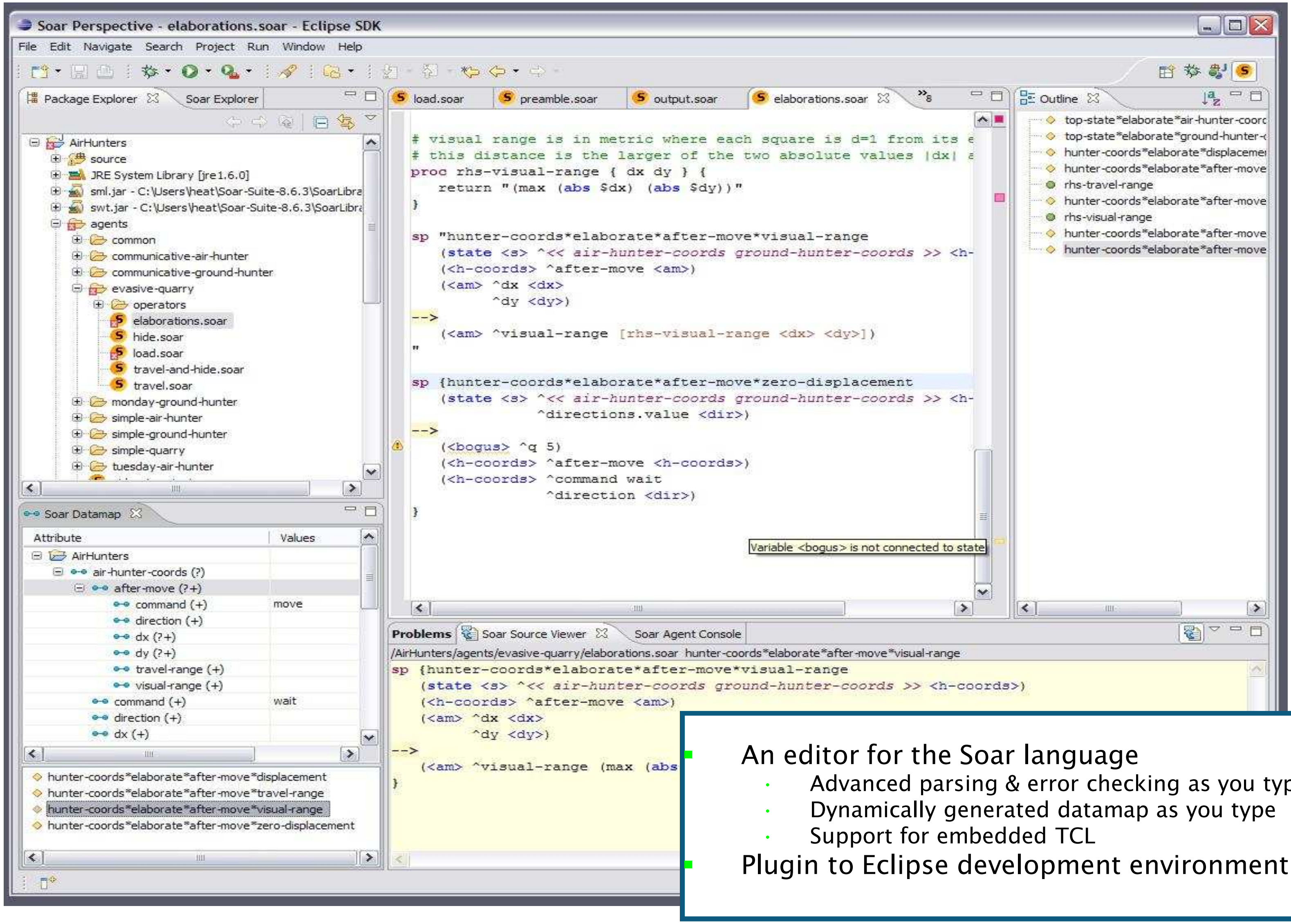
Soar Technology
Thinking *inside* the box.

Soar IDE Update

Keith Knudsen, Geoffrey Morgan
{knudsen,gmorgan} @soartech.com
May 6, 2008

What is the Soar IDE?


Soar Perspective - elaborations.soar - Eclipse SDK
File Edit Navigate Search Project Run Window Help
Package Explorer
Soar Explorer
AirHunters
source
JRE System Library [jre1.6.0]
sml.jar - C:\Users\heat\Soar-Suite-8.6.3\SoarLibra
swt.jar - C:\Users\heat\Soar-Suite-8.6.3\SoarLibra
agents
common
communicative-air-hunter
communicative-ground-hunter
evasive-quarry
operators
elaborations.soar
hide.soar
load.soar
travel-and-hide.soar
travel.soar
monday-ground-hunter
simple-air-hunter
simple-ground-hunter
simple-quarry
tuesday-air-hunter
load.soar
preamble.soar
output.soar
elaborations.soar
Outline
top-state*elaborate*air-hunter-coorc
top-state*elaborate*ground-hunter-c
hunter-coords*elaborate*displaceme
hunter-coords*elaborate*after-move
rhs-travel-range
hunter-coords*elaborate*after-move
rhs-visual-range
hunter-coords*elaborate*after-move
hunter-coords*elaborate*after-move
Soar Datamap
Problems
Soar Source Viewer
Soar Agent Console

```
# visual range is in metric where each square is d=1 from its e
# this distance is the larger of the two absolute values |dx| a
proc rhs-visual-range { dx dy } {
   return "(max (abs $dx) (abs $dy))"
}

sp "hunter-coords*elaborate*after-move*visual-range
   (state <s> ^<< air-hunter-coords ground-hunter-coords >> <h-
   (<h-coords> ^after-move <am>)
   (<am> ^dx <dx>
         ^dy <dy>)
-->
   (<am> ^visual-range [rhs-visual-range <dx> <dy>])
"

sp {hunter-coords*elaborate*after-move*zero-displacement
   (state <s> ^<< air-hunter-coords ground-hunter-coords >> <h-
              ^directions.value <dir>)
-->
   (<bogus> ^q 5)
   (<h-coords> ^after-move <h-coords>)
   (<h-coords> ^command wait
               ^direction <dir>)
}
```

Variable <bogus> is not connected to state

Attribute	Values
AirHunters	
air-hunter-coords (?)	
after-move (?+)	
command (+)	move
direction (+)	
dx (?+)	
dy (?+)	
travel-range (+)	
visual-range (+)	
command (+)	wait
direction (+)	
dx (+)	

hunter-coords*elaborate*after-move*displacement
hunter-coords*elaborate*after-move*travel-range
hunter-coords*elaborate*after-move*visual-range
hunter-coords*elaborate*after-move*zero-displacement

/AirHunters/agents/evasive-quarry/elaborations.soar hunter-coords*elaborate*after-move*visual-range

```
sp {hunter-coords*elaborate*after-move*visual-range
   (state <s> ^<< air-hunter-coords ground-hunter-coords >> <h-coords>)
   (<h-coords> ^after-move <am>)
   (<am> ^dx <dx>
         ^dy <dy>)
-->
   (<am> ^visual-range (max (abs
}
```

- An editor for the Soar language
  - Advanced parsing & error checking as you type
  - Dynamically generated datamap as you type
  - Support for embedded TCL
- Plugin to Eclipse development environment

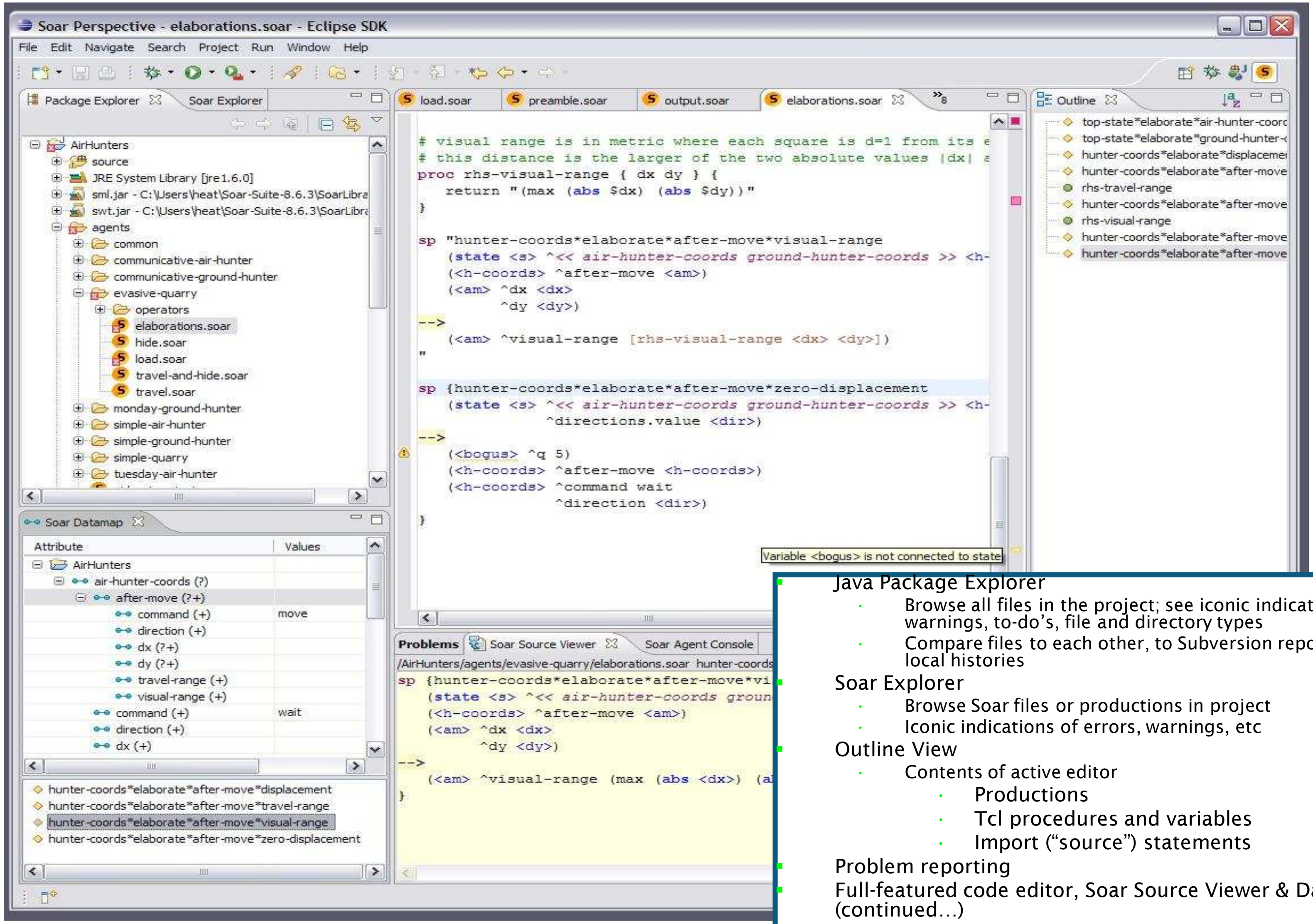
Soar Technology
Thinking *inside* the box.

