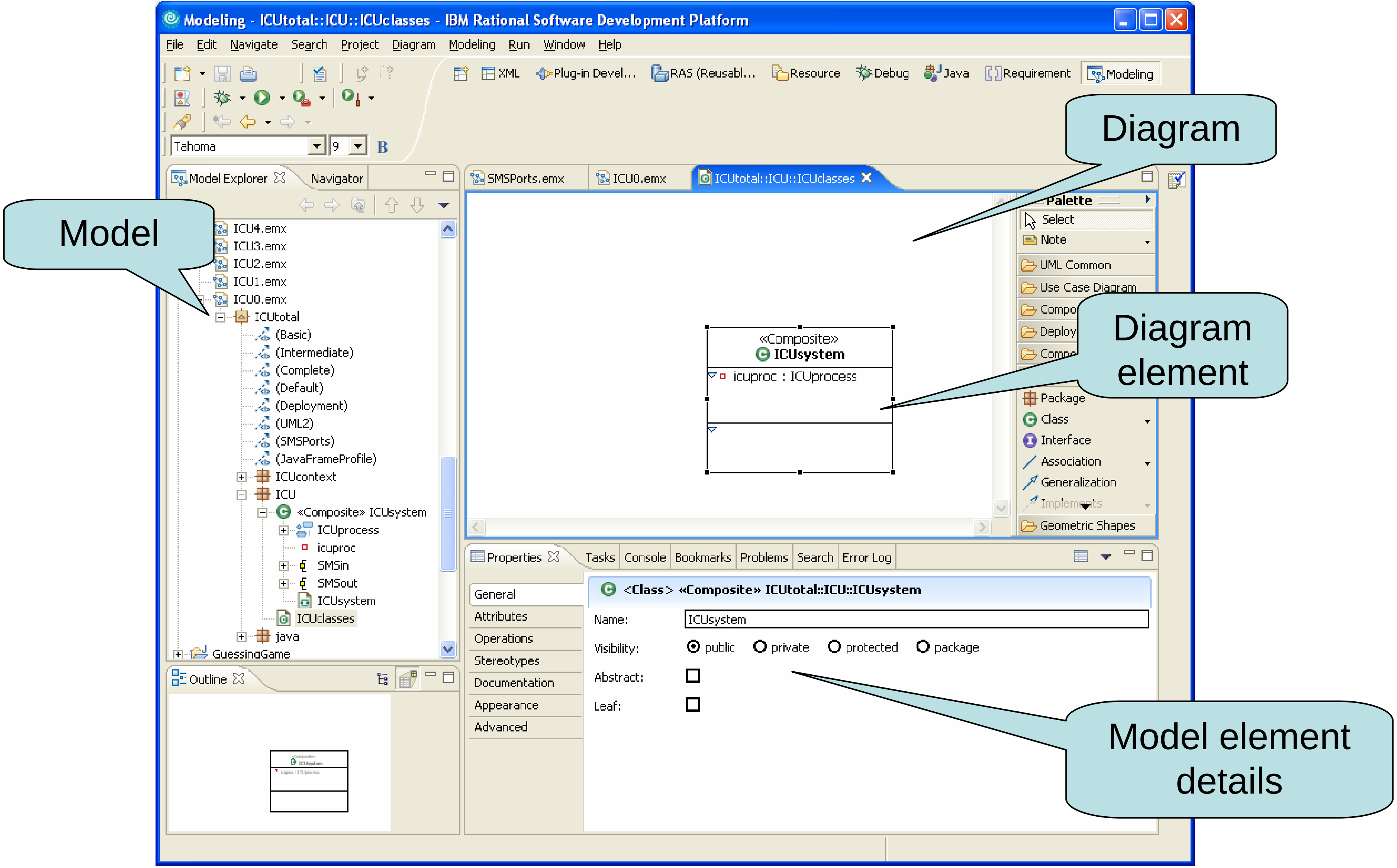
This will appear

Register a new site

Site URL for IFI UML Total

continue here

# Important distinctions of a UML model



<Class> «Composite» ICUtotal::ICU::ICUsystem

Name: ICUsystem

Visibility: ● public ○ private ○ protected ○ package

Abstract: □

Leaf: □

Diagram

Model

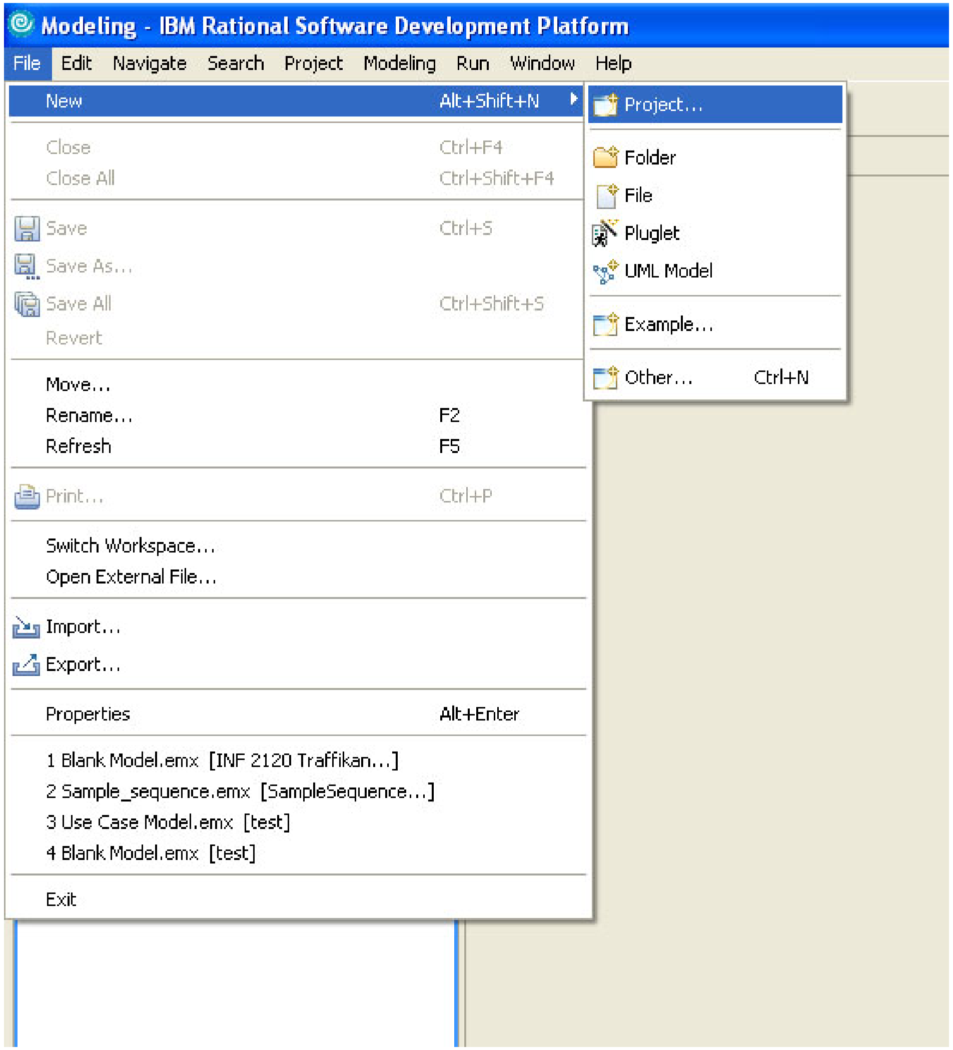
Diagram element

Model element details

# IBM Rational® Software Modeler

- Provides a flexible development environment for creating and editing UML models.
- You can use the Model Explorer view to edit the source code and model structure of the semantic model.
- You can use the diagram editor to edit the visualized model.
- When you edit models, you should understand the differences between model elements and diagram elements.
- For example, when you right-click an element in the diagram editor, there are two delete options.
- If you click **Delete from Diagram**, the element is deleted from the diagram only, because the diagram element is only a visualization of a model element.
- Conversely, if you click **Delete from Model**, the element is deleted from both the model and the diagram.

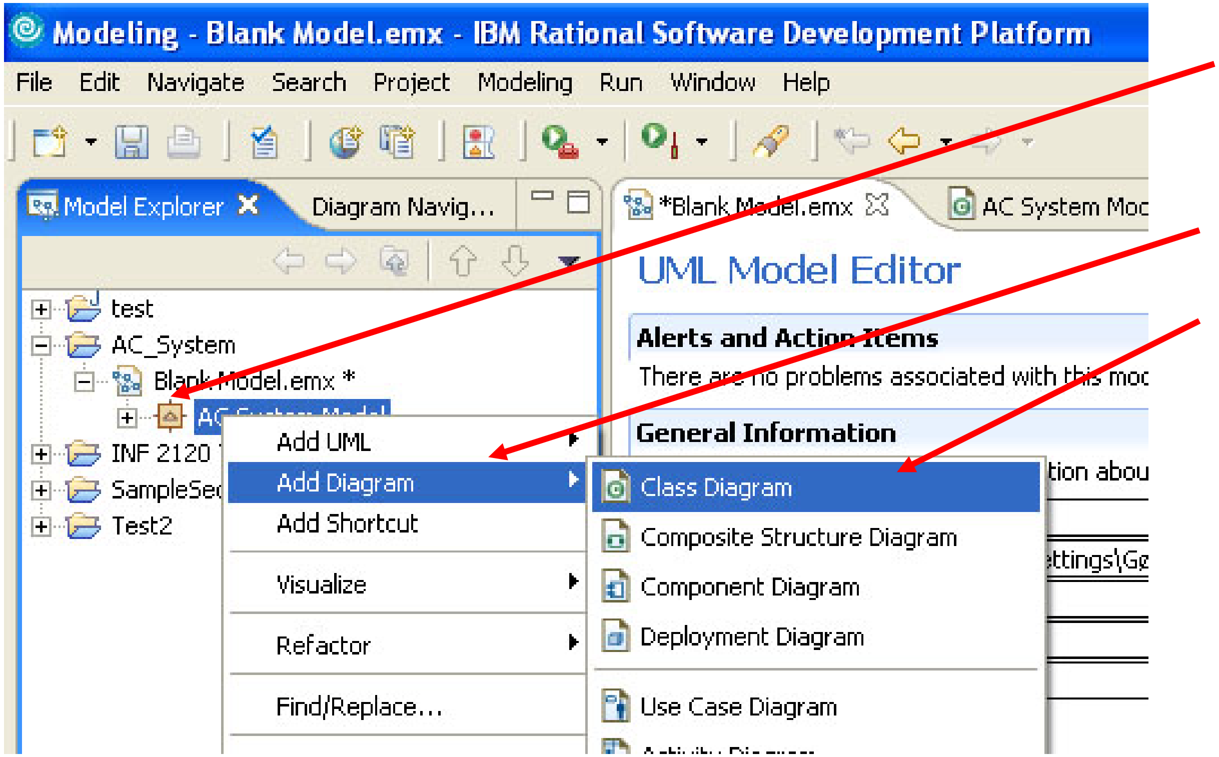
# Create a new project



**From File menu choose :**

1. New
2. Project
3. Modeling
4. UML Project

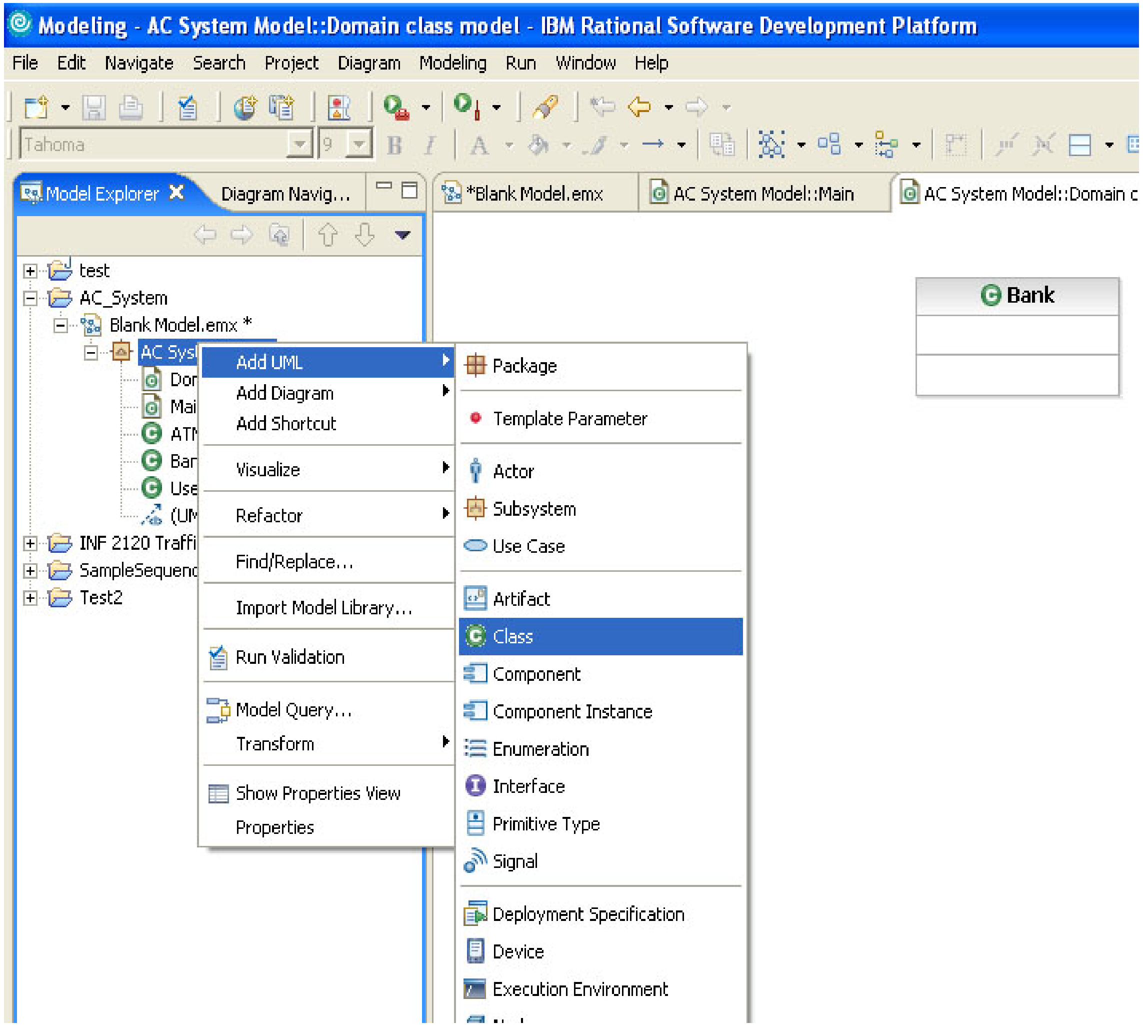
# Creating a new class diagram



There are no problems associated with this moc

1. Right-click your model
2. Add Diagram
3. Class Diagram

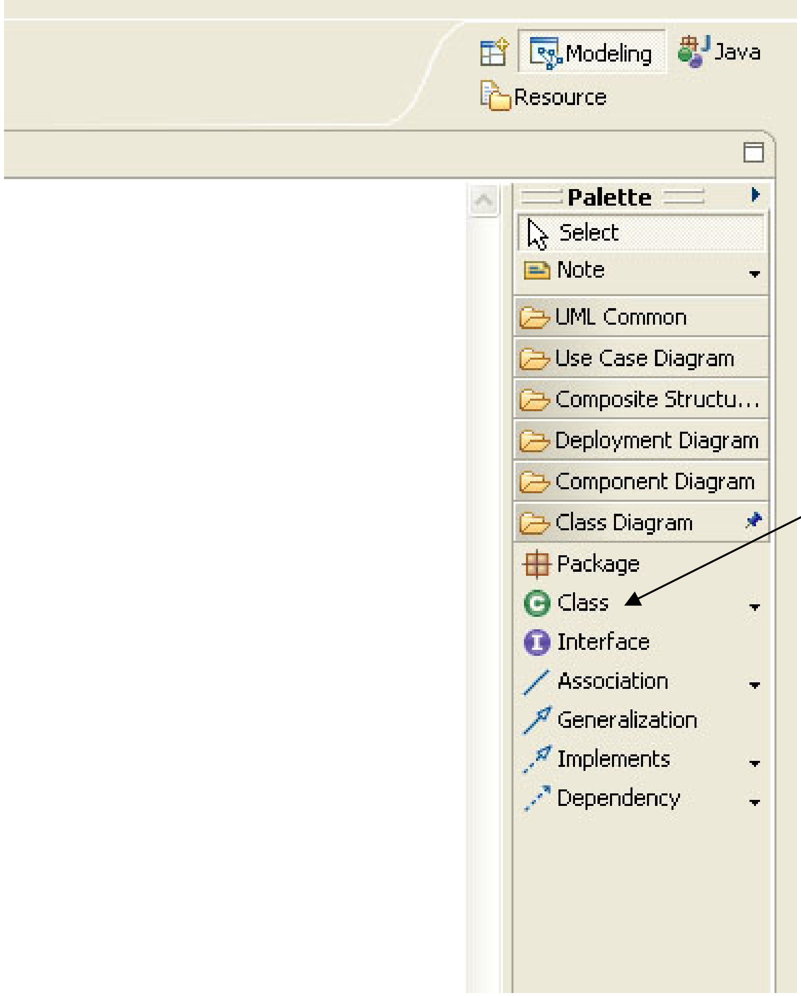
# Adding a class to your model (1)



