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SysML to AADL

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SysML and AADL

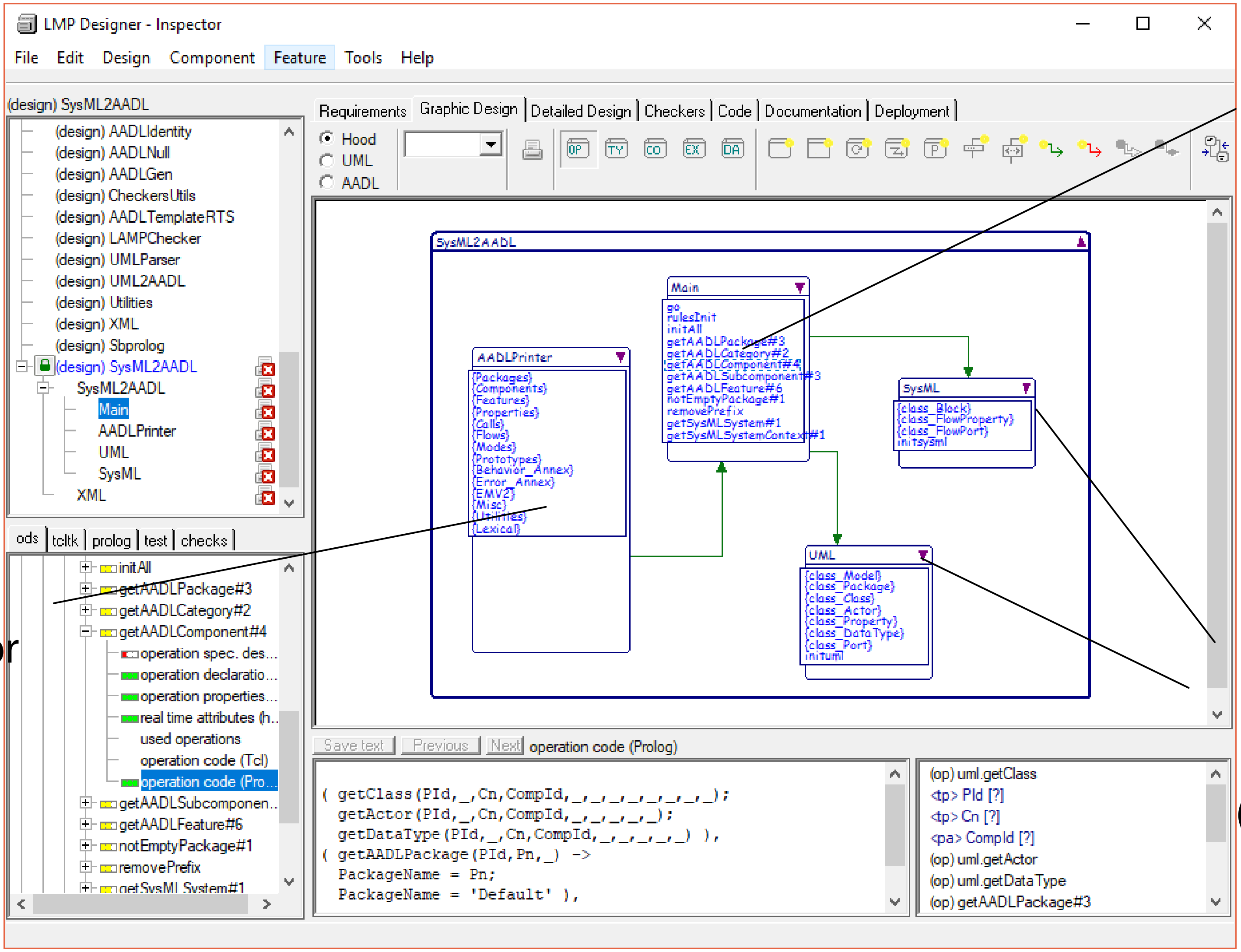
Our return of experience

- Positioning in the workflow/lifecycle:
  - Use of SysML for system engineering (but no unique way to do it)
  - Use of AADL for the refinement of the electronic and software subsystems
  - AADL can also be a way to perform more formal verifications
- Status of the SysML standardisation:
  - Poor tools interoperability (XMI)
  - Complicated by the dependency with core UML
- Converting SysML to AADL:
  - No unique mapping of concepts
  - No unique input format