Release History

- 0.9.1 (July 2007) – External BETA Release
- 1.0.0 (Nov 2007) – Public Release
  - Improved performance and memory usage
  - Support for "Agent“ concept (vs. file-only)
  - Datamap-based code completion
  - Automatic code formatting
  - Numerous bug fixes & usability improvements
- 1.0.2 (Nov 2007)
  - Bug fixes
- 1.1.0 (Jun 2008?)
  - Improve TCL error reporting
  - Simple refactoring support
  - Filterable datamap display
- 1.2 (Fall 2008?)
  - Integrate Soar Java Debugger?

REVIEW OF CORE FEATURES

Soar Perspective



```
AirHunters
  source
  JRE System Library [jre1.6.0]
  sml.jar - C:\Users\heat\Soar-Suite-8.6.3\SoarLibra
  swt.jar - C:\Users\heat\Soar-Suite-8.6.3\SoarLibra
  agents
    common
    communicative-air-hunter
    communicative-ground-hunter
    evasive-quarry
      operators
      elaborations.soar
      hide.soar
      load.soar
      travel-and-hide.soar
      travel.soar
    monday-ground-hunter
    simple-air-hunter
    simple-ground-hunter
    simple-quarry
    tuesday-air-hunter
```

```
# visual range is in metric where each square is d=1 from its e
# this distance is the larger of the two absolute values |dx| a
proc rhs-visual-range { dx dy } {
   return "(max (abs $dx) (abs $dy))"
}

sp "hunter-coords*elaborate*after-move*visual-range
   (state <s> ^<< air-hunter-coords ground-hunter-coords >> <h-
   (<h-coords> ^after-move <am>)
   (<am> ^dx <dx>
         ^dy <dy>)
-->
   (<am> ^visual-range [rhs-visual-range <dx> <dy>])
"

sp {hunter-coords*elaborate*after-move*zero-displacement
   (state <s> ^<< air-hunter-coords ground-hunter-coords >> <h-
                ^directions.value <dir>)
-->
   (<bogus> ^q 5)
   (<h-coords> ^after-move <h-coords>)
   (<h-coords> ^command wait
                ^direction <dir>)
}
```

Variable <bogus> is not connected to state

```
top-state*elaborate*air-hunter-coorc
top-state*elaborate*ground-hunter-c
hunter-coords*elaborate*displaceme
hunter-coords*elaborate*after-move
rhs-travel-range
hunter-coords*elaborate*after-move
rhs-visual-range
hunter-coords*elaborate*after-move
hunter-coords*elaborate*after-move
```

Attribute	Values
AirHunters	
air-hunter-coords (?)	
after-move (?+)	
command (+)	move
direction (+)	
dx (?+)	
dy (?+)	
travel-range (+)	
visual-range (+)	
command (+)	wait
direction (+)	
dx (+)	

```
hunter-coords*elaborate*after-move*displacement
hunter-coords*elaborate*after-move*travel-range
hunter-coords*elaborate*after-move*visual-range
hunter-coords*elaborate*after-move*zero-displacement
```

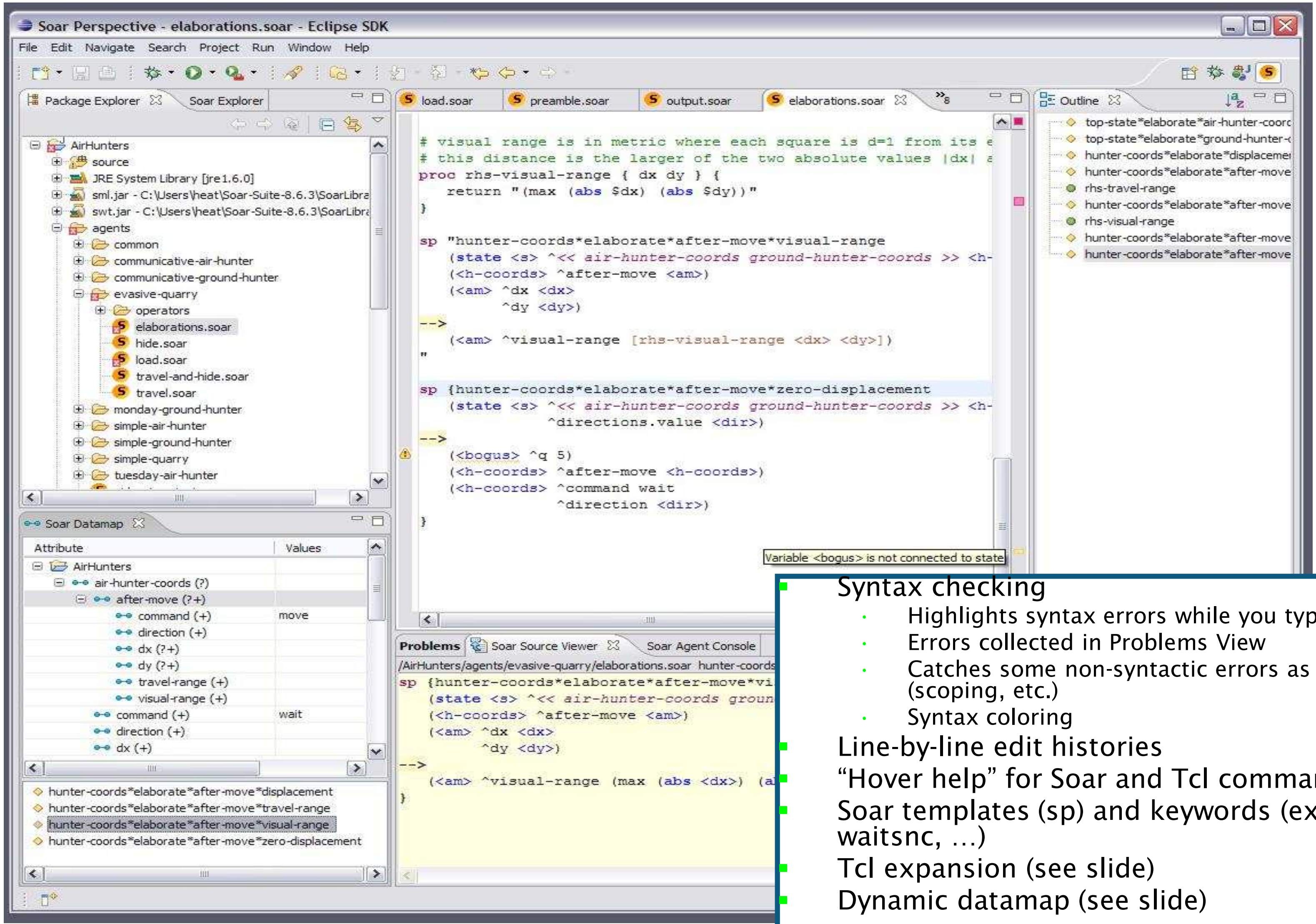
/AirHunters/agents/evasive-quarry/elaborations.soar hunter-coords

```
sp {hunter-coords*elaborate*after-move*vi
   (state <s> ^<< air-hunter-coords groun
   (<h-coords> ^after-move <am>)
   (<am> ^dx <dx>
         ^dy <dy>)
-->
   (<am> ^visual-range (max (abs <dx>) (a
}
```

- Java Package Explorer
  - Browse all files in the project; see iconic indications of errors, warnings, to-do's, file and directory types
  - Compare files to each other, to Subversion repository, or to local histories
- Soar Explorer
  - Browse Soar files or productions in project
  - Iconic indications of errors, warnings, etc
- Outline View
  - Contents of active editor
    - Productions
    - Tcl procedures and variables
    - Import ("source") statements
- Problem reporting
- Full-featured code editor, Soar Source Viewer & Datamap (continued…)

Soar Technology
Thinking *inside* the box.