**Classes can be added from the Model explorer field:**

1. Right click your new class model
2. Add UML
3. Class

# Adding a class to your model (2)



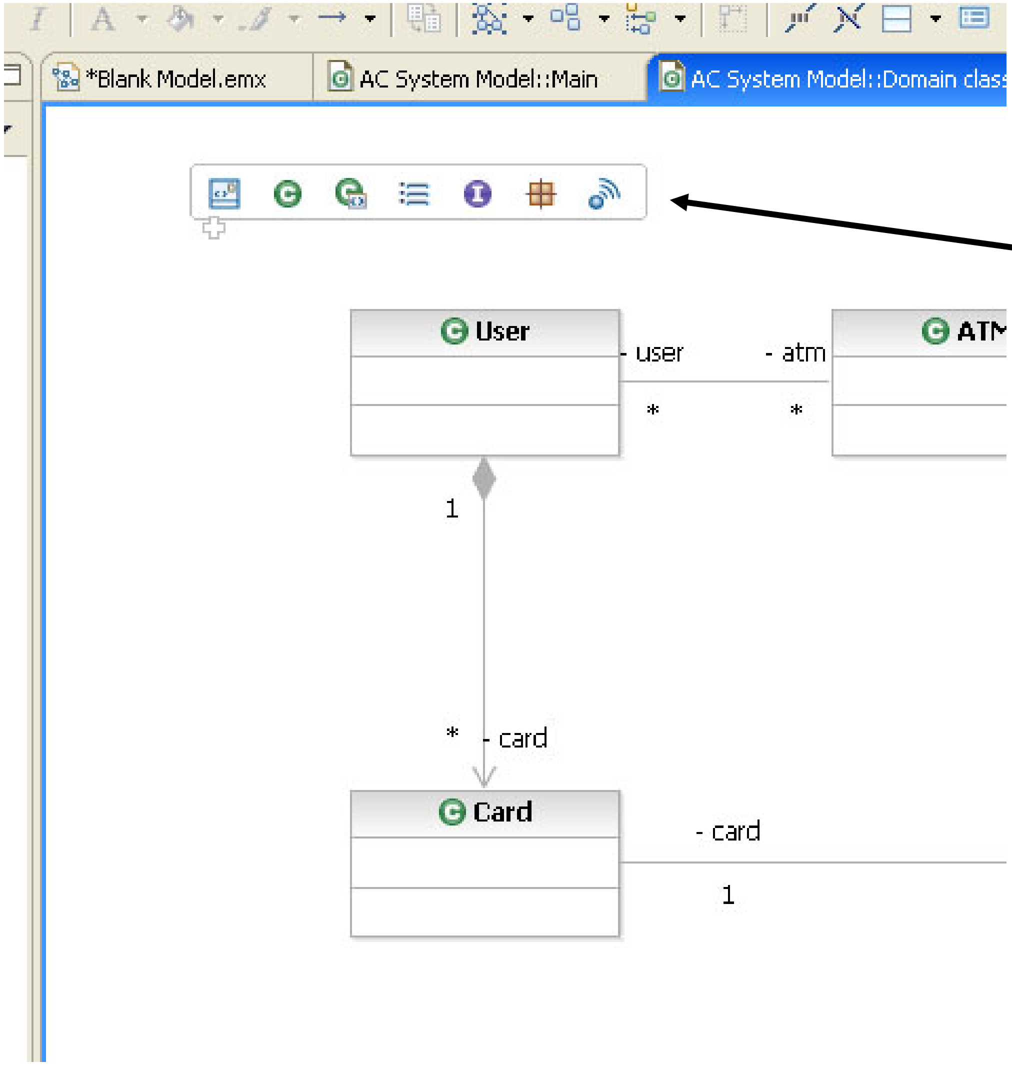
**From the Palette**

**on the right side of**

**your screen:**

1. Left-click the class icon
2. Left-click or click and drag in the editor
3. Enter the name of the class

# Adding a class to your model (3)



**Or simply hold the mouse still in the editor:**

1. A menu will appear
2. Choose what element you want to create
3. Enter element name

# Group formation for Oblig 2

- While Oblig 1 must be individually solved, Oblig 2 shall be achieved in a group of 3-5 persons
- Divide the group in
  - PhD students and those with a Master already
  - Those with INF2120
  - Those with special needs
  - The rest
- Everybody signs up their name on the blackboard in the appropriate column
- The lecturer will select the groups
  - and add those that are not present

# ICU0 – your very first ”I see you” system

surveillence at your fingertips,

first we only observe yourself

# Agile modeling

- ”agile”
  - = having a quick resourceful and adaptable character
- executable models!
- very stepwise approach
  - each step will have its specification and executable model
  - each step should be tested
- We shall use one example throughout the course
  - with many steps
  - intended to be mirrored by the project exercise model
- Every week a working program!

# Manifesto for Agile Software Development

- We are uncovering better ways of developing software by doing it and helping others do it.
- Through this work we have come to value:
  - **Individuals and interactions** over processes and tools
  - **Working software** over comprehensive documentation
  - **Customer collaboration** over contract negotiation
  - **Responding to change** over following a plan
- That is, while there is value in the items on
  the right, we value the items on the left more.

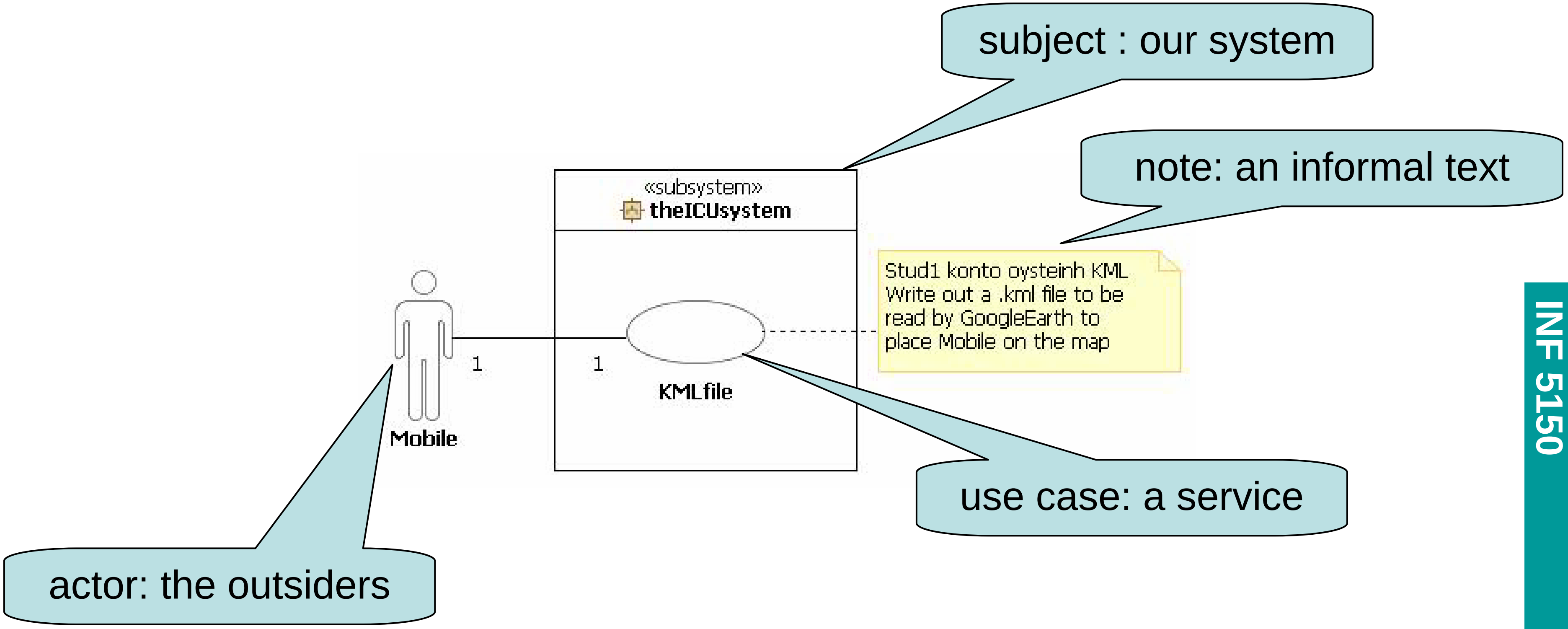
# Dialectic Software Development

- Software Development is a process of learning
  - once you have totally understood the system you are building, it is done
- Learning is best achieved through conflict, not harmony
  - discussions reveal problematic points
  - silence hides critical errors
- By applying different perspectives to the system to be designed
  - inconsistencies may appear
  - and they must be harmonized
- Inconsistencies are not always errors!
  - difference of opinion
  - difference of understanding
  - misunderstanding each other
  - a result of partial knowledge
- Reliable systems are those that have already met challenges

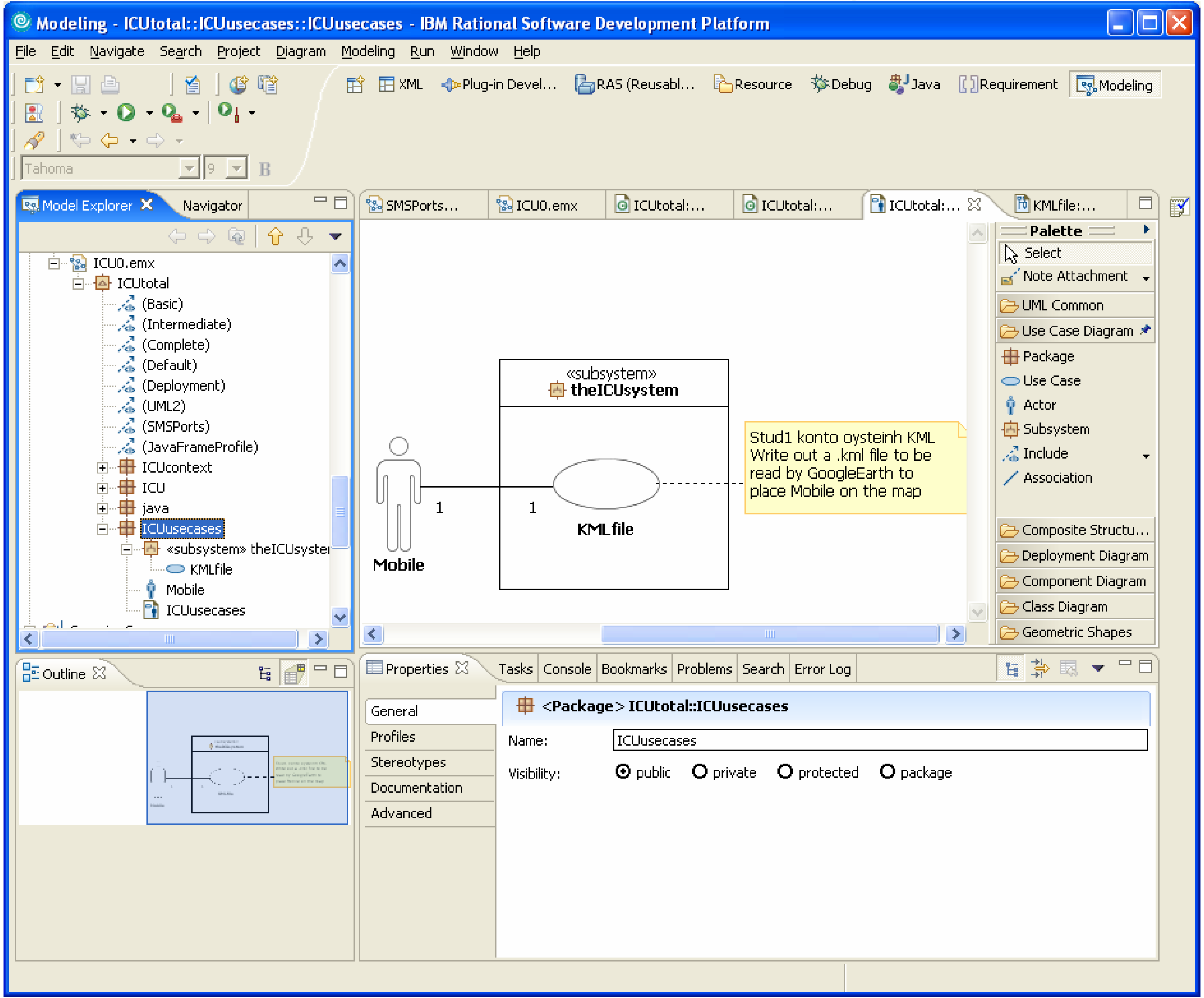
# Buzzzzz 1: Agility

- Join your project group – this is its first assignment!
- Give 3 reasons for why agile modeling/programming is a good approach
- Give 3 possible problems for an agile approach
- Give each pro and each con a short name