Our current solution:

- A generic approach to develop custom SysML to AADL transformations
- An illustration of this approach for demostration purpose:
  - An experimental "import SysML" plugin in AADL Inspector (current version)
  - A toy example inspired from a No Magic case study
- Requires adaptation for real use (mapping + transformation update)

Building the transformation (LMP)



```
( getClass(PId,_,Cn,CompId,_,_,_,_,_,_,_,_);
  getActor(PId,_,Cn,CompId,_,_,_,_,_);
  getDataType(PId,_,Cn,CompId,_,_,_,_,_) ),
( getAADLPackage(PId,Pn,_) ->
  PackageName = Pn;
  PackageName = 'Default' ),
```

Mapping implementation (prolog)

AADL generator

XMI model elements (selection)

generation of a LMP plugin for AADL Inspector

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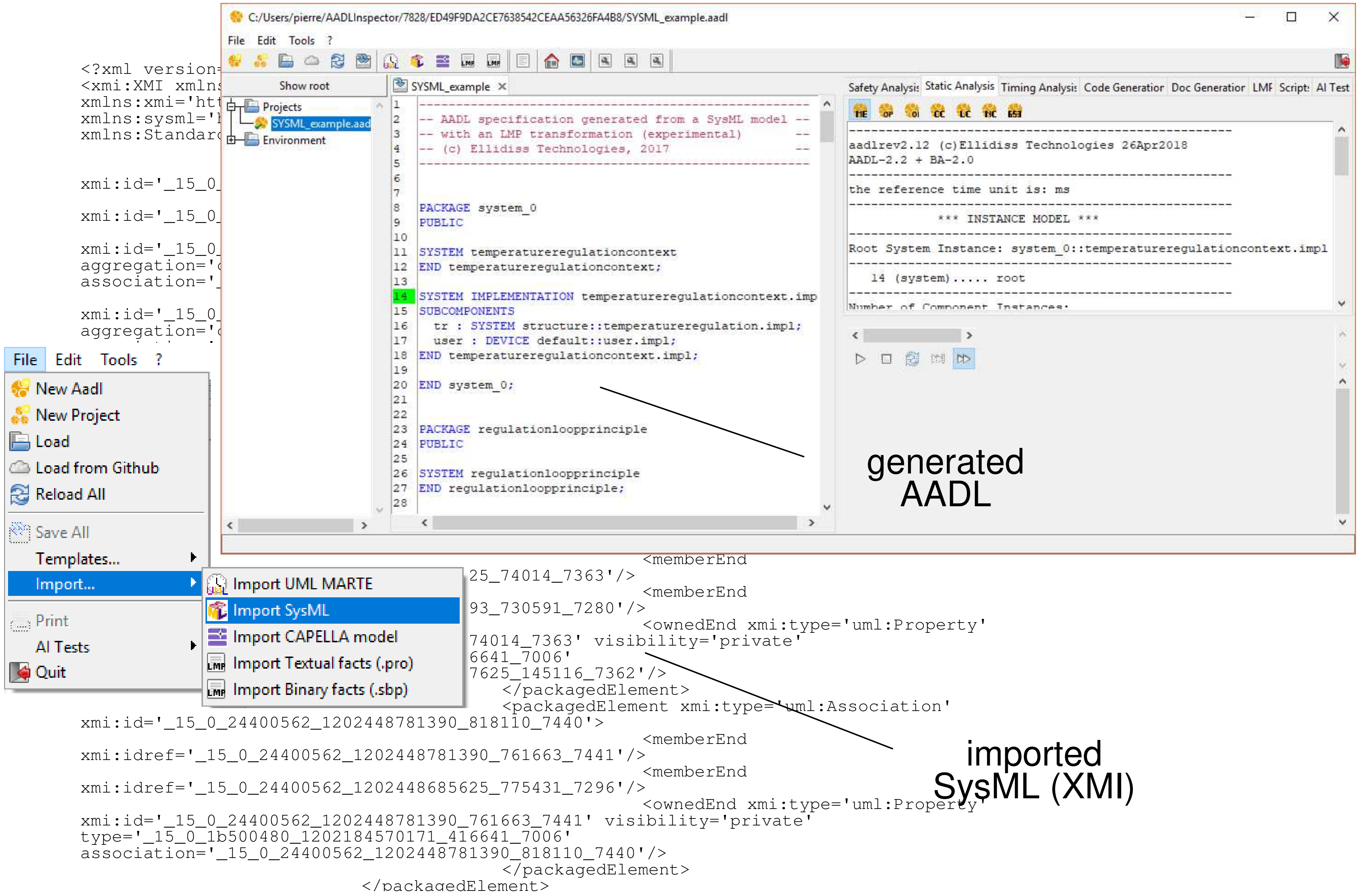
Using the transformation (AI 1.6)



```
-------------------------------------------------------------
-- AADL specification generated from a SysML model --
-- with an LMP transformation (experimental)        --
-- (c) Ellidiss Technologies, 2017                  --
-------------------------------------------------------------


PACKAGE system_0
PUBLIC

SYSTEM temperatureregulationcontext
END temperatureregulationcontext;

SYSTEM IMPLEMENTATION temperatureregulationcontext.imp
SUBCOMPONENTS
  tr : SYSTEM structure::temperatureregulation.impl;
  user : DEVICE default::user.impl;
END temperatureregulationcontext.impl;

END system_0;


PACKAGE regulationloopprinciple
PUBLIC

SYSTEM regulationloopprinciple
END regulationloopprinciple;
```

```
--------------------------------------------------------
aadlrev2.12 (c)Ellidiss Technologies 26Apr2018
AADL-2.2 + BA-2.0
--------------------------------------------------------
the reference time unit is: ms
--------------------------------------------------------