Soar Editor



AirHunters
- source
- JRE System Library [jre1.6.0]
- sml.jar - C:\Users\heat\Soar-Suite-8.6.3\SoarLibra
- swt.jar - C:\Users\heat\Soar-Suite-8.6.3\SoarLibra
- agents
  - common
  - communicative-air-hunter
  - communicative-ground-hunter
  - evasive-quarry
    - operators
    - elaborations.soar
    - hide.soar
    - load.soar
    - travel-and-hide.soar
    - travel.soar
  - monday-ground-hunter
  - simple-air-hunter
  - simple-ground-hunter
  - simple-quarry
  - tuesday-air-hunter

```
# visual range is in metric where each square is d=1 from its e
# this distance is the larger of the two absolute values |dx| a
proc rhs-visual-range { dx dy } {
   return "(max (abs $dx) (abs $dy))"
}

sp "hunter-coords*elaborate*after-move*visual-range
   (state <s> ^<< air-hunter-coords ground-hunter-coords >> <h-
   (<h-coords> ^after-move <am>)
   (<am> ^dx <dx>
         ^dy <dy>)
-->
   (<am> ^visual-range [rhs-visual-range <dx> <dy>])
"

sp {hunter-coords*elaborate*after-move*zero-displacement
   (state <s> ^<< air-hunter-coords ground-hunter-coords >> <h-
                 ^directions.value <dir>)
-->
   (<bogus> ^q 5)
   (<h-coords> ^after-move <h-coords>)
   (<h-coords> ^command wait
                ^direction <dir>)
}
```

Variable <bogus> is not connected to state

- top-state*elaborate*air-hunter-coorc
- top-state*elaborate*ground-hunter-c
- hunter-coords*elaborate*displacemer
- hunter-coords*elaborate*after-move
- rhs-travel-range
- hunter-coords*elaborate*after-move
- rhs-visual-range
- hunter-coords*elaborate*after-move
- hunter-coords*elaborate*after-move

Attribute	Values
AirHunters	
air-hunter-coords (?)	
after-move (?+)	
command (+)	move
direction (+)	
dx (?+)	
dy (?+)	
travel-range (+)	
visual-range (+)	
command (+)	wait
direction (+)	
dx (+)	

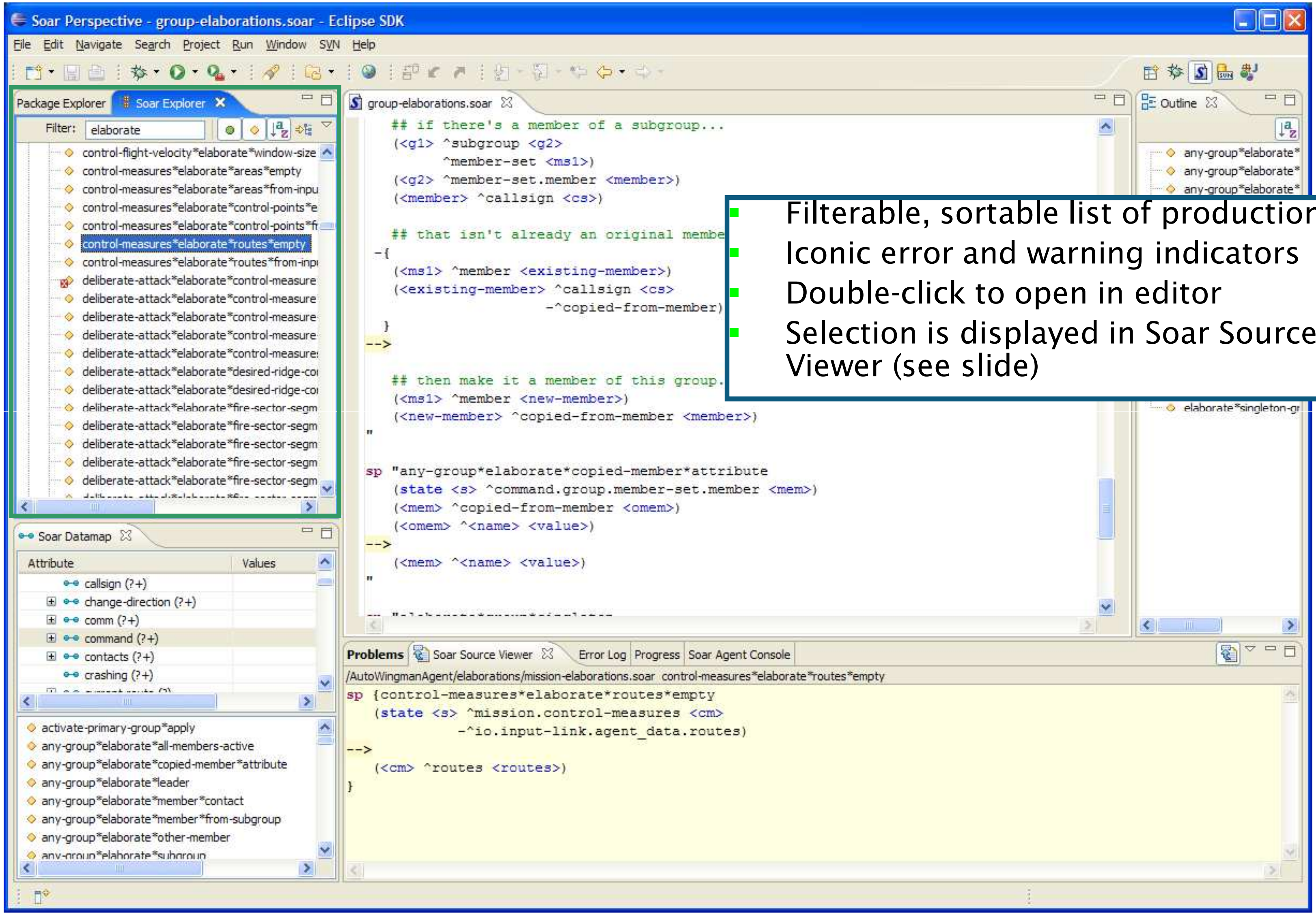
- hunter-coords*elaborate*after-move*displacement
- hunter-coords*elaborate*after-move*travel-range
- hunter-coords*elaborate*after-move*visual-range
- hunter-coords*elaborate*after-move*zero-displacement

```
/AirHunters/agents/evasive-quarry/elaborations.soar  hunter-coords
sp {hunter-coords*elaborate*after-move*vi
   (state <s> ^<< air-hunter-coords groun
   (<h-coords> ^after-move <am>)
   (<am> ^dx <dx>
         ^dy <dy>)
-->
   (<am> ^visual-range (max (abs <dx>) (a
}
```

- Syntax checking
  - Highlights syntax errors while you type
  - Errors collected in Problems View
  - Catches some non-syntactic errors as well (scoping, etc.)
  - Syntax coloring
- Line-by-line edit histories
- “Hover help” for Soar and Tcl commands
- Soar templates (sp) and keywords (excise, waitsnc, …)
- Tcl expansion (see slide)
- Dynamic datamap (see slide)

Soar Technology
Thinking *inside* the box.

Soar Explorer



Filter: elaborate

- control-flight-velocity*elaborate*window-size
- control-measures*elaborate*areas*empty
- control-measures*elaborate*areas*from-inpu
- control-measures*elaborate*control-points*e
- control-measures*elaborate*control-points*fr
- control-measures*elaborate*routes*empty
- control-measures*elaborate*routes*from-inpı
- deliberate-attack*elaborate*control-measure
- deliberate-attack*elaborate*control-measure
- deliberate-attack*elaborate*control-measure
- deliberate-attack*elaborate*control-measure
- deliberate-attack*elaborate*control-measure:
- deliberate-attack*elaborate*desired-ridge-coı
- deliberate-attack*elaborate*desired-ridge-coı
- deliberate-attack*elaborate*fire-sector-segm
- deliberate-attack*elaborate*fire-sector-segm
- deliberate-attack*elaborate*fire-sector-segm
- deliberate-attack*elaborate*fire-sector-segm
- deliberate-attack*elaborate*fire-sector-segm

```
   ## if there's a member of a subgroup...
   (<g1> ^subgroup <g2>
         ^member-set <ms1>)
   (<g2> ^member-set.member <member>)
   (<member> ^callsign <cs>)

   ## that isn't already an original membe
 -{
   (<ms1> ^member <existing-member>)
   (<existing-member> ^callsign <cs>
                     -^copied-from-member)
  }
-->

   ## then make it a member of this group.
   (<ms1> ^member <new-member>)
   (<new-member> ^copied-from-member <member>)
"

sp "any-group*elaborate*copied-member*attribute
   (state <s> ^command.group.member-set.member <mem>)
   (<mem> ^copied-from-member <omem>)
   (<omem> ^<name> <value>)
-->
   (<mem> ^<name> <value>)
"
```

- any-group*elaborate*
- any-group*elaborate*
- any-group*elaborate*
- elaborate*singleton-gr

Attribute	Values
callsign (?+)	
⊞ change-direction (?+)	
⊞ comm (?+)	
⊞ command (?+)	
⊞ contacts (?+)	
crashing (?+)	

- activate-primary-group*apply
- any-group*elaborate*all-members-active
- any-group*elaborate*copied-member*attribute
- any-group*elaborate*leader
- any-group*elaborate*member*contact
- any-group*elaborate*member*from-subgroup
- any-group*elaborate*other-member
- any-group*elaborate*subgroup

/AutoWingmanAgent/elaborations/mission-elaborations.soar control-measures*elaborate*routes*empty