# UML Use Cases – very very simple



# Use cases in a separate package



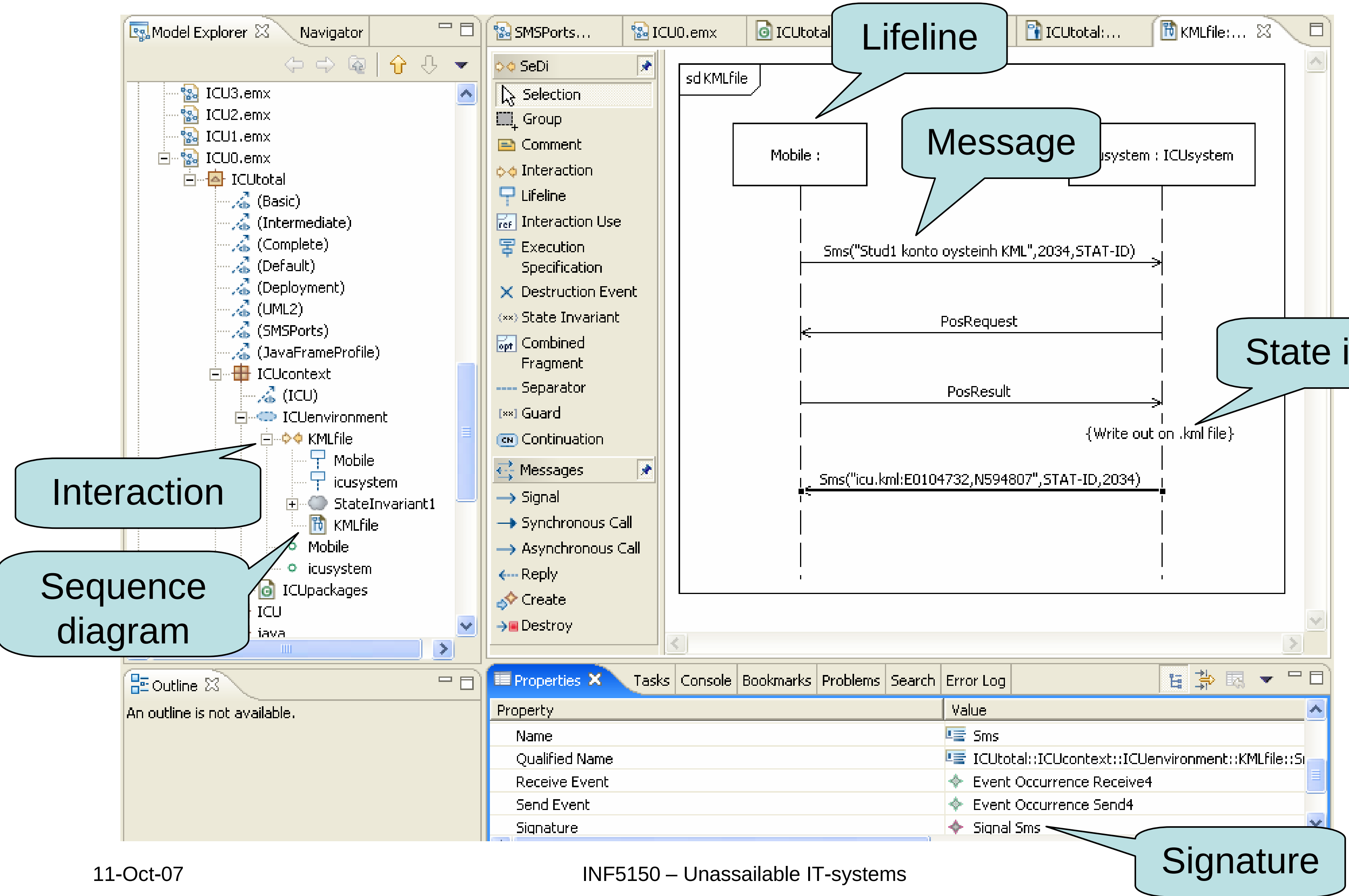
Stud1 konto oysteinh KML
Write out a .kml file to be
read by GoogleEarth to
place Mobile on the map

<Package> ICUtotal::ICUusecases

Name: ICUusecases

Visibility: ● public ○ private ○ protected ○ package

# UML Sequence Diagrams: a more precise way

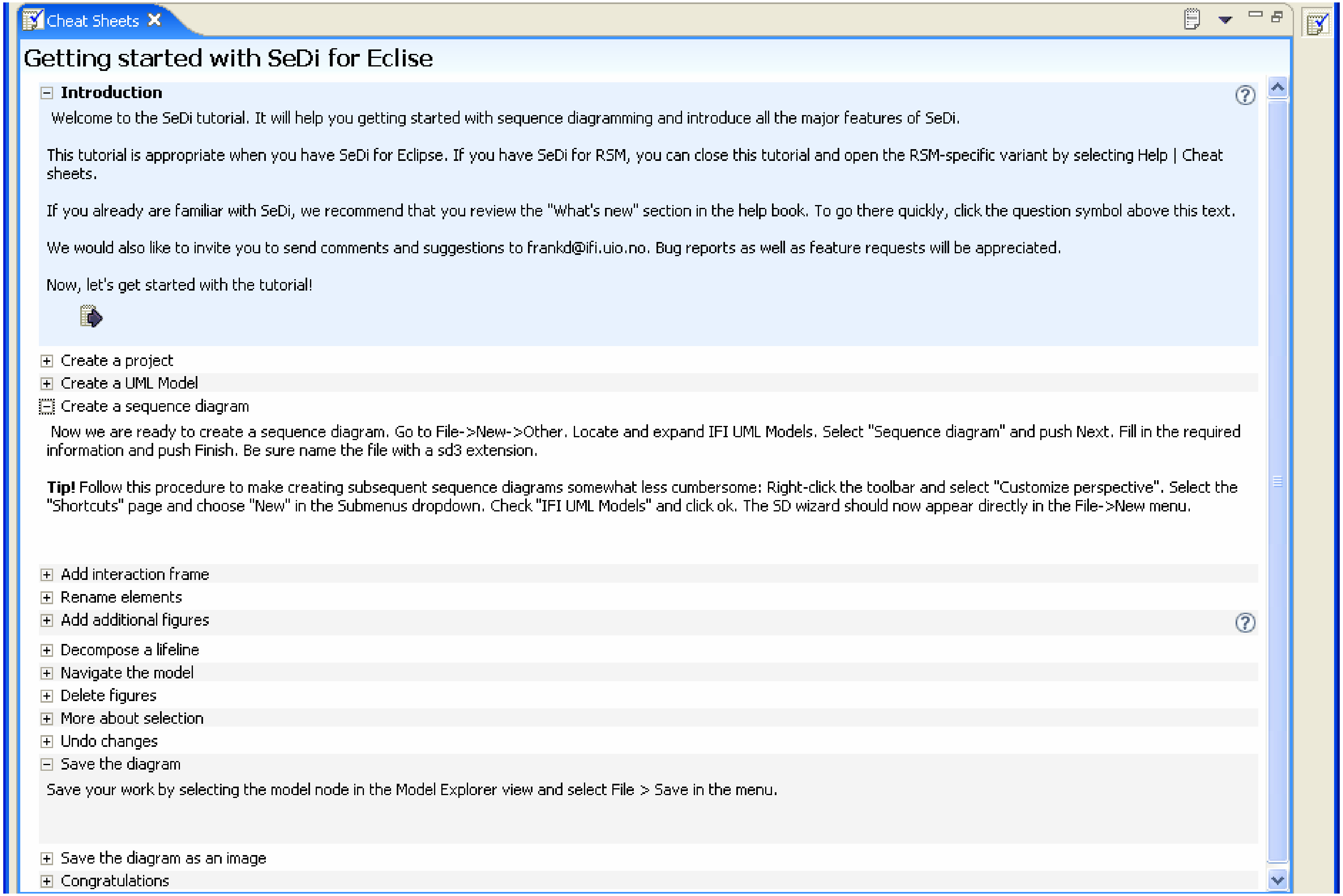


- ICU3.emx
- ICU2.emx
- ICU1.emx
- ICU0.emx
  - ICUtotal
    - (Basic)
    - (Intermediate)
    - (Complete)
    - (Default)
    - (Deployment)
    - (UML2)
    - (SMSPorts)
    - (JavaFrameProfile)
    - ICUcontext
      - (ICU)
      - ICUenvironment
        - KMLfile
          - Mobile
          - icusystem
          - StateInvariant1
          - KMLfile
        - Mobile
        - icusystem
    - ICUpackages
    - ICU
    - java

An outline is not available.

| Property | Value |
|---|---|
| Name | Sms |
| Qualified Name | ICUtotal::ICUcontext::ICUenvironment::KMLfile::Sı |
| Receive Event | Event Occurrence Receive4 |
| Send Event | Event Occurrence Send4 |
| Signature | Signal Sms |

# SeDi – the IFI UML Total Sequence Diagram edit



## Getting started with SeDi for Eclise

⊟ **Introduction**

Welcome to the SeDi tutorial. It will help you getting started with sequence diagramming and introduce all the major features of SeDi.

This tutorial is appropriate when you have SeDi for Eclipse. If you have SeDi for RSM, you can close this tutorial and open the RSM-specific variant by selecting Help | Cheat sheets.

If you already are familiar with SeDi, we recommend that you review the "What's new" section in the help book. To go there quickly, click the question symbol above this text.

We would also like to invite you to send comments and suggestions to frankd@ifi.uio.no. Bug reports as well as feature requests will be appreciated.

Now, let's get started with the tutorial!

⊞ Create a project

⊞ Create a UML Model

Create a sequence diagram

Now we are ready to create a sequence diagram. Go to File->New->Other. Locate and expand IFI UML Models. Select "Sequence diagram" and push Next. Fill in the required information and push Finish. Be sure name the file with a sd3 extension.

**Tip!** Follow this procedure to make creating subsequent sequence diagrams somewhat less cumbersome: Right-click the toolbar and select "Customize perspective". Select the "Shortcuts" page and choose "New" in the Submenus dropdown. Check "IFI UML Models" and click ok. The SD wizard should now appear directly in the File->New menu.

⊞ Add interaction frame

⊞ Rename elements

⊞ Add additional figures

⊞ Decompose a lifeline

⊞ Navigate the model

⊞ Delete figures

⊞ More about selection

⊞ Undo changes

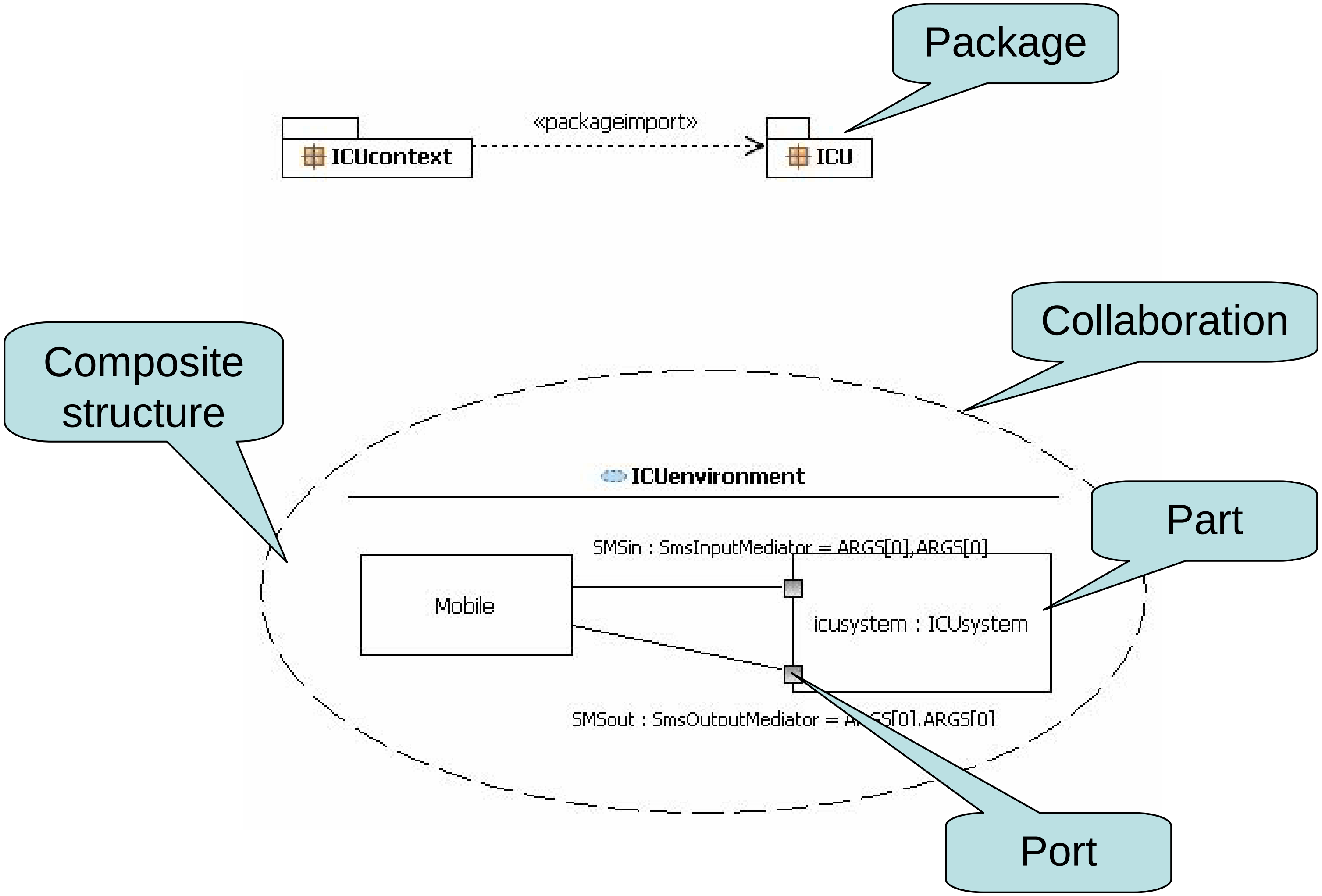
⊟ Save the diagram

Save your work by selecting the model node in the Model Explorer view and select File > Save in the menu.

⊞ Save the diagram as an image

⊞ Congratulations

# Packages, Collaboration, Composite Structure


ICUcontext
«packageimport»
ICU
ICUenvironment
SMSin : SmsInputMediator = ARGS[0],ARGS[0]
Mobile
icusystem : ICUsystem
SMSout : SmsOutputMediator = ARGS[0].ARGS[0]