           *** INSTANCE MODEL ***
--------------------------------------------------------
Root System Instance: system_0::temperatureregulationcontext.impl
--------------------------------------------------------
   14 (system)..... root
--------------------------------------------------------
Number of Component Instances:
```

```
<?xml version=
<xmi:XMI xmlns
xmlns:xmi='htt
xmlns:sysml='h
xmlns:Standard

xmi:id='_15_0_

xmi:id='_15_0_

xmi:id='_15_0_
aggregation='
association='_

xmi:id='_15_0_
aggregation='
                                                   <memberEnd
                                           25_74014_7363'/>
                                                   <memberEnd
                                           93_730591_7280'/>
                                                   <ownedEnd xmi:type='uml:Property'
                                           74014_7363' visibility='private'
                                           6641_7006'
                                           7625_145116_7362'/>
                                              </packagedElement>
                                              <packagedElement xmi:type='uml:Association'
xmi:id='_15_0_24400562_1202448781390_818110_7440'>
                                                   <memberEnd
xmi:idref='_15_0_24400562_1202448781390_761663_7441'/>
                                                   <memberEnd
xmi:idref='_15_0_24400562_1202448685625_775431_7296'/>
                                                   <ownedEnd xmi:type='uml:Property'
xmi:id='_15_0_24400562_1202448781390_761663_7441' visibility='private'
type='_15_0_1b500480_1202184570171_416641_7006'
association='_15_0_24400562_1202448781390_818110_7440'/>
                                              </packagedElement>
                              </packagedElement>
```