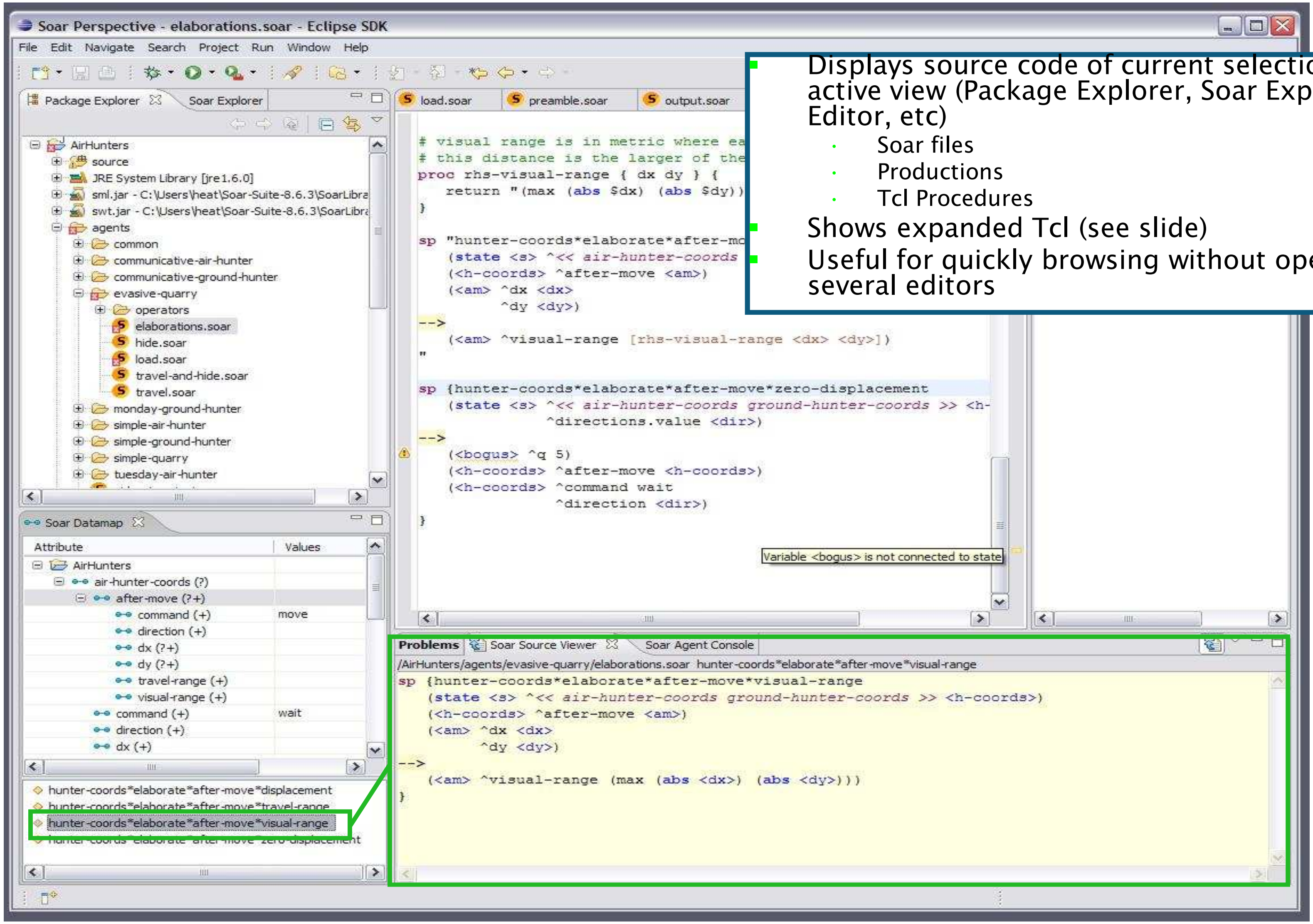
```
sp {control-measures*elaborate*routes*empty
   (state <s> ^mission.control-measures <cm>
              -^io.input-link.agent_data.routes)
-->
   (<cm> ^routes <routes>)
}
```

- Filterable, sortable list of productions
- Iconic error and warning indicators
- Double-click to open in editor
- Selection is displayed in Soar Source Viewer (see slide)

Soar Technology
Thinking *inside* the box.

Soar Source Viewer

- Displays source code of current selection of active view (Package Explorer, Soar Explorer, Editor, etc)
  - Soar files
  - Productions
  - Tcl Procedures
- Shows expanded Tcl (see slide)
- Useful for quickly browsing without opening several editors



```
# visual range is in metric where ea
# this distance is the larger of the
proc rhs-visual-range { dx dy } {
   return "(max (abs $dx) (abs $dy))
}

sp "hunter-coords*elaborate*after-mo
   (state <s> ^<< air-hunter-coords
   (<h-coords> ^after-move <am>)
   (<am> ^dx <dx>
         ^dy <dy>)
-->
   (<am> ^visual-range [rhs-visual-range <dx> <dy>])
"

sp {hunter-coords*elaborate*after-move*zero-displacement
   (state <s> ^<< air-hunter-coords ground-hunter-coords >> <h-
              ^directions.value <dir>)
-->
   (<bogus> ^q 5)
   (<h-coords> ^after-move <h-coords>)
   (<h-coords> ^command wait
               ^direction <dir>)
}
```

Variable <bogus> is not connected to state

Attribute	Values
AirHunters	
air-hunter-coords (?)	
after-move (?+)	
command (+)	move
direction (+)	
dx (?+)	
dy (?+)	
travel-range (+)	
visual-range (+)	
command (+)	wait
direction (+)	
dx (+)	

hunter-coords*elaborate*after-move*displacement
hunter-coords*elaborate*after-move*travel-range
hunter-coords*elaborate*after-move*visual-range
hunter-coords*elaborate*after-move*zero-displacement

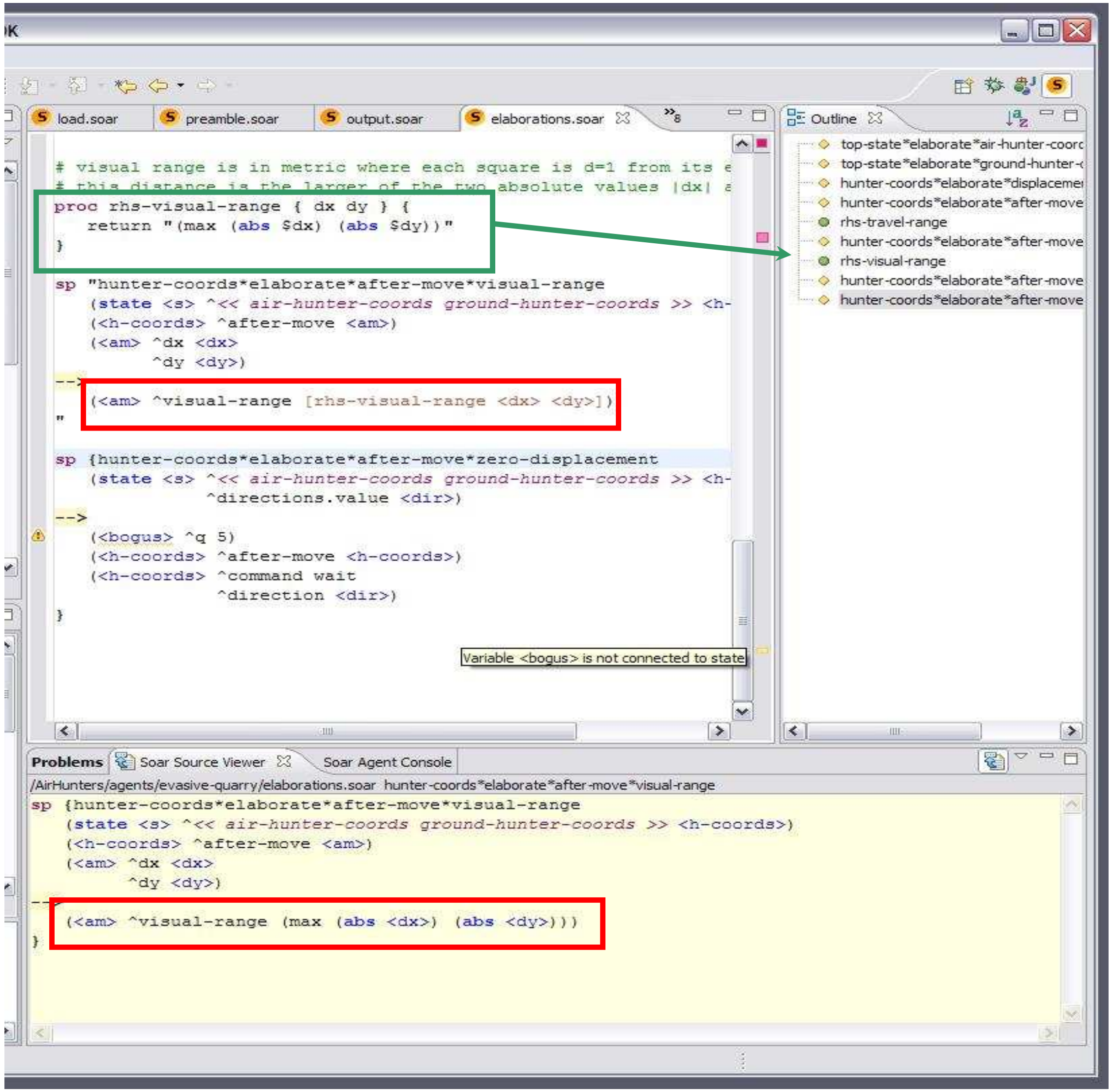
/AirHunters/agents/evasive-quarry/elaborations.soar hunter-coords*elaborate*after-move*visual-range

```
sp {hunter-coords*elaborate*after-move*visual-range
   (state <s> ^<< air-hunter-coords ground-hunter-coords >> <h-coords>)
   (<h-coords> ^after-move <am>)
   (<am> ^dx <dx>
         ^dy <dy>)
-->
   (<am> ^visual-range (max (abs <dx>) (abs <dy>)))
}
```

Soar Technology
Thinking *inside* the box.