Package

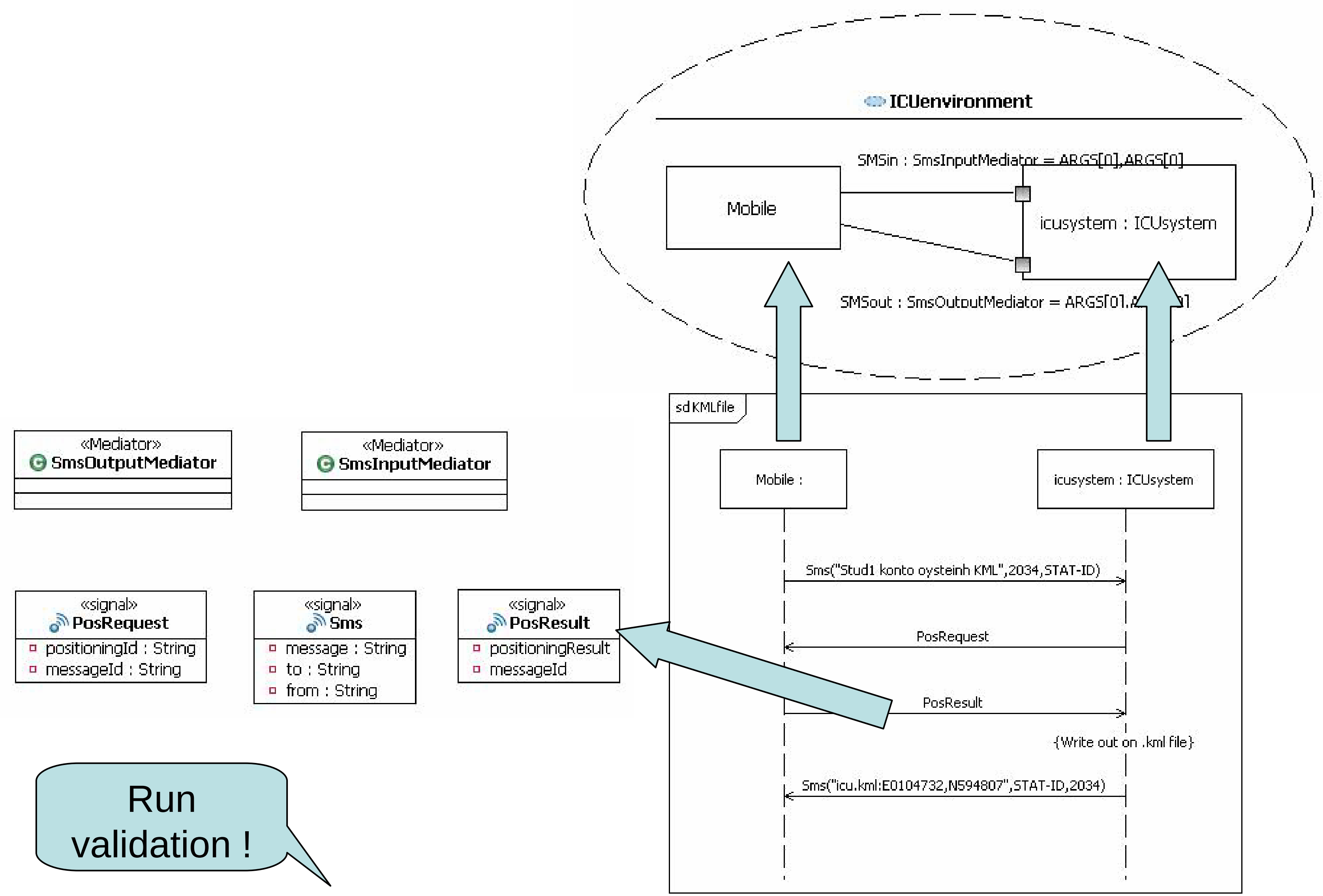
Collaboration

Composite structure

Part

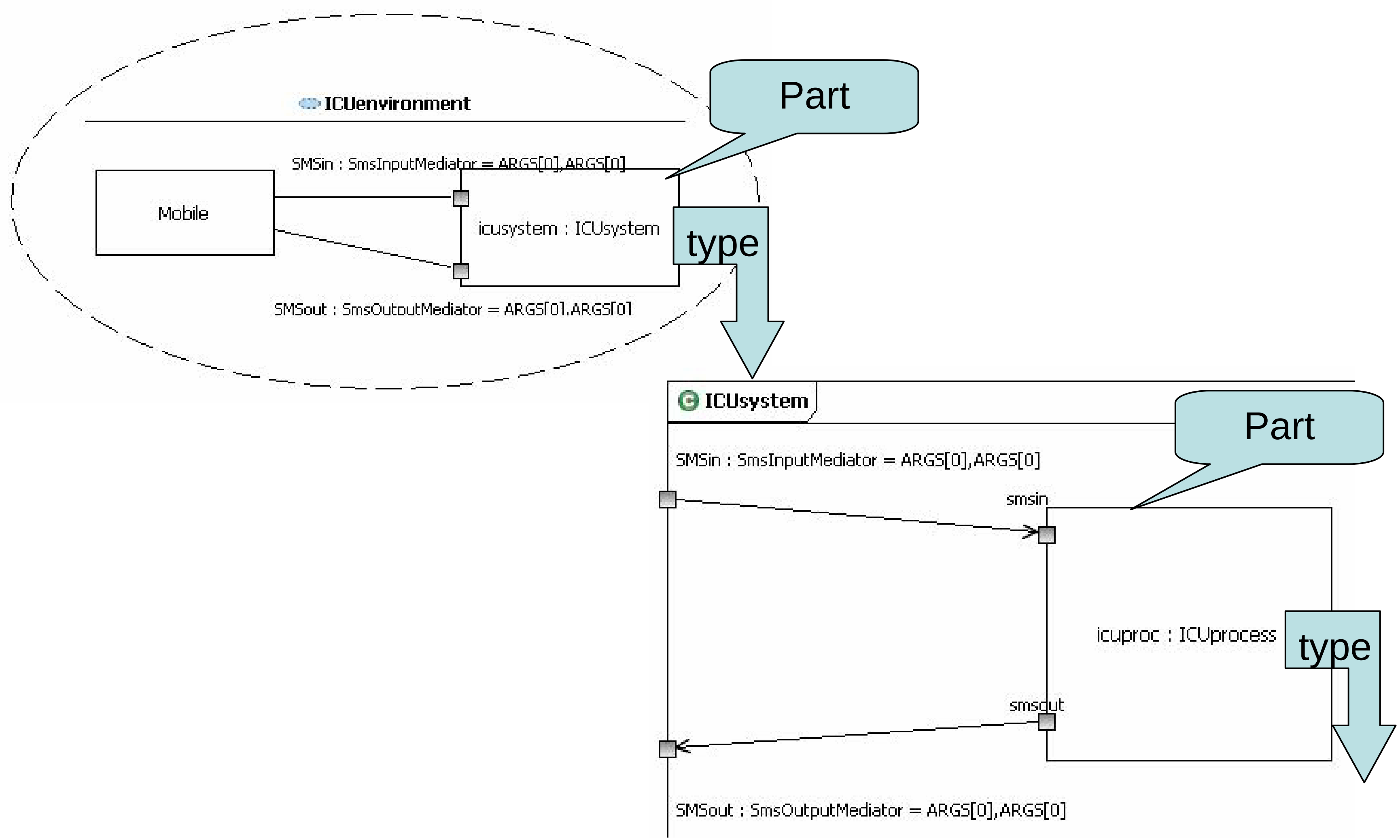
Port

# Model-time Consistency!

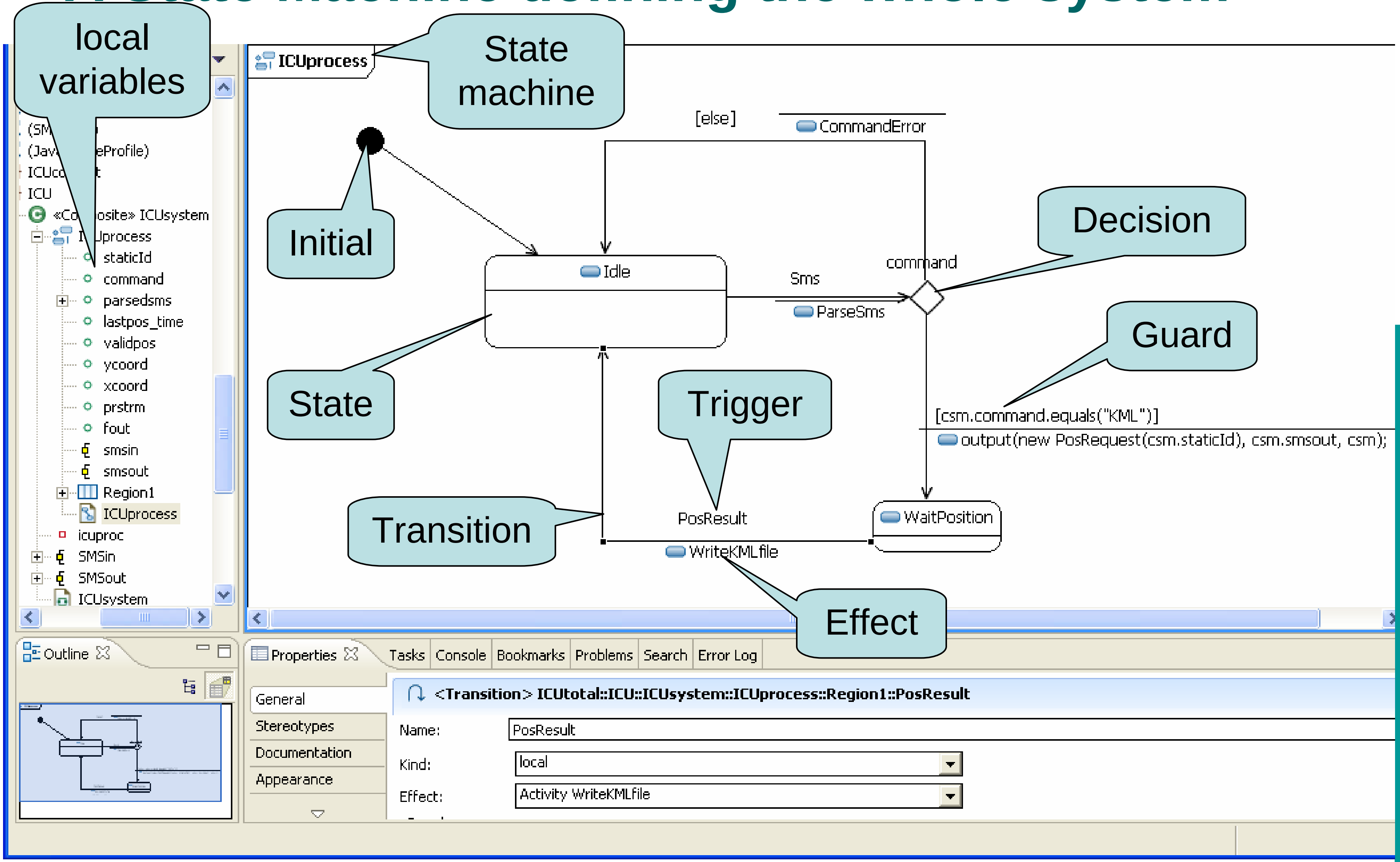


Run validation !

# Structure hierarchy


ICUenvironment
SMSin : SmsInputMediator = ARGS[0],ARGS[0]
Mobile
icusystem : ICUsystem
SMSout : SmsOutputMediator = ARGS[0],ARGS[0]
Part
type
ICUsystem
SMSin : SmsInputMediator = ARGS[0],ARGS[0]
smsin
icuproc : ICUprocess
smsout
SMSout : SmsOutputMediator = ARGS[0],ARGS[0]
Part
type

# A State Machine defining the whole system



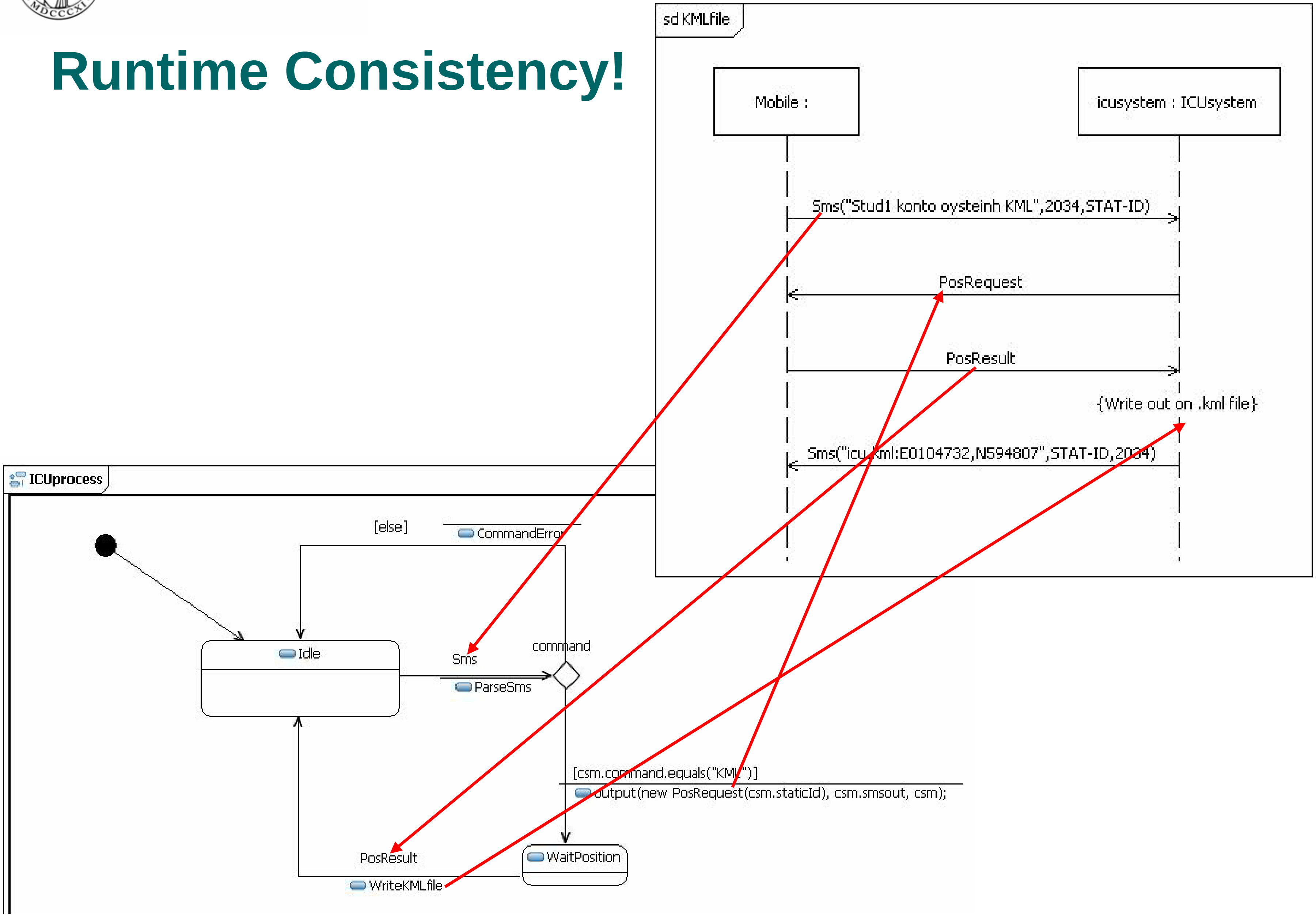
<Transition> ICUtotal::ICU::ICUsystem::ICUprocess::Region1::PosResult

Name: PosResult

Kind: local

Effect: Activity WriteKMLfile

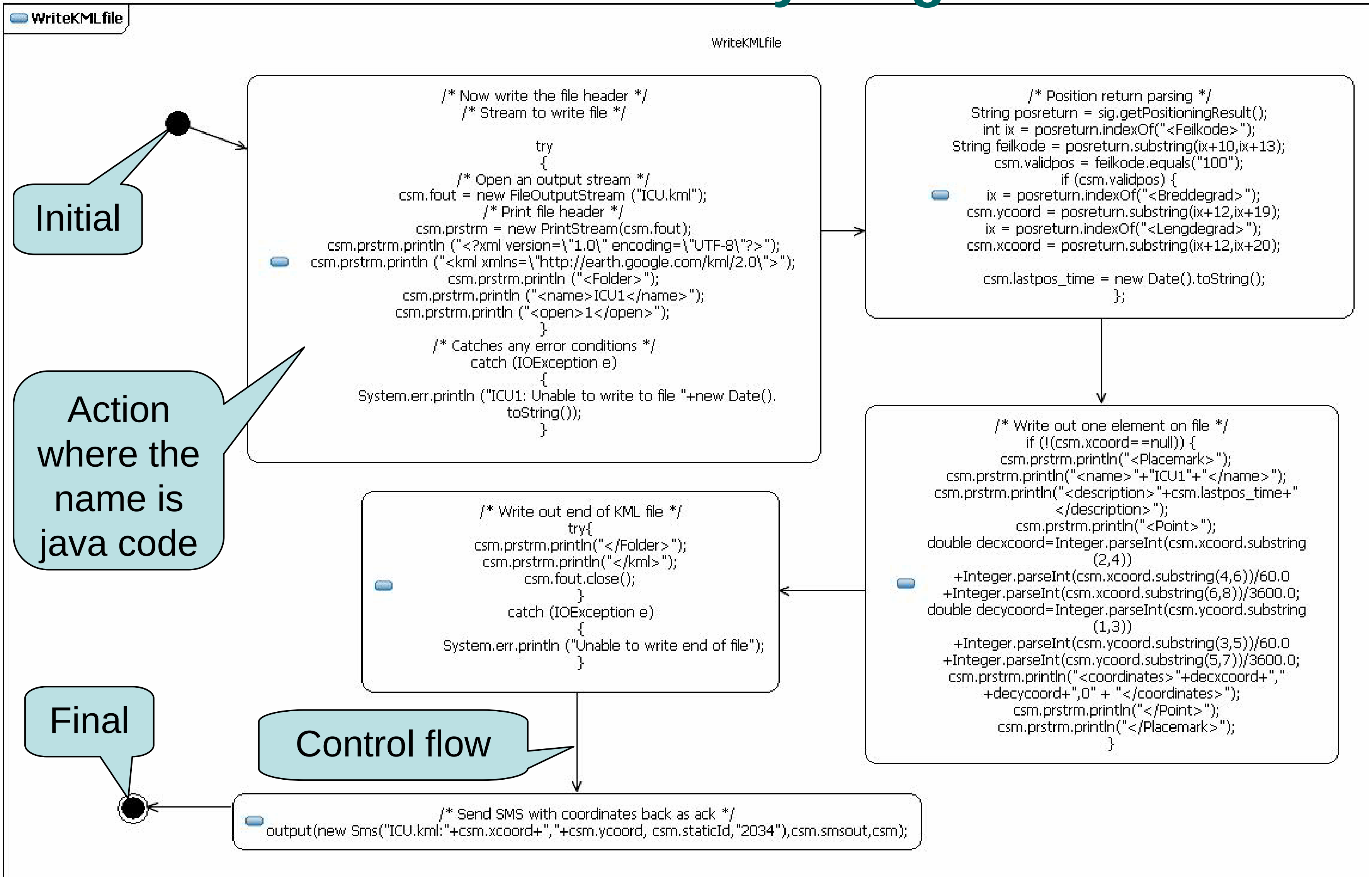
# Runtime Consistency!