Tcl Expansion

- View original and Tcl-expanded source simultaneously
- Live updating of Tcl macro and variable definitions
- Tcl procedures appear in outline view


load.soar
preamble.soar
output.soar
elaborations.soar
Outline
top-state*elaborate*air-hunter-coorc
top-state*elaborate*ground-hunter-c
hunter-coords*elaborate*displacemer
hunter-coords*elaborate*after-move
rhs-travel-range
hunter-coords*elaborate*after-move
rhs-visual-range
hunter-coords*elaborate*after-move
hunter-coords*elaborate*after-move
Problems
Soar Source Viewer
Soar Agent Console

```
# visual range is in metric where each square is d=1 from its e
# this distance is the larger of the two absolute values |dx| a
proc rhs-visual-range { dx dy } {
   return "(max (abs $dx) (abs $dy))"
}

sp "hunter-coords*elaborate*after-move*visual-range
   (state <s> ^<< air-hunter-coords ground-hunter-coords >> <h-
   (<h-coords> ^after-move <am>)
   (<am> ^dx <dx>
         ^dy <dy>)
-->
   (<am> ^visual-range [rhs-visual-range <dx> <dy>])
"

sp {hunter-coords*elaborate*after-move*zero-displacement
   (state <s> ^<< air-hunter-coords ground-hunter-coords >> <h-
              ^directions.value <dir>)
-->
   (<bogus> ^q 5)
   (<h-coords> ^after-move <h-coords>)
   (<h-coords> ^command wait
               ^direction <dir>)
}
```

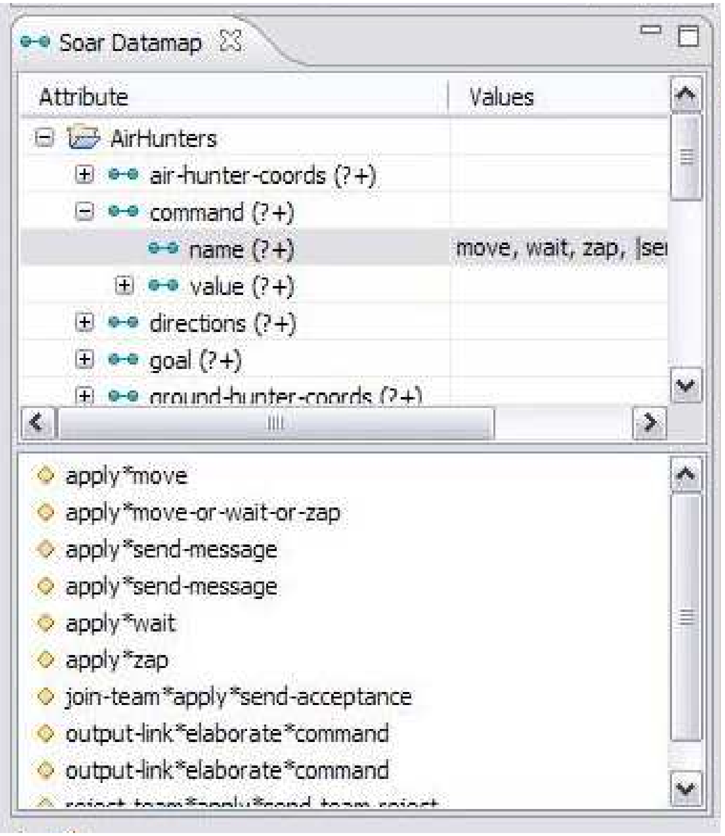
Variable <bogus> is not connected to state

/AirHunters/agents/evasive-quarry/elaborations.soar hunter-coords*elaborate*after-move*visual-range

```
sp {hunter-coords*elaborate*after-move*visual-range
   (state <s> ^<< air-hunter-coords ground-hunter-coords >> <h-coords>)
   (<h-coords> ^after-move <am>)
   (<am> ^dx <dx>
         ^dy <dy>)
-->
   (<am> ^visual-range (max (abs <dx>) (abs <dy>)))
}
```

Dynamic Datamap

- Shows tests (?), assignments (+), and values of attributes
  - Context-sensitive, e.g., operator and goal 'name' attributes are distinct
  - Hierarchy reflects the structure of working memory
- Updates along with code changes
- Linked to original productions
  - Easily locate code that reads individual portions of input link, or that writes specific output-link commands



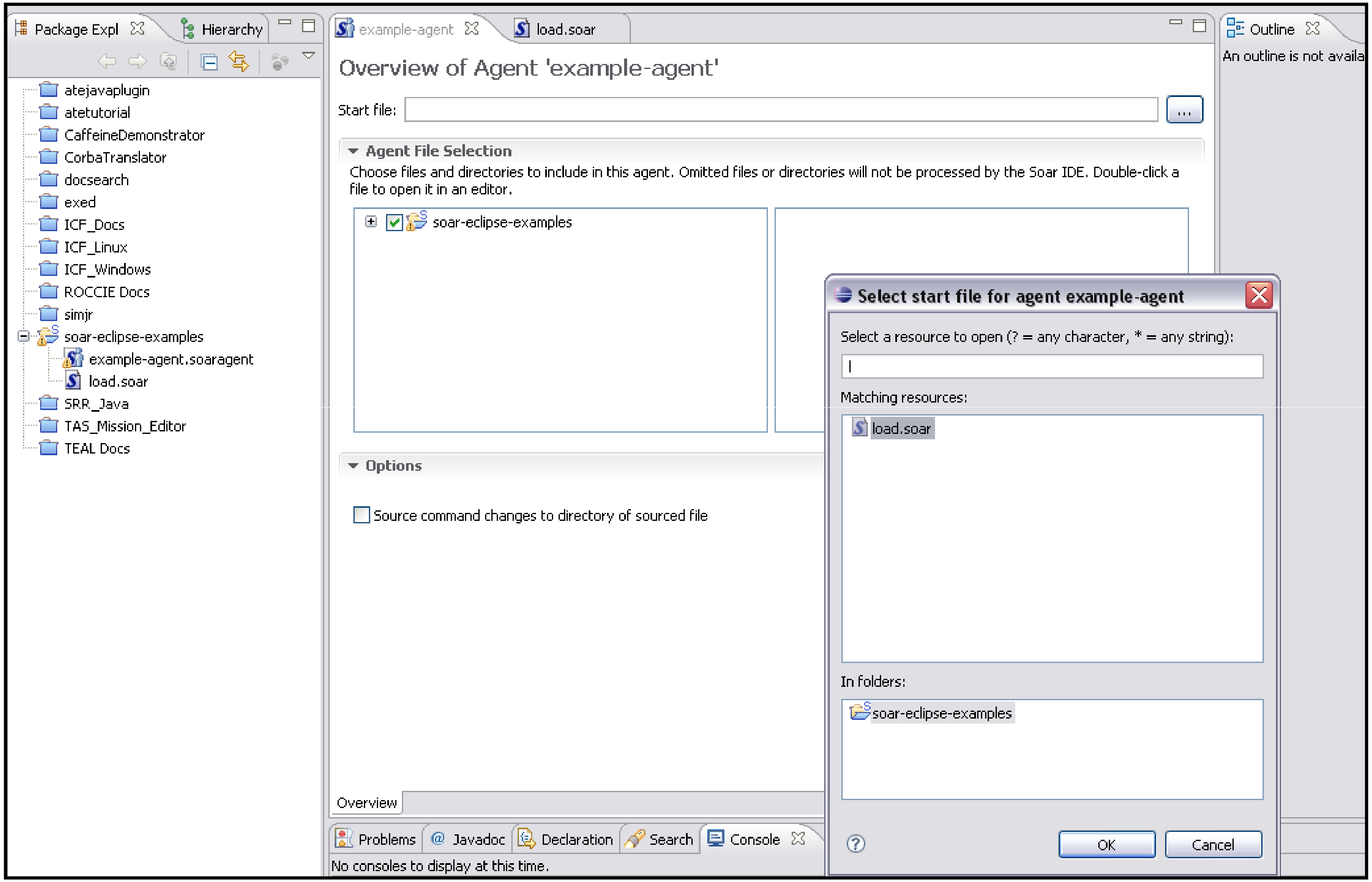
Attribute	Values
AirHunters	
air-hunter-coords (?+)	
command (?+)	
name (?+)	move, wait, zap, |se
value (?+)	
directions (?+)	
goal (?+)	
ground-hunter-coords (?+)	

- apply*move
- apply*move-or-wait-or-zap
- apply*send-message
- apply*send-message
- apply*wait
- apply*zap
- join-team*apply*send-acceptance
- output-link*elaborate*command
- output-link*elaborate*command
- reject-team*apply*send-reject

Soar Technology
Thinking *inside* the box.

VERSION 1.0 FEATURES

Feature: IDE Agents



Overview of Agent 'example-agent'

Start file:

Agent File Selection

Choose files and directories to include in this agent. Omitted files or directories will not be processed by the Soar IDE. Double-click a file to open it in an editor.

☑ soar-eclipse-examples

Options

☐ Source command changes to directory of sourced file

Select start file for agent example-agent

Select a resource to open (? = any character, * = any string):

Matching resources:

load.soar

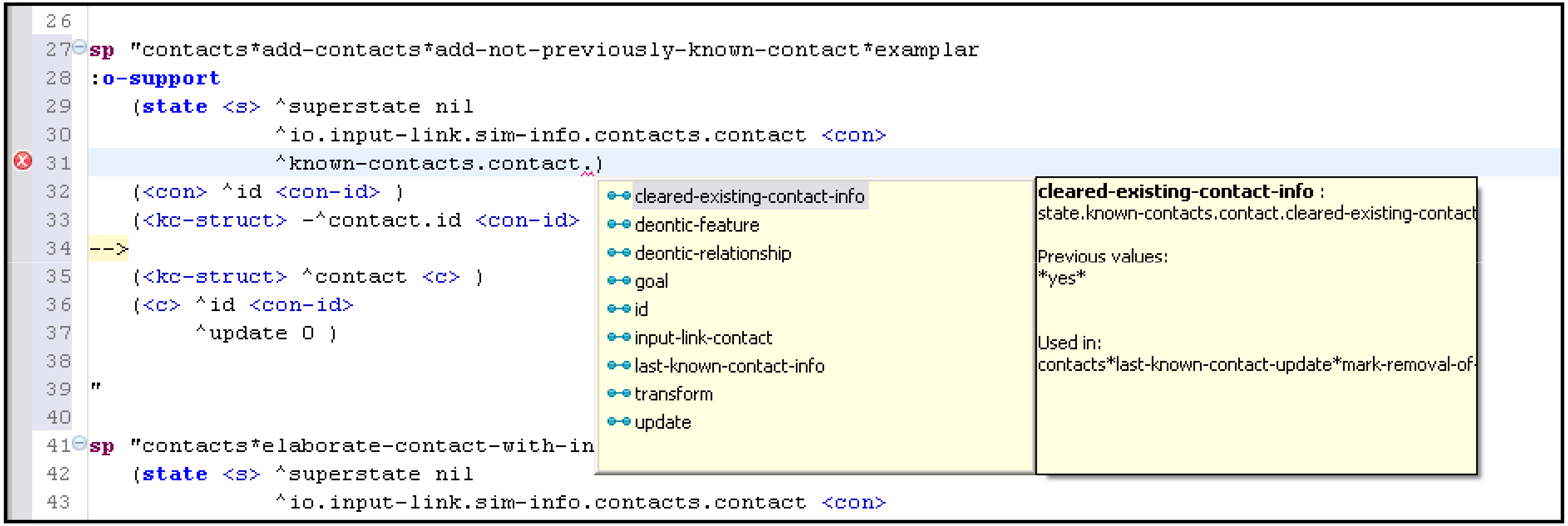
In folders:

soar-eclipse-examples

No consoles to display at this time.

An outline is not availa

Feature: Code Completion



```
sp "contacts*add-contacts*add-not-previously-known-contact*examplar
:o-support
   (state <s> ^superstate nil
              ^io.input-link.sim-info.contacts.contact <con>
              ^known-contacts.contact.)
   (<con> ^id <con-id> )
   (<kc-struct> -^contact.id <con-id>
-->
   (<kc-struct> ^contact <c> )
   (<c> ^id <con-id>
        ^update 0 )

"

sp "contacts*elaborate-contact-with-in
   (state <s> ^superstate nil
              ^io.input-link.sim-info.contacts.contact <con>
```

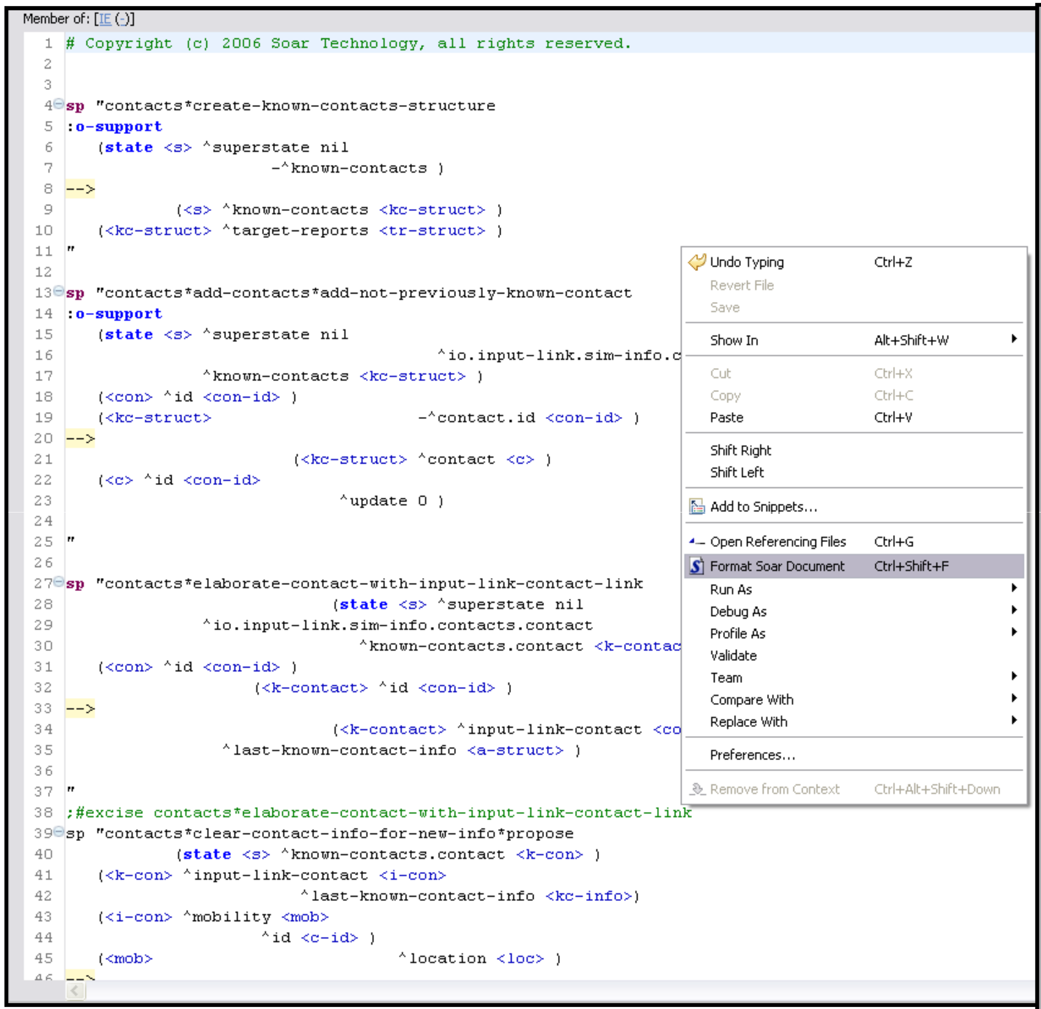
- cleared-existing-contact-info
- deontic-feature
- deontic-relationship
- goal
- id
- input-link-contact
- last-known-contact-info
- transform
- update

cleared-existing-contact-info :
state.known-contacts.contact.cleared-existing-contact

Previous values:
yes

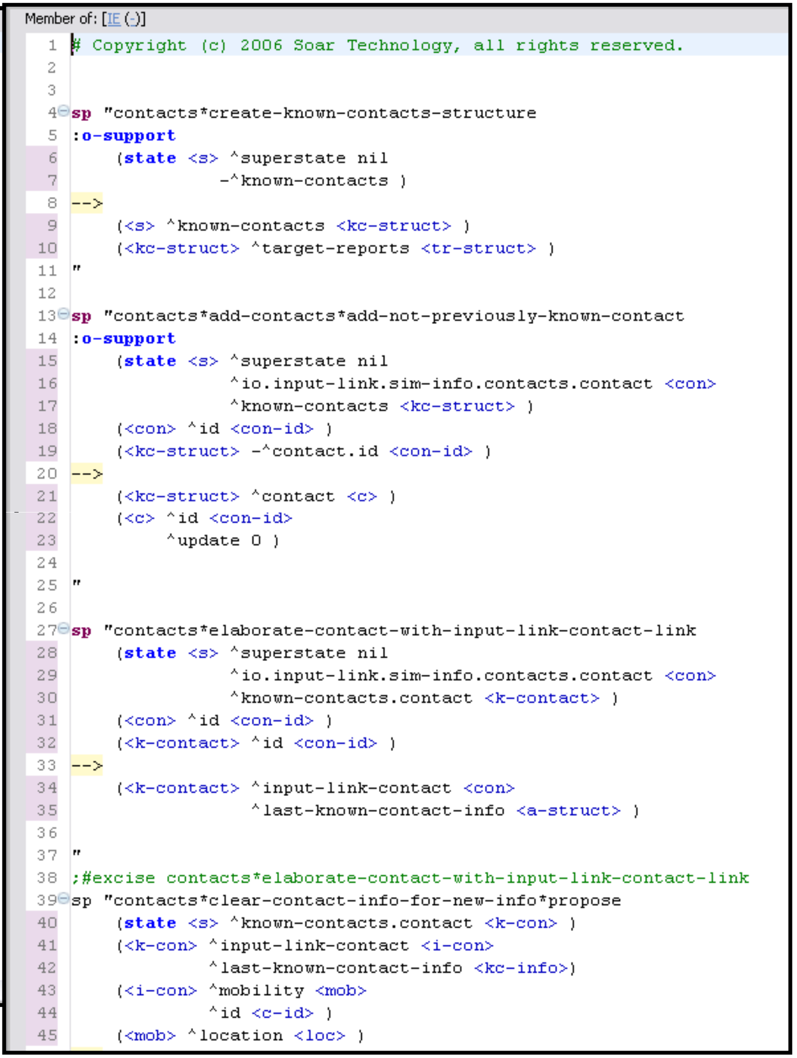
Used in:
contacts*last-known-contact-update*mark-removal-of-