sd KMLfile
Mobile :
icusystem : ICUsystem
Sms("Stud1 konto oysteinh KML",2034,STAT-ID)
PosRequest
PosResult
{Write out on .kml file}
Sms("icu.kml:E0104732,N594807",STAT-ID,2034)
ICUprocess
[else]
CommandError
Idle
Sms
command
ParseSms
[csm.command.equals("KML")]
output(new PosRequest(csm.staticId), csm.smsout, csm);
PosResult
WriteKMLfile
WaitPosition

# Buzzzzz 2: Refinement

- Assume that the semantics of the state machine are the traces that it potentially may produce (given all reasonable input from a Mobile) as positive traces and all other traces as negative.
- Is the state machine *ICUprocess* a refinement of the interaction *KMLfile*?
- Is the opposite refinement also true? (that *KMLfile* is a refinement of *ICUprocess*)

# Transition Effect – Activity Diagram



```
/* Now write the file header */
/* Stream to write file */

try
{
/* Open an output stream */
csm.fout = new FileOutputStream ("ICU.kml");
/* Print file header */
csm.prstrm = new PrintStream(csm.fout);
csm.prstrm.println ("<?xml version=\"1.0\" encoding=\"UTF-8\"?>");
csm.prstrm.println ("<kml xmlns=\"http://earth.google.com/kml/2.0\">");
csm.prstrm.println ("<Folder>");
csm.prstrm.println ("<name>ICU1</name>");
csm.prstrm.println ("<open>1</open>");
}
/* Catches any error conditions */
catch (IOException e)
{
System.err.println ("ICU1: Unable to write to file "+new Date().
toString());
}
```

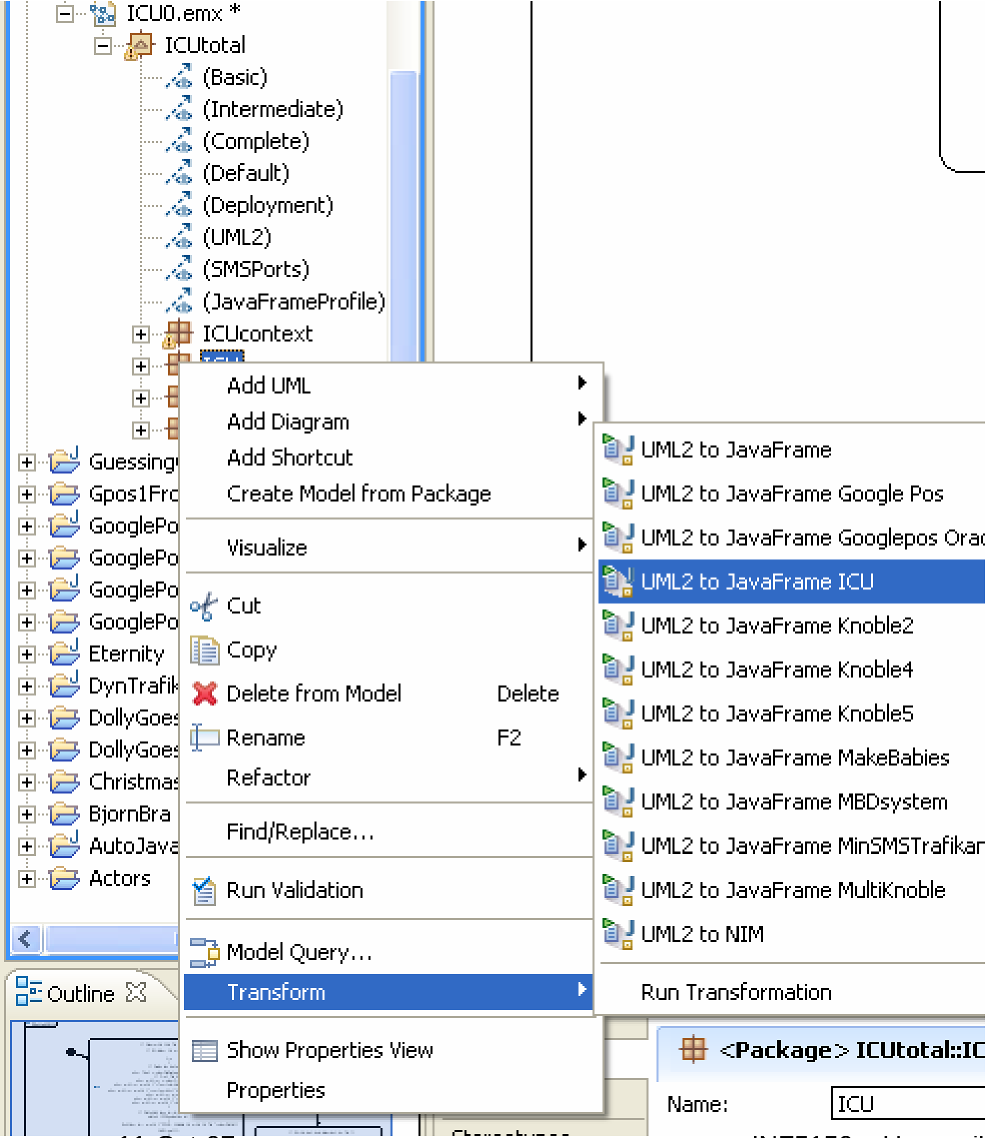
```
/* Position return parsing */
String posreturn = sig.getPositioningResult();
int ix = posreturn.indexOf("<Feilkode>");
String feilkode = posreturn.substring(ix+10,ix+13);
csm.validpos = feilkode.equals("100");
if (csm.validpos) {
ix = posreturn.indexOf("<Breddegrad>");
csm.ycoord = posreturn.substring(ix+12,ix+19);
ix = posreturn.indexOf("<Lengdegrad>");
csm.xcoord = posreturn.substring(ix+12,ix+20);

csm.lastpos_time = new Date().toString();
};
```

```
/* Write out one element on file */
if (!(csm.xcoord==null)) {
csm.prstrm.println("<Placemark>");
csm.prstrm.println("<name>"+"ICU1"+"</name>");
csm.prstrm.println("<description>"+csm.lastpos_time+"
</description>");
csm.prstrm.println("<Point>");
double decxcoord=Integer.parseInt(csm.xcoord.substring
(2,4))
+Integer.parseInt(csm.xcoord.substring(4,6))/60.0
+Integer.parseInt(csm.xcoord.substring(6,8))/3600.0;
double decycoord=Integer.parseInt(csm.ycoord.substring
(1,3))
+Integer.parseInt(csm.ycoord.substring(3,5))/60.0
+Integer.parseInt(csm.ycoord.substring(5,7))/3600.0;
csm.prstrm.println("<coordinates>"+decxcoord+","
+decycoord+",0" + "</coordinates>");
csm.prstrm.println("</Point>");
csm.prstrm.println("</Placemark>");
}
```

```
/* Write out end of KML file */
try{
csm.prstrm.println("</Folder>");
csm.prstrm.println("</kml>");
csm.fout.close();
}
catch (IOException e)
{
System.err.println ("Unable to write end of file");
}
```

```
/* Send SMS with coordinates back as ack */
output(new Sms("ICU.kml:"+csm.xcoord+","+csm.ycoord, csm.staticId,"2034"),csm.smsout,csm);
```

# UML compilation and execution

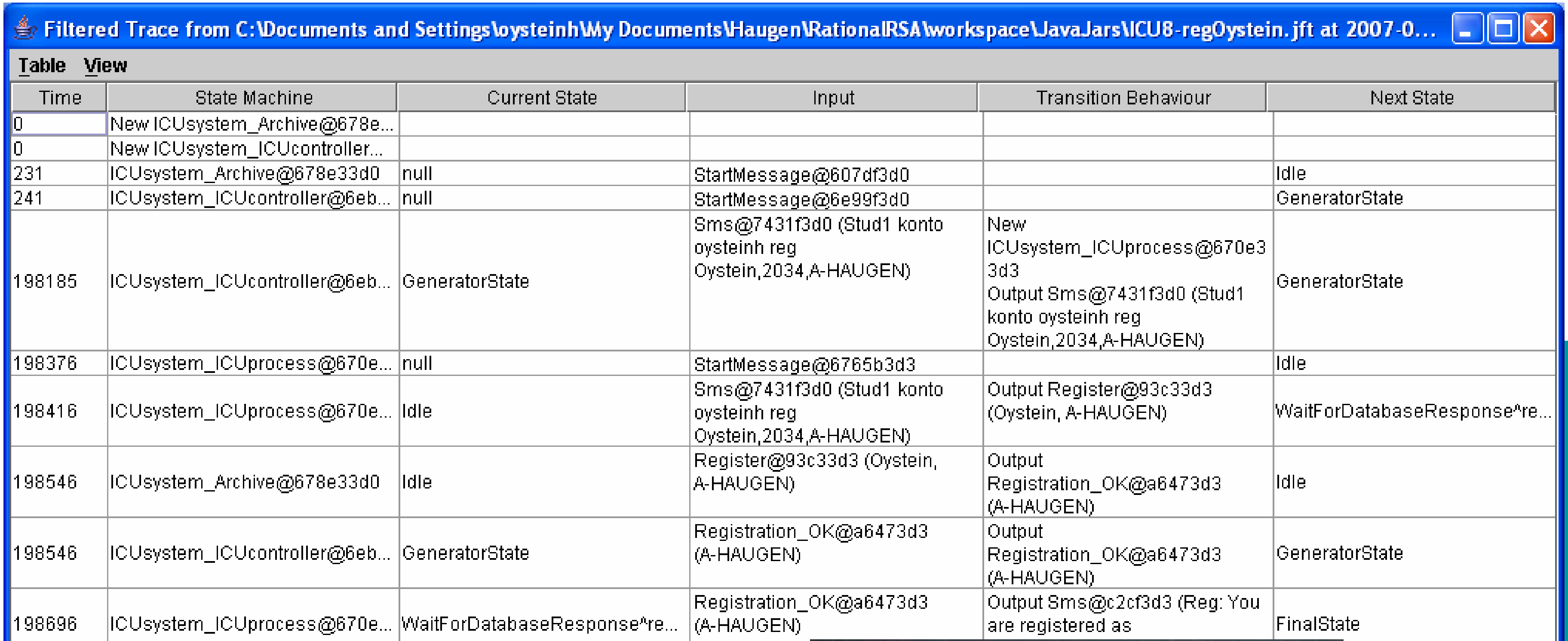


- Make target java project
- Set up java libraries
- Make transformation config.
- Make run configuration

- Apply transformation config by rightclicking on desired package (not the whole model)
- Apply run configuration

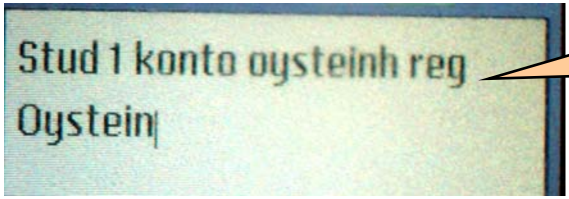
- Enjoy the running system

# Execute the trace tool (JFTrace) and ICU appl.



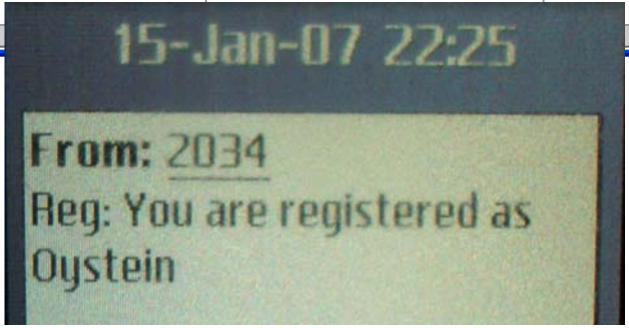
Filtered Trace from C:\Documents and Settings\oysteinh\My Documents\Haugen\RationalRSA\workspace\JavaJars\ICU8-regOystein.jft at 2007-0...
Table View

| Time | State Machine | Current State | Input | Transition Behaviour | Next State |
|---|---|---|---|---|---|
| 0 | New ICUsystem_Archive@678e... | | | | |
| 0 | New ICUsystem_ICUcontroller... | | | | |
| 231 | ICUsystem_Archive@678e33d0 | null | StartMessage@607df3d0 | | Idle |
| 241 | ICUsystem_ICUcontroller@6eb... | null | StartMessage@6e99f3d0 | | GeneratorState |
| 198185 | ICUsystem_ICUcontroller@6eb... | GeneratorState | Sms@7431f3d0 (Stud1 konto oysteinh reg Oystein,2034,A-HAUGEN) | New ICUsystem_ICUprocess@670e33d3<br>Output Sms@7431f3d0 (Stud1 konto oysteinh reg Oystein,2034,A-HAUGEN) | GeneratorState |
| 198376 | ICUsystem_ICUprocess@670e... | null | StartMessage@6765b3d3 | | Idle |
| 198416 | ICUsystem_ICUprocess@670e... | Idle | Sms@7431f3d0 (Stud1 konto oysteinh reg Oystein,2034,A-HAUGEN) | Output Register@93c33d3 (Oystein, A-HAUGEN) | WaitForDatabaseResponse^re... |
| 198546 | ICUsystem_Archive@678e33d0 | Idle | Register@93c33d3 (Oystein, A-HAUGEN) | Output Registration_OK@a6473d3 (A-HAUGEN) | Idle |
| 198546 | ICUsystem_ICUcontroller@6eb... | GeneratorState | Registration_OK@a6473d3 (A-HAUGEN) | Output Registration_OK@a6473d3 (A-HAUGEN) | GeneratorState |
| 198696 | ICUsystem_ICUprocess@670e... | WaitForDatabaseResponse^re... | Registration_OK@a6473d3 (A-HAUGEN) | Output Sms@c2cf3d3 (Reg: You are registered as | FinalState |



Stud 1 konto oysteinh reg
Oystein

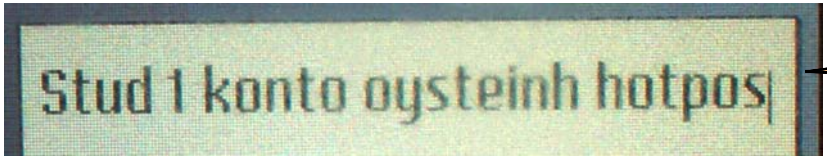
to 2034
(Telenor!!!)



15-Jan-07 22:25

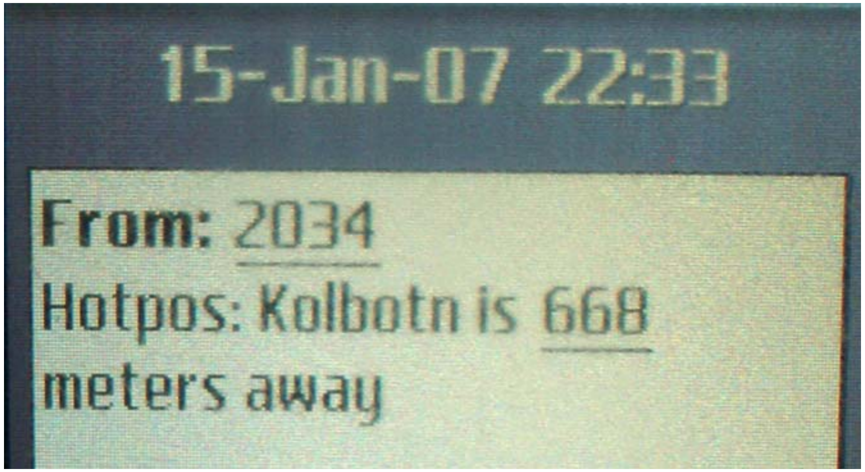
From: 2034
Reg: You are registered as
Oystein

# Hotpos: finding out where you are



Stud 1 konto oysteinh hotpos

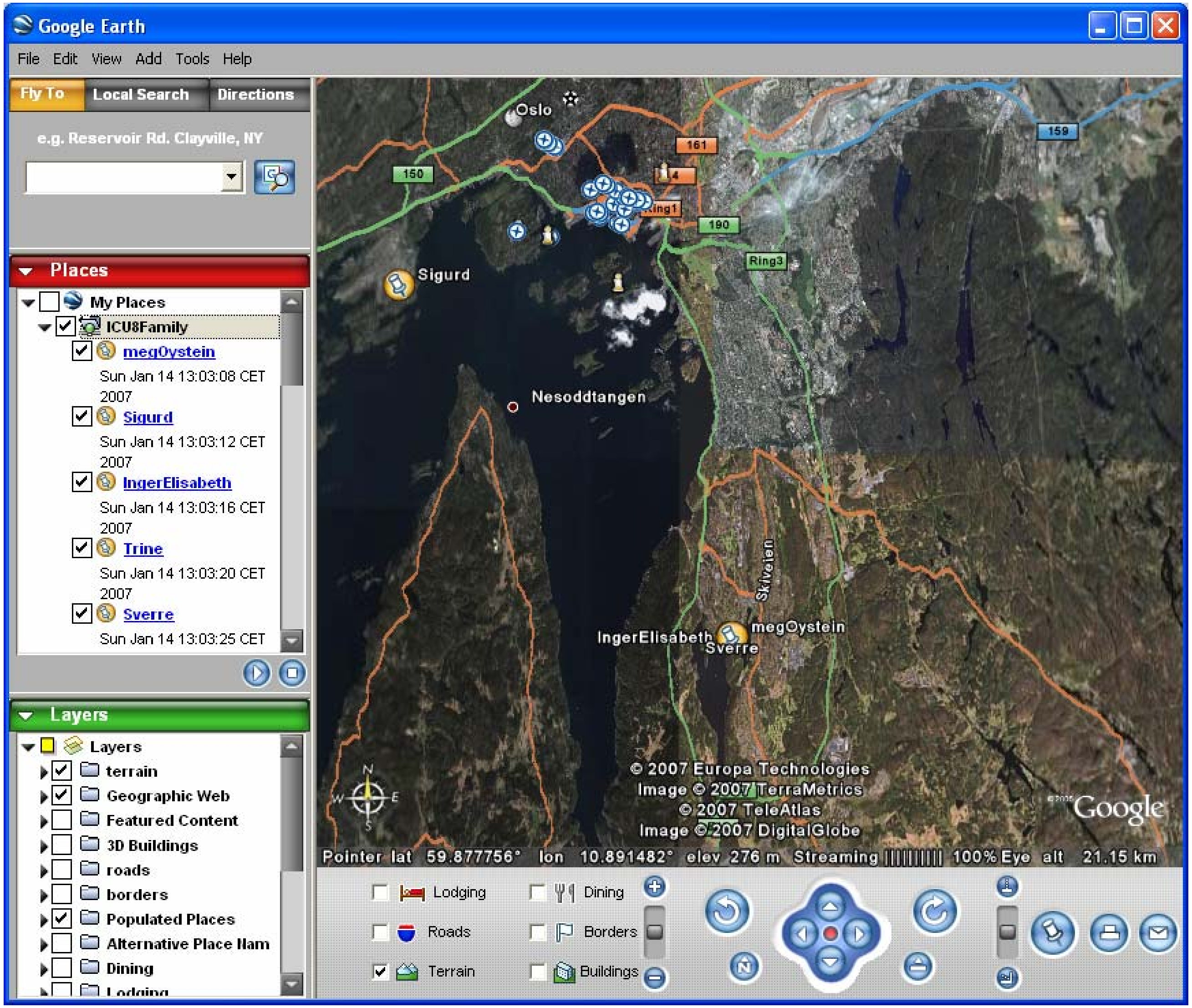
to 2034
(Telenor!!!)



15-Jan-07 22:33

From: 2034
Hotpos: Kolbotn is 668
meters away

# KML: using GoogleEarth to place mobiles


Google Earth
File Edit View Add Tools Help
Fly To
Local Search
Directions
e.g. Reservoir Rd. Clayville, NY
Places
Layers
Oslo
161
159
150
4
Ring1
190
Ring3
Sigurd
Nesoddtangen
Skiveien
IngerElisabeth
megOystein
Sverre
N
W
E
S
© 2007 Europa Technologies
Image © 2007 TerraMetrics
© 2007 TeleAtlas
Image © 2007 DigitalGlobe
©2006 Google
Pointer lat 59.877756° lon 10.891482° elev 276 m Streaming ||||||||| 100% Eye alt 21.15 km
Lodging
Dining
Roads
Borders
Terrain
Buildings

- □ My Places
  - ☑ ICU8Family
    - ☑ megOystein
      Sun Jan 14 13:03:08 CET 2007
    - ☑ Sigurd
      Sun Jan 14 13:03:12 CET 2007
    - ☑ IngerElisabeth
      Sun Jan 14 13:03:16 CET 2007
    - ☑ Trine
      Sun Jan 14 13:03:20 CET 2007
    - ☑ Sverre
      Sun Jan 14 13:03:25 CET

- □ Layers
  - ☑ terrain
  - ☑ Geographic Web
  - □ Featured Content
  - □ 3D Buildings
  - □ roads
  - □ borders
  - ☑ Populated Places
  - □ Alternative Place Nam
  - □ Dining
  - □ Lodging

□ Lodging □ Dining
□ Roads □ Borders
☑ Terrain □ Buildings

# Testing ICU0

by using the UML Testing Profile
with foils also from
Prof. Dr. Ina Schieferdecker

# The Problem

- Software
  - Increases in complexity, concurrency, and dynamics
  - Quality is key
    - Functionality
    - Performance
    - Scalability
    - Reliability
    - Usability
    - Efficiency
    - Maintainability
    - ...
- ➢ Testing is
  - Means to obtain objective quality metrics about systems in their target environment
  - Central means to relate requirements and specification to the real system

# Testing Today

- Is
  - Important
  - Means to obtain approval
  - Time critical

- But often
  - Rarely practiced
  - Unsystematic
  - Performed by hand
  - Error-prone
  - Considered being destructive
  - *Uncool*

    *„If you are a bad programmer you might be a tester“*

- Conjecture:
  There is a lack of appropriate test methods and techniques

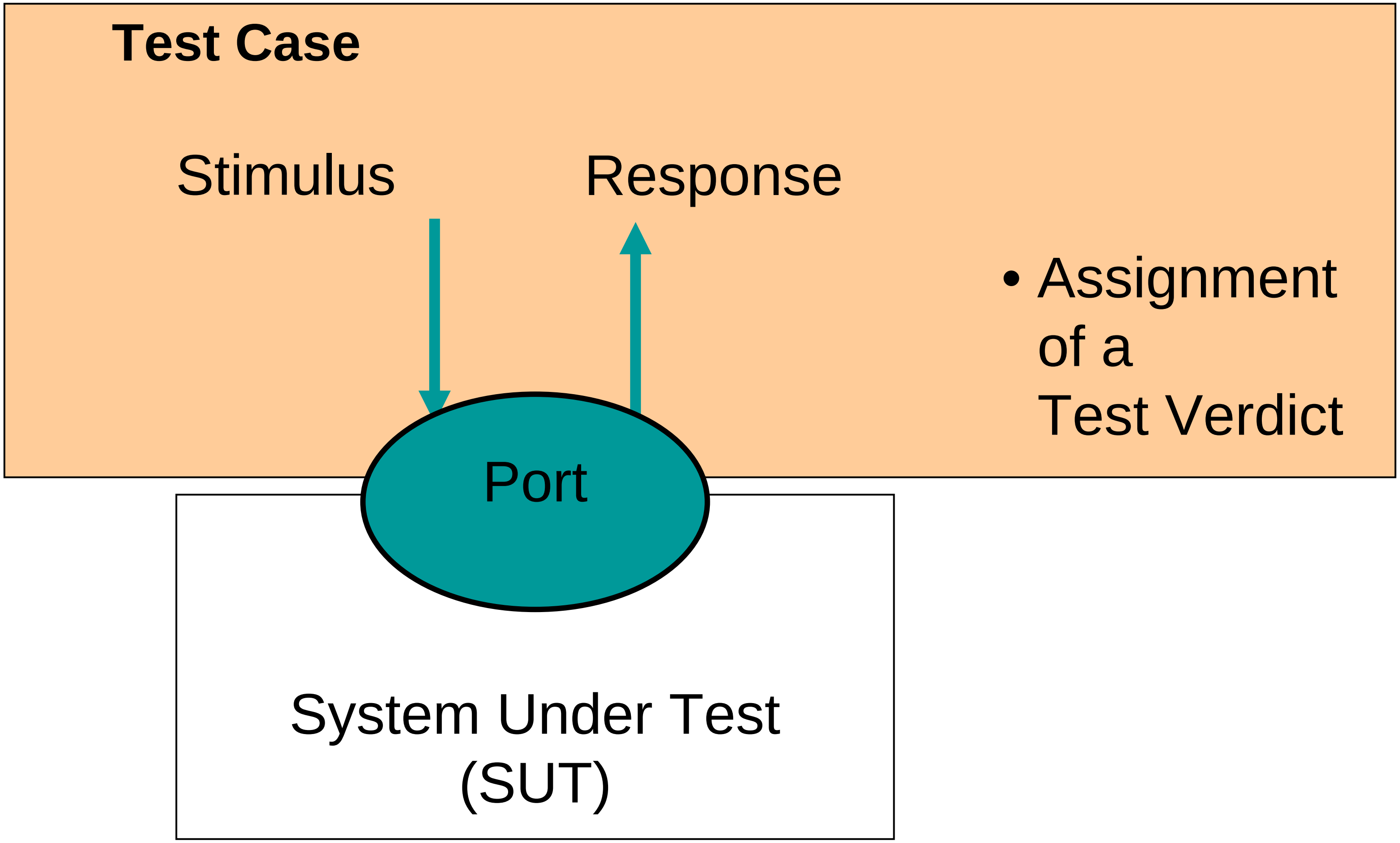
# Testing is …

- A technical process
- Performed by experimenting with a system
- In a controlled environment following a specified procedure
- With the intent of observing one or more characteristics of the system
- By demonstrating the deviation of the system’s actual status from the required status/specification.

# Goals of the UML Testing Profile

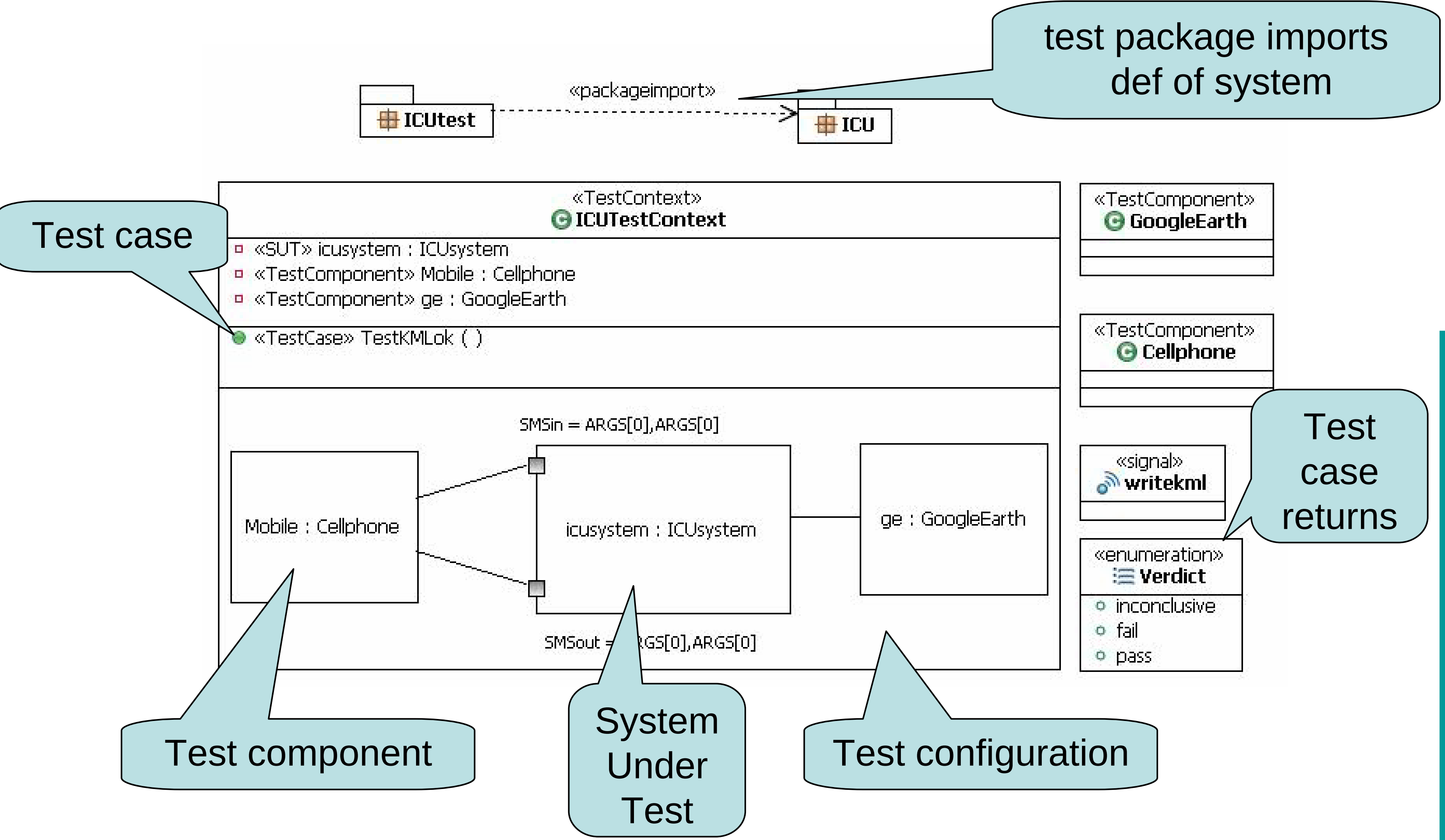
- Definition of a testing profile to capture all information that would be needed by different test processes
  - To allow black-box testing (i.e. at UML interfaces) of computational models in UML
- A testing profile based upon UML 2.0
  - That enables the test definition and test generation based on structural (static) and behavioral (dynamic) aspects of UML models, and
  - That is capable of inter-operation with existing test technologies for black-box testing
- Define
  - Test purposes for computational UML models, which should be related to relevant system interfaces
  - Test components, test configurations and test system interfaces
  - Test cases in an implementation independent manner