Feature: Code Formatting



Member of: [IE (-)]

```
# Copyright (c) 2006 Soar Technology, all rights reserved.


sp "contacts*create-known-contacts-structure
:o-support
   (state <s> ^superstate nil
                     -^known-contacts )
-->
           (<s> ^known-contacts <kc-struct> )
   (<kc-struct> ^target-reports <tr-struct> )
"

sp "contacts*add-contacts*add-not-previously-known-contact
:o-support
   (state <s> ^superstate nil
                                      ^io.input-link.sim-info.c
              ^known-contacts <kc-struct> )
   (<con> ^id <con-id> )
   (<kc-struct>                     -^contact.id <con-id> )
-->
                       (<kc-struct> ^contact <c> )
   (<c> ^id <con-id>
                            ^update 0 )

"

sp "contacts*elaborate-contact-with-input-link-contact-link
                           (state <s> ^superstate nil
              ^io.input-link.sim-info.contacts.contact
                              ^known-contacts.contact <k-contac
   (<con> ^id <con-id> )
                   (<k-contact> ^id <con-id> )
-->
                           (<k-contact> ^input-link-contact <co
                ^last-known-contact-info <a-struct> )

"
;#excise contacts*elaborate-contact-with-input-link-contact-link
sp "contacts*clear-contact-info-for-new-info*propose
           (state <s> ^known-contacts.contact <k-con> )
   (<k-con> ^input-link-contact <i-con>
                        ^last-known-contact-info <kc-info>)
   (<i-con> ^mobility <mob>
                    ^id <c-id> )
   (<mob>                         ^location <loc> )
-->
```

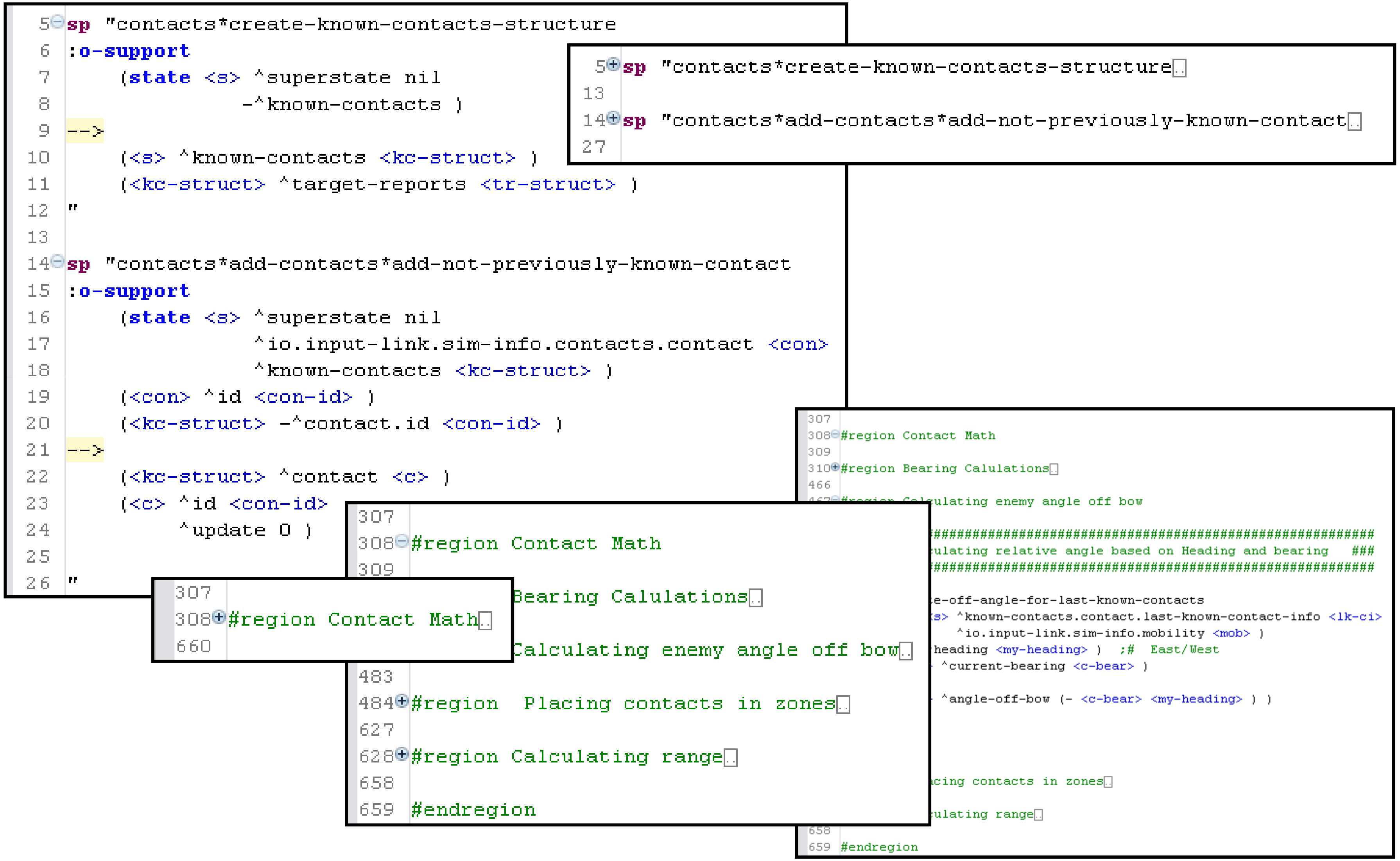


Member of: [IE (-)]

```
# Copyright (c) 2006 Soar Technology, all rights reserved.


sp "contacts*create-known-contacts-structure
:o-support
    (state <s> ^superstate nil
              -^known-contacts )
-->
    (<s> ^known-contacts <kc-struct> )
    (<kc-struct> ^target-reports <tr-struct> )
"

sp "contacts*add-contacts*add-not-previously-known-contact
:o-support
    (state <s> ^superstate nil
               ^io.input-link.sim-info.contacts.contact <con>
               ^known-contacts <kc-struct> )
    (<con> ^id <con-id> )
    (<kc-struct> -^contact.id <con-id> )
-->
    (<kc-struct> ^contact <c> )
    (<c> ^id <con-id>
         ^update 0 )

"

sp "contacts*elaborate-contact-with-input-link-contact-link
    (state <s> ^superstate nil
               ^io.input-link.sim-info.contacts.contact <con>
               ^known-contacts.contact <k-contact> )
    (<con> ^id <con-id> )
    (<k-contact> ^id <con-id> )
-->
    (<k-contact> ^input-link-contact <con>
                 ^last-known-contact-info <a-struct> )

"
;#excise contacts*elaborate-contact-with-input-link-contact-link
sp "contacts*clear-contact-info-for-new-info*propose
    (state <s> ^known-contacts.contact <k-con> )
    (<k-con> ^input-link-contact <i-con>
             ^last-known-contact-info <kc-info>)
    (<i-con> ^mobility <mob>
             ^id <c-id> )
    (<mob> ^location <loc> )
```

Soar Technology
Thinking *inside* the box.

Feature: Code Folding (and regions!)



```
sp "contacts*create-known-contacts-structure
:o-support
    (state <s> ^superstate nil
               -^known-contacts )
-->
    (<s> ^known-contacts <kc-struct> )
    (<kc-struct> ^target-reports <tr-struct> )
"

sp "contacts*add-contacts*add-not-previously-known-contact
:o-support
    (state <s> ^superstate nil
               ^io.input-link.sim-info.contacts.contact <con>
               ^known-contacts <kc-struct> )
    (<con> ^id <con-id> )
    (<kc-struct> -^contact.id <con-id> )
-->
    (<kc-struct> ^contact <c> )
    (<c> ^id <con-id>
         ^update 0 )

"
```

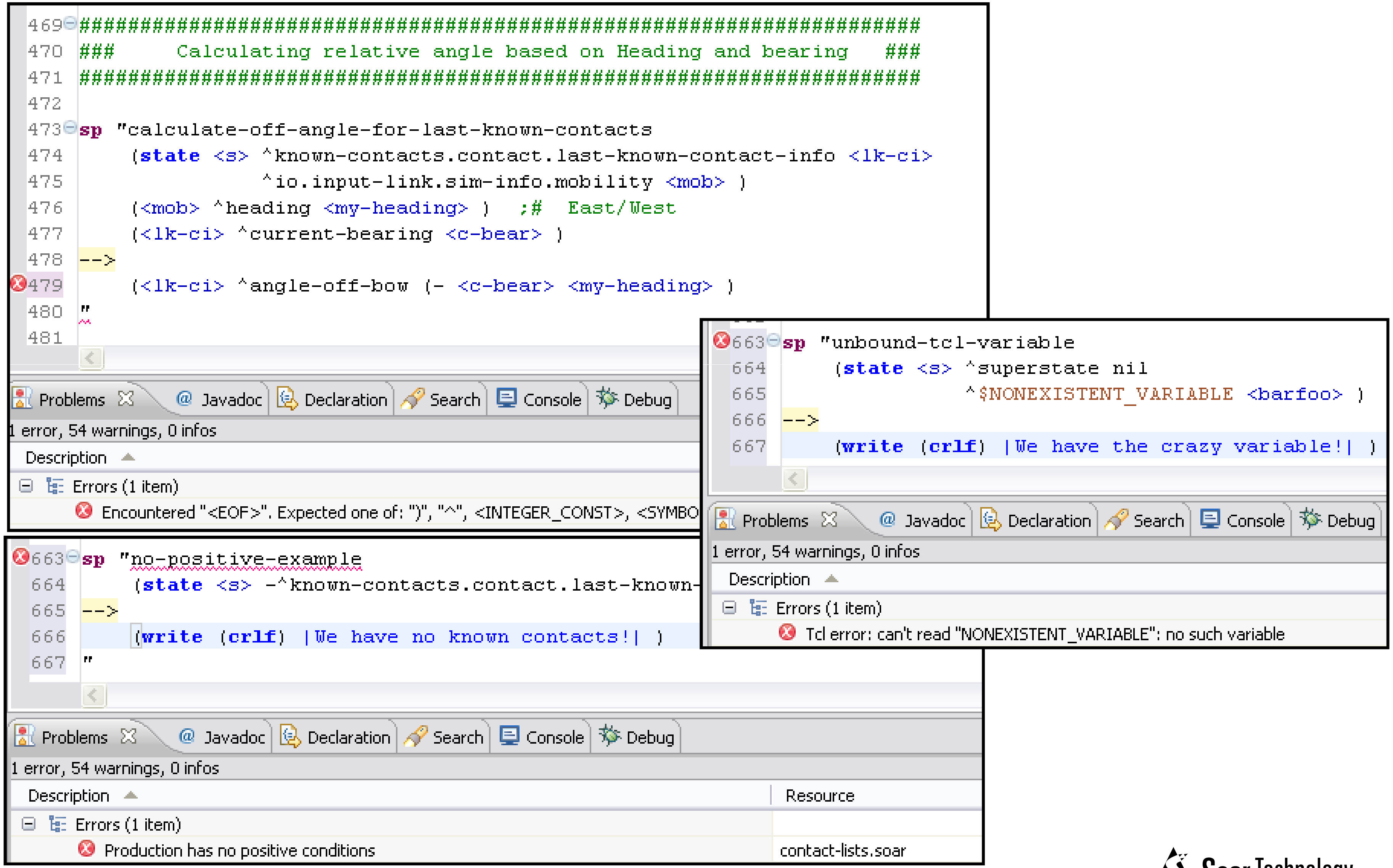
```
sp "contacts*create-known-contacts-structure[..]

sp "contacts*add-contacts*add-not-previously-known-contact[..]