# Test Concepts: Black-Box Testing



- Assignment of a Test Verdict

# ICU0 test context



test package imports def of system

Test case

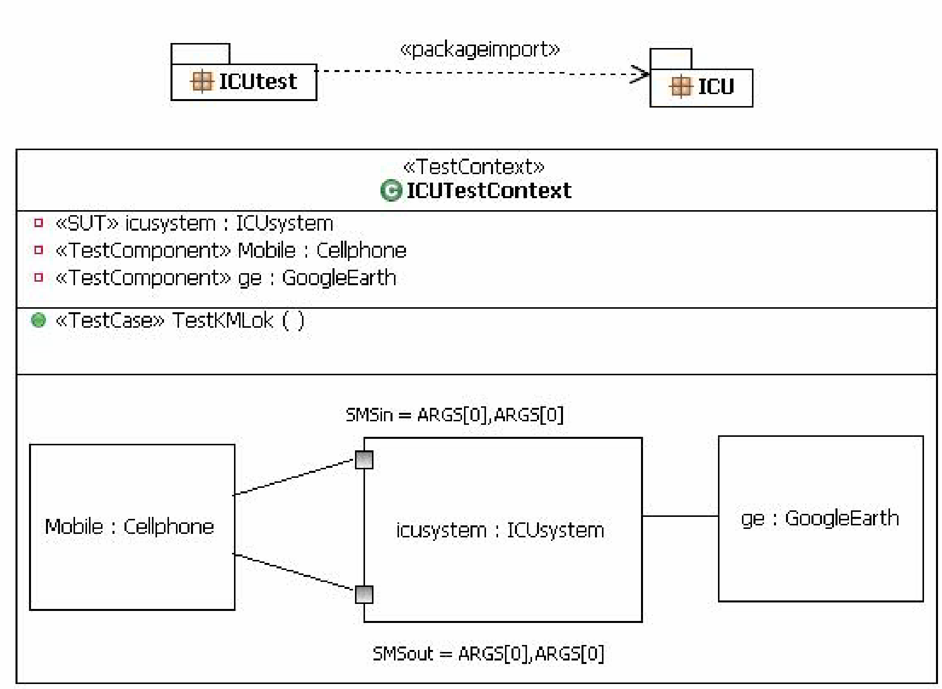
Test case returns

Test component

System Under Test

Test configuration

# Test context and system context are similar



ICUtest «packageimport» ICU

«TestContext»
ICUTestContext

- «SUT» icusystem : ICUsystem
- «TestComponent» Mobile : Cellphone
- «TestComponent» ge : GoogleEarth

● «TestCase» TestKMLok ( )

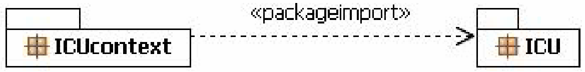
SMSin = ARGS[0],ARGS[0]

Mobile : Cellphone

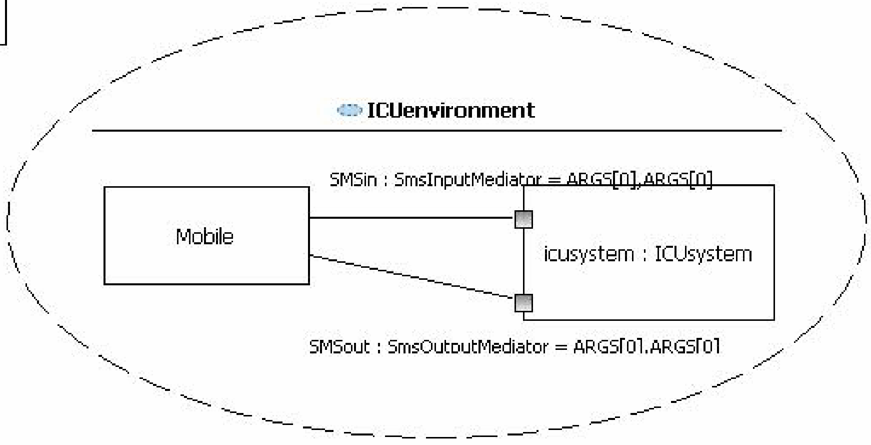
icusystem : ICUsystem

ge : GoogleEarth

SMSout = ARGS[0],ARGS[0]



ICUcontext «packageimport» ICU



ICUenvironment

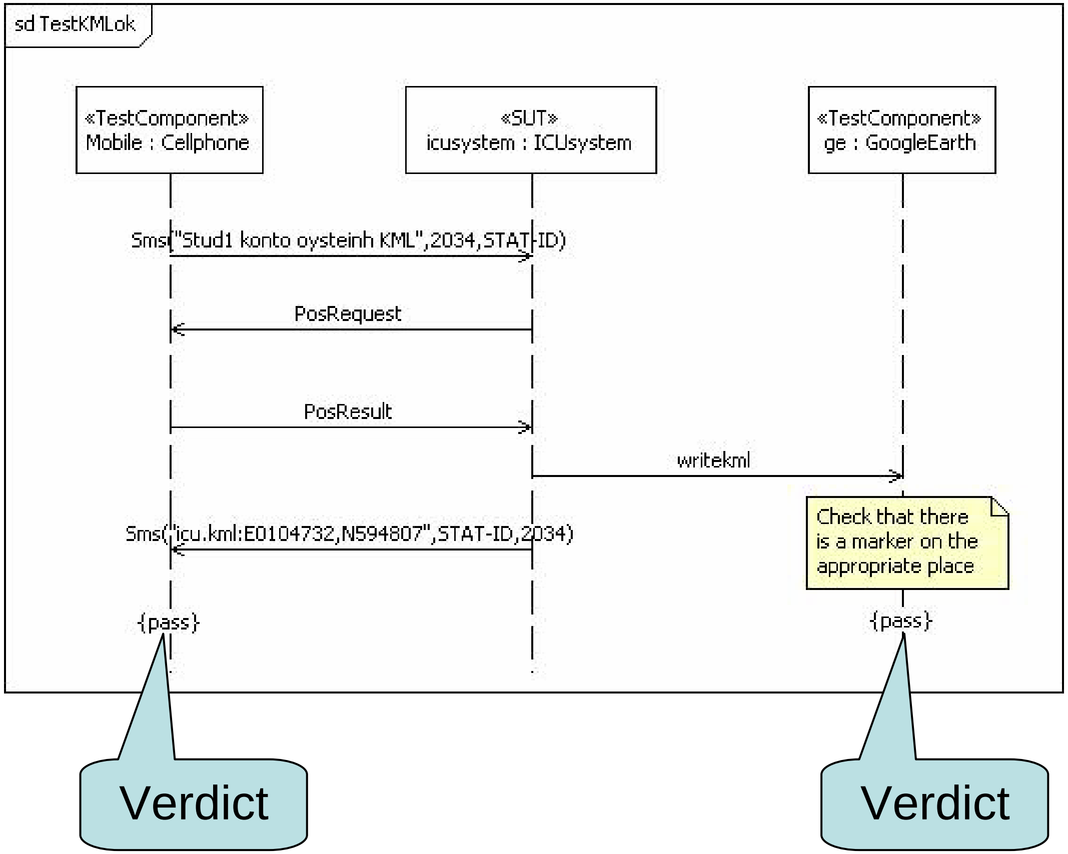
SMSin : SmsInputMediator = ARGS[0],ARGS[0]

Mobile

icusystem : ICUsystem

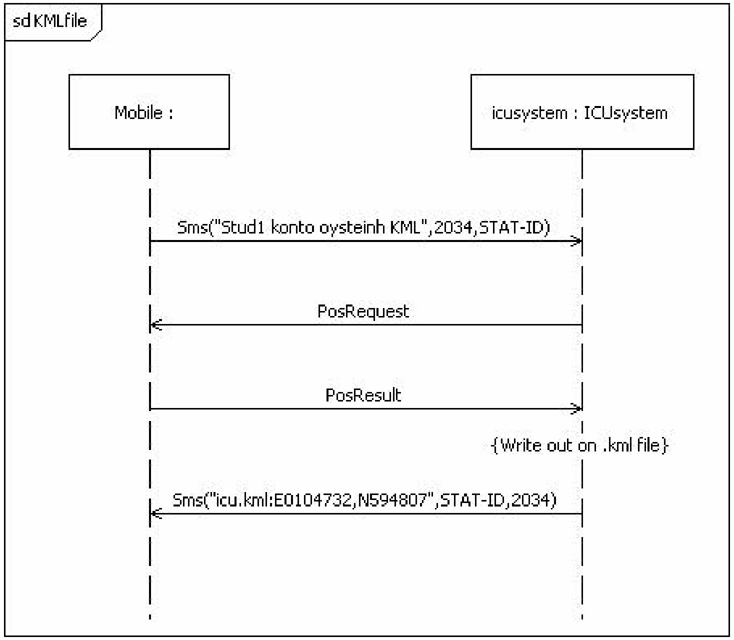
SMSout : SmsOutputMediator = ARGS[0],ARGS[0]

# Test behavior and context behavior are similar


sd TestKMLok
«TestComponent» Mobile : Cellphone
«SUT» icusystem : ICUsystem
«TestComponent» ge : GoogleEarth
Sms("Stud1 konto oysteinh KML",2034,STAT-ID)
PosRequest
PosResult
writekml
Sms("icu.kml:E0104732,N594807",STAT-ID,2034)
Check that there is a marker on the appropriate place
{pass}
{pass}

Verdict

Verdict


sd KMLfile
Mobile :
icusystem : ICUsystem
Sms("Stud1 konto oysteinh KML",2034,STAT-ID)
PosRequest
PosResult
{Write out on .kml file}
Sms("icu.kml:E0104732,N594807",STAT-ID,2034)

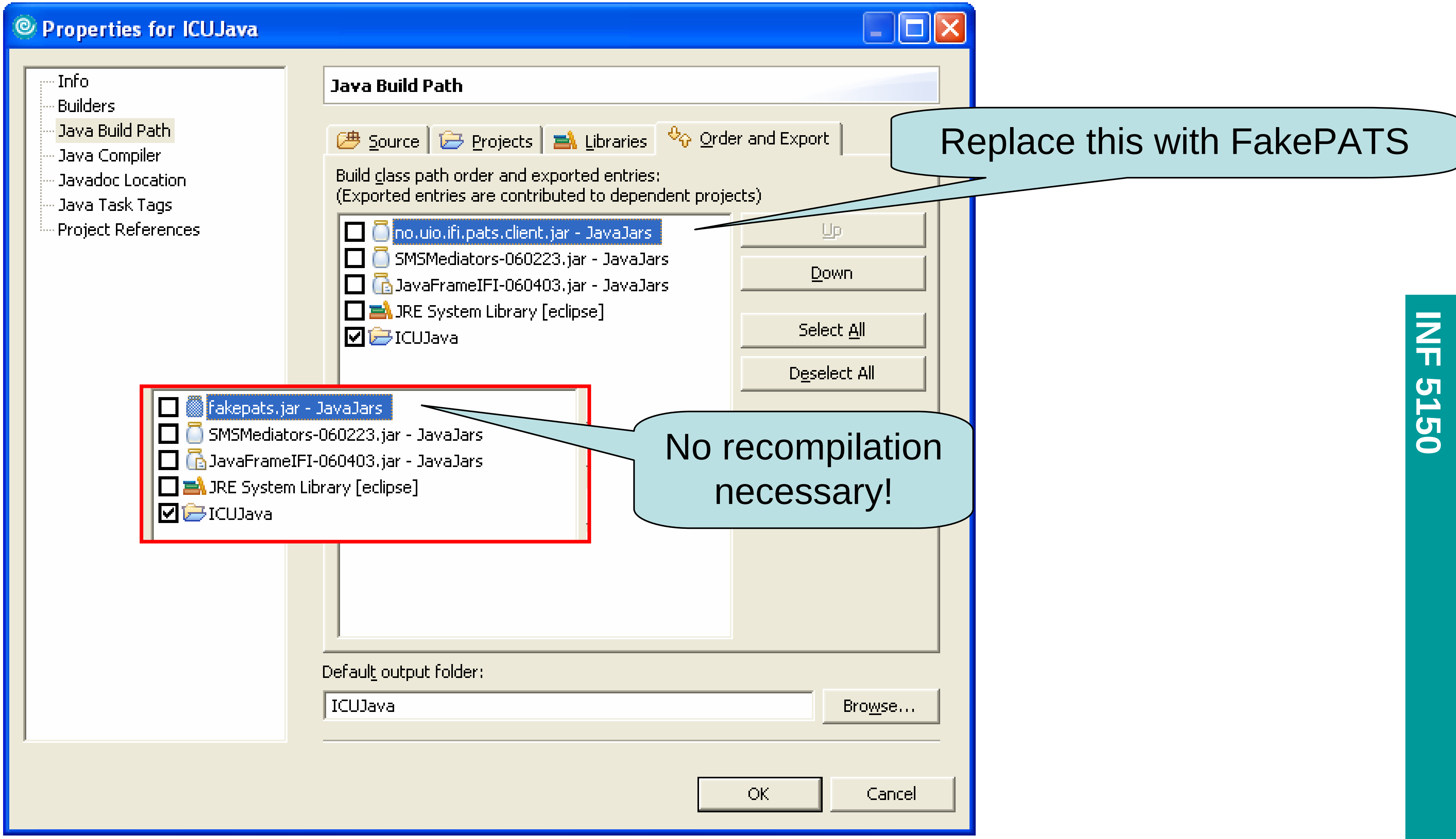
# Buzzzz 3: Why both context behavior and tests?

- Why do we need tests when we have context behavior
  - We do not always only want *pass* verdicts
    - we could also use the **neg** fragments in Sequence Diagrams
  - We may want more tests than context behaviors
- Tests should be explicit
  - Identify the SUT and the Test components
    - this distinction is not done in the context behavior sequence diagrams
  - Clearly specify the verdicts
    - context behaviors usually specify potential positive behaviors only

# How to execute the tests

- Generated test components
  - we could specify the behavior of the test components
  - then compile and run the total test management system
  - and have the tool verify the test cases by comparison
- Manual execution on real environment
  - you operate the mobile phone, and observe the resulting SMSes
  - you observe also the GoogleEarth results
  - Disadvantage: slow procedure since you need to physically move
  - Advantage: it is the real thing
- Manual execution on simulated environment
  - FakePATS made by Frank Davidsen
  - Advantage: quicker turn-around, easier manipulation, cheaper

# FakePATS instead of low level PATS-software



Properties for ICUJava

Java Build Path

Build class path order and exported entries:
(Exported entries are contributed to dependent projects)

- ☐ no.uio.ifi.pats.client.jar - JavaJars
- ☐ SMSMediators-060223.jar - JavaJars
- ☐ JavaFrameIFI-060403.jar - JavaJars
- ☐ JRE System Library [eclipse]
- ☑ ICUJava

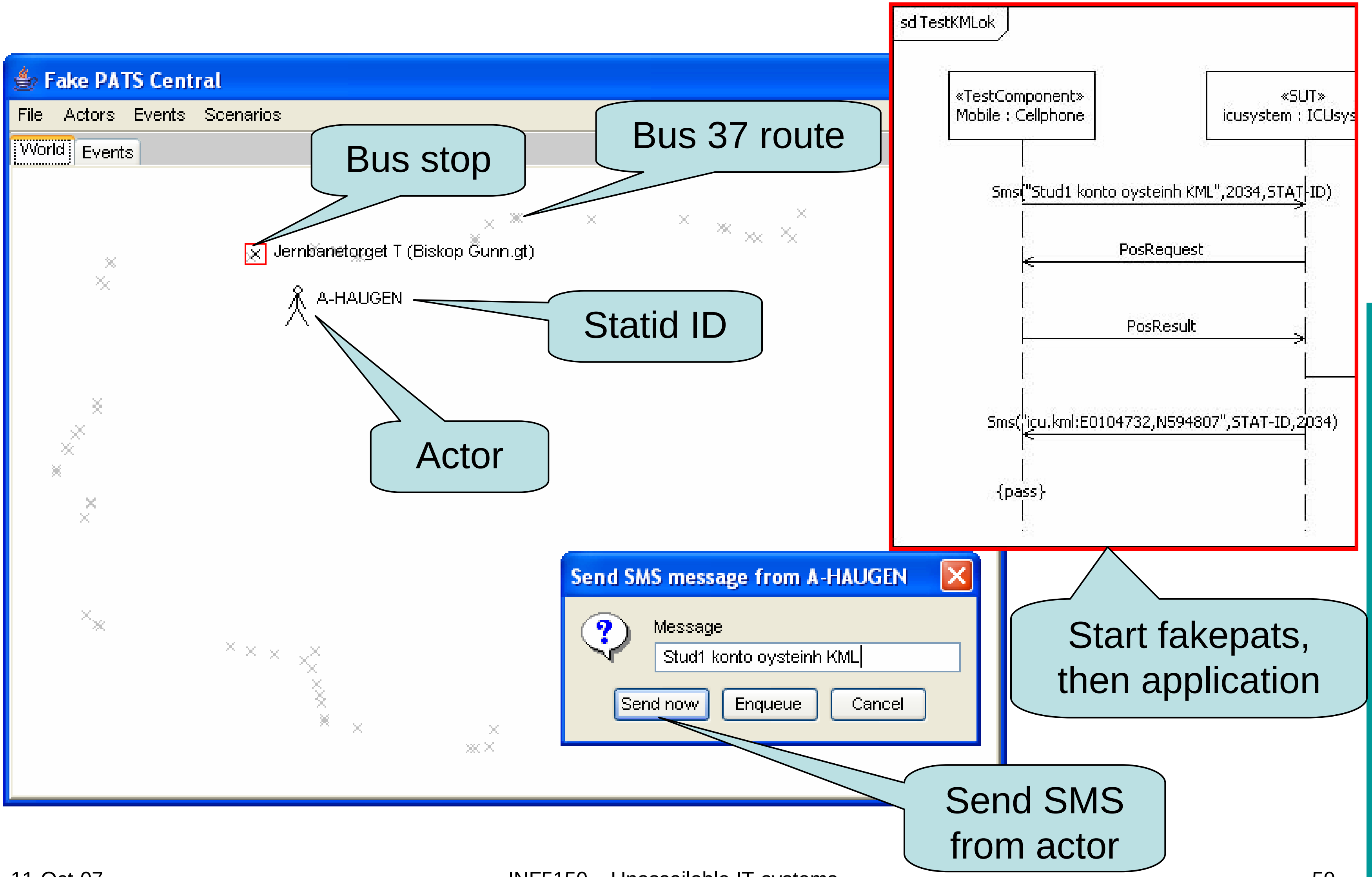
- ☐ fakepats.jar - JavaJars
- ☐ SMSMediators-060223.jar - JavaJars
- ☐ JavaFrameIFI-060403.jar - JavaJars
- ☐ JRE System Library [eclipse]
- ☑ ICUJava

Default output folder: ICUJava

Replace this with FakePATS

No recompilation necessary!

# fakepats.jar is also a stand-alone program!


Fake PATS Central
File Actors Events Scenarios
World Events
Jernbanetorget T (Biskop Gunn.gt)
A-HAUGEN
Send SMS message from A-HAUGEN
Send now
Enqueue
Cancel
sd TestKMLok
«TestComponent»
Mobile : Cellphone
«SUT»
icusystem : ICUsys
Sms("Stud1 konto oysteinh KML",2034,STAT-ID)
PosRequest
PosResult
Sms("icu.kml:E0104732,N594807",STAT-ID,2034)
{pass}

Message: Stud1 konto oysteinh KML

Bus stop

Bus 37 route

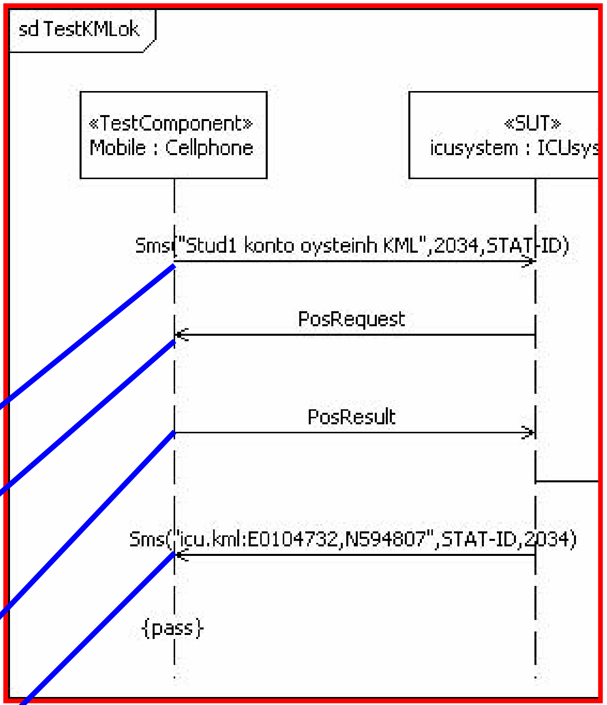
Statid ID

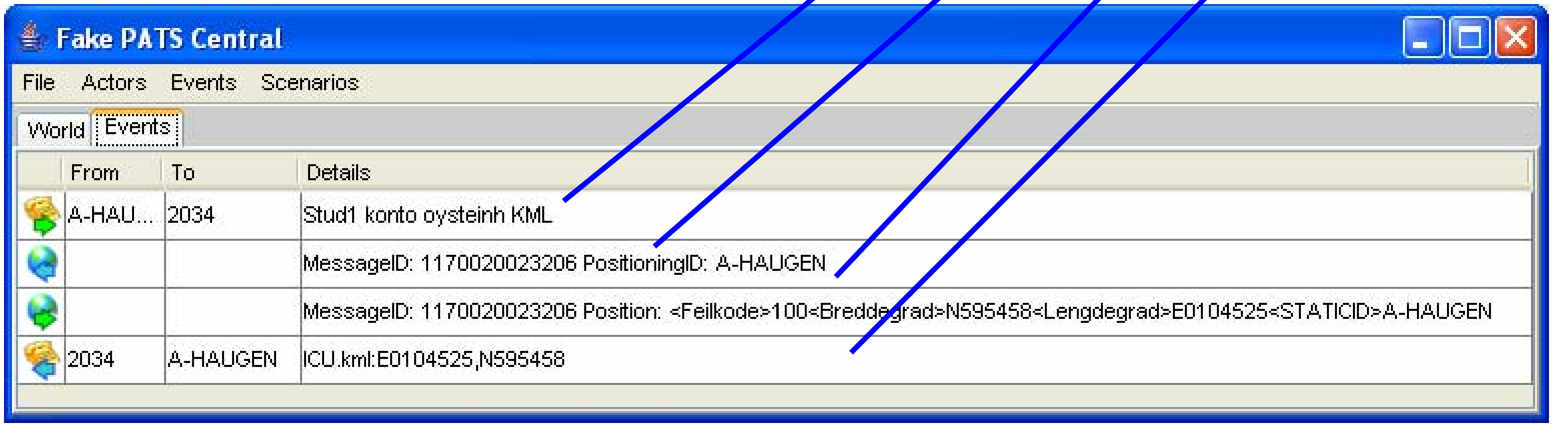
Actor

Start fakepats, then application

Send SMS from actor

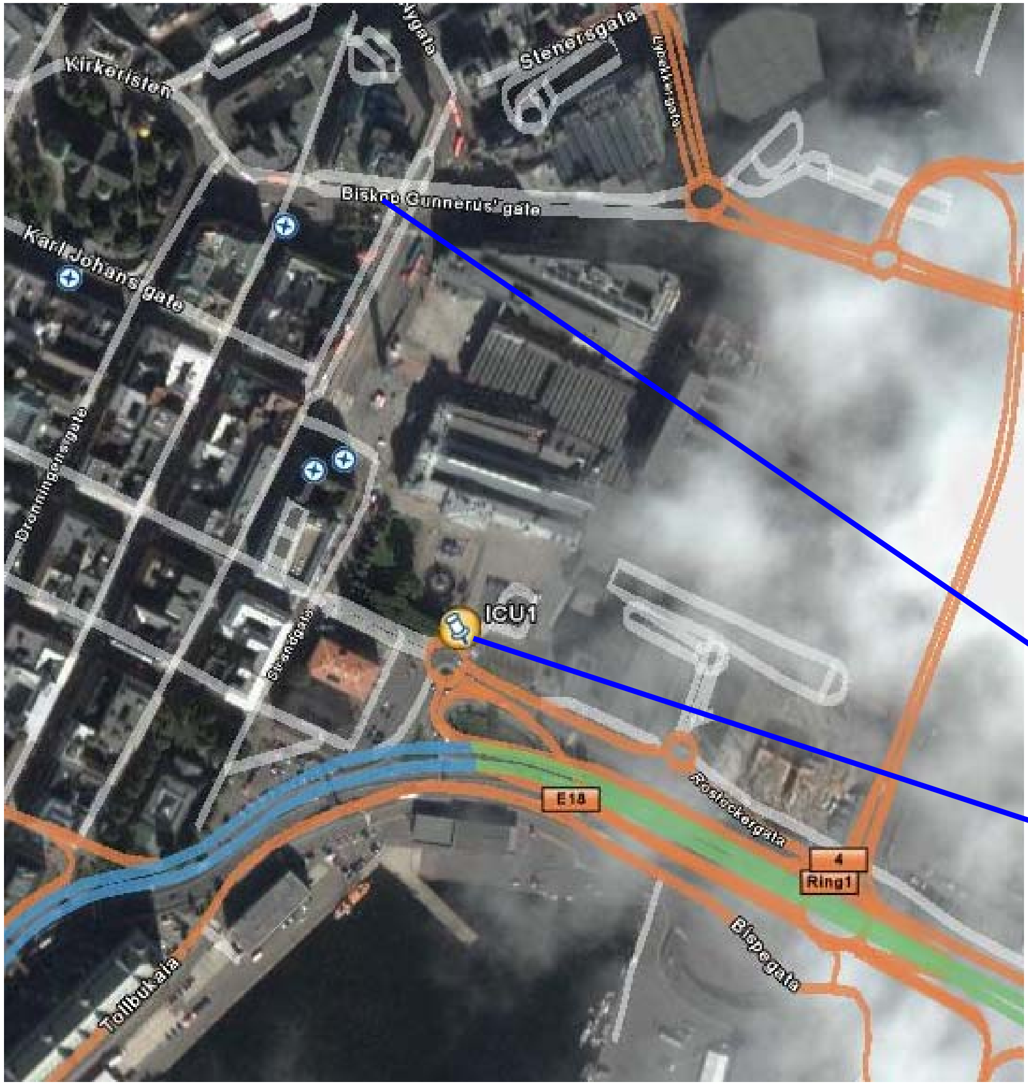
# The verdict of the fake mobile

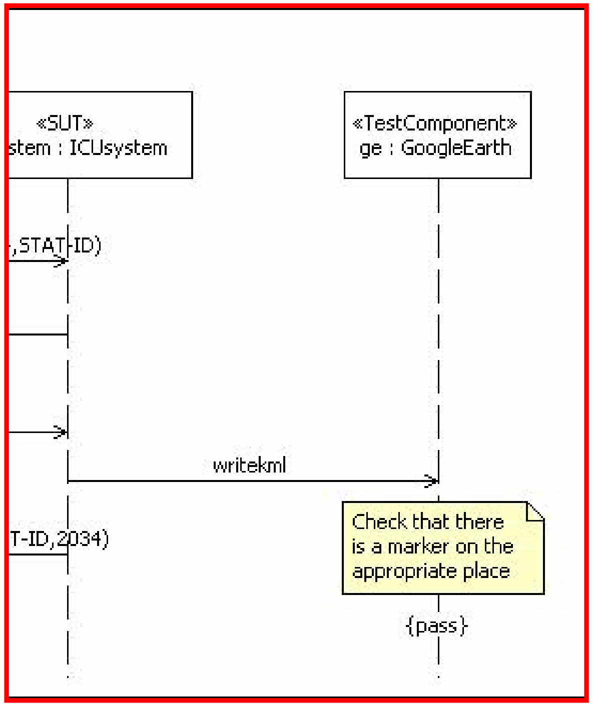


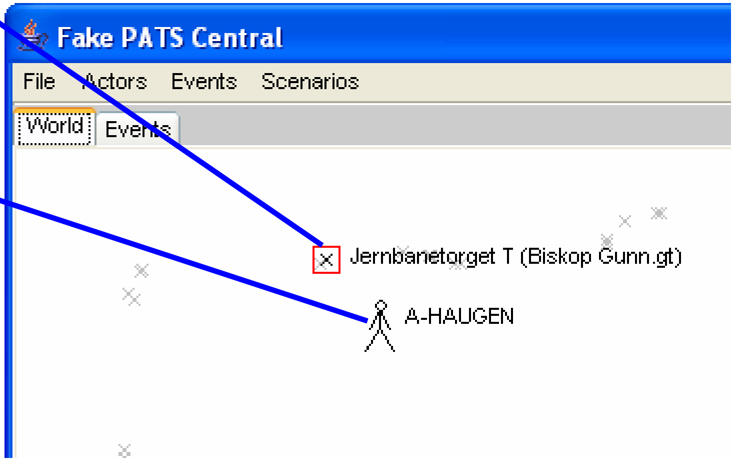


| | From | To | Details |
|---|---|---|---|
| | A-HAU... | 2034 | Stud1 konto oysteinh KML |
| | | | MessageID: 1170020023206 PositioningID: A-HAUGEN |
| | | | MessageID: 1170020023206 Position: <Feilkode>100<Breddegrad>N595458<Lengdegrad>E0104525<STATICID>A-HAUGEN |
| | 2034 | A-HAUGEN | ICU.kml:E0104525,N595458 |

# Verdict of GoogleEarth


Kirkeristen
Stenersgata
Biskop Gunnerus' gate
Karl Johans gate
Dronningens gate
Strandgata
ICU1
E18
Rostockergata
4
Ring1
Bispegata
Tollbukaia


«SUT»
stem : ICUsystem
«TestComponent»
ge : GoogleEarth
,STAT-ID)
writekml
T-ID,2034)
Check that there is a marker on the appropriate place
{pass}


Fake PATS Central
File
Actors
Events
Scenarios
World
Events
Jernbanetorget T (Biskop Gunn.gt)
A-HAUGEN