```

```

#region Contact Math[..]

```

```

#region Contact Math

Bearing Calulations[..]

Calculating enemy angle off bow[..]


#region  Placing contacts in zones[..]

#region Calculating range[..]

#endregion
```

```

#region Contact Math

#region Bearing Calulations[..]

#region Calculating enemy angle off bow

###############################################################
ulating relative angle based on Heading and bearing    ###
###############################################################

e-off-angle-for-last-known-contacts
s> ^known-contacts.contact.last-known-contact-info <lk-ci>
    ^io.input-link.sim-info.mobility <mob> )
heading <my-heading> )  ;#  East/West
 ^current-bearing <c-bear> )

 ^angle-off-bow (- <c-bear> <my-heading> ) )



cing contacts in zones[..]

ulating range[..]

#endregion
```

Code Feature: Error Detection



```
######################################################################
###      Calculating relative angle based on Heading and bearing    ###
######################################################################

sp "calculate-off-angle-for-last-known-contacts
    (state <s> ^known-contacts.contact.last-known-contact-info <lk-ci>
               ^io.input-link.sim-info.mobility <mob> )
    (<mob> ^heading <my-heading> )   ;#  East/West
    (<lk-ci> ^current-bearing <c-bear> )
-->
    (<lk-ci> ^angle-off-bow (- <c-bear> <my-heading> )
"

```

1 error, 54 warnings, 0 infos

Description

Errors (1 item)

Encountered "<EOF>". Expected one of: ")", "^", <INTEGER_CONST>, <SYMBO

```
sp "unbound-tcl-variable
    (state <s> ^superstate nil
               ^$NONEXISTENT_VARIABLE <barfoo> )
-->
    (write (crlf) |We have the crazy variable!| )
```

1 error, 54 warnings, 0 infos

Description

Errors (1 item)

Tcl error: can't read "NONEXISTENT_VARIABLE": no such variable

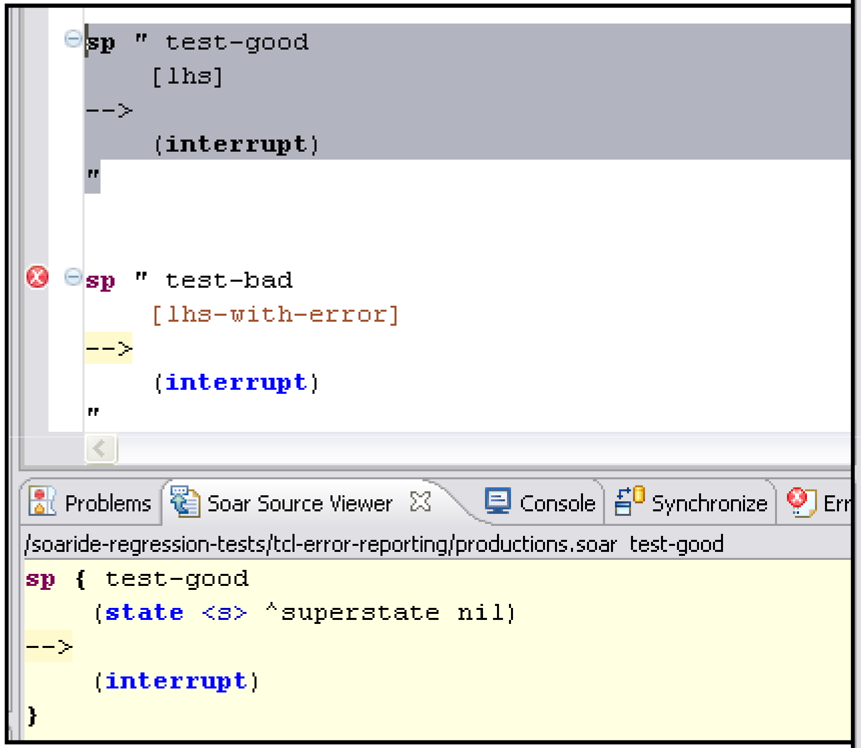
```
sp "no-positive-example
    (state <s> -^known-contacts.contact.last-known-
-->
    (write (crlf) |We have no known contacts!| )
"
```

1 error, 54 warnings, 0 infos

Description	Resource
Errors (1 item)	
Production has no positive conditions	contact-lists.soar

VERSION 1.1 FEATURES

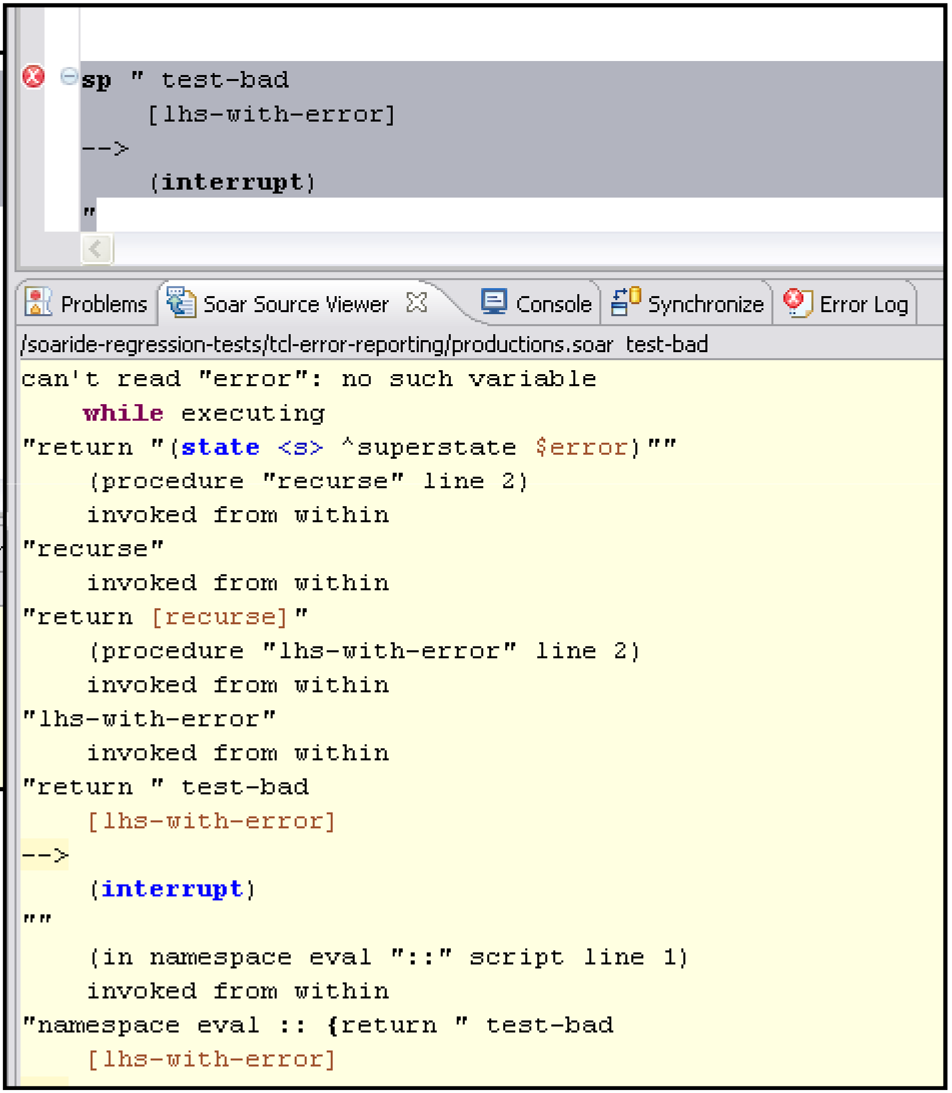
Improved Tcl error reporting



```
sp " test-good
    [lhs]
-->
    (interrupt)
"


sp " test-bad
    [lhs-with-error]
-->
    (interrupt)
"
```

/soaride-regression-tests/tcl-error-reporting/productions.soar test-good

```
sp { test-good
    (state <s> ^superstate nil)
-->
    (interrupt)
}
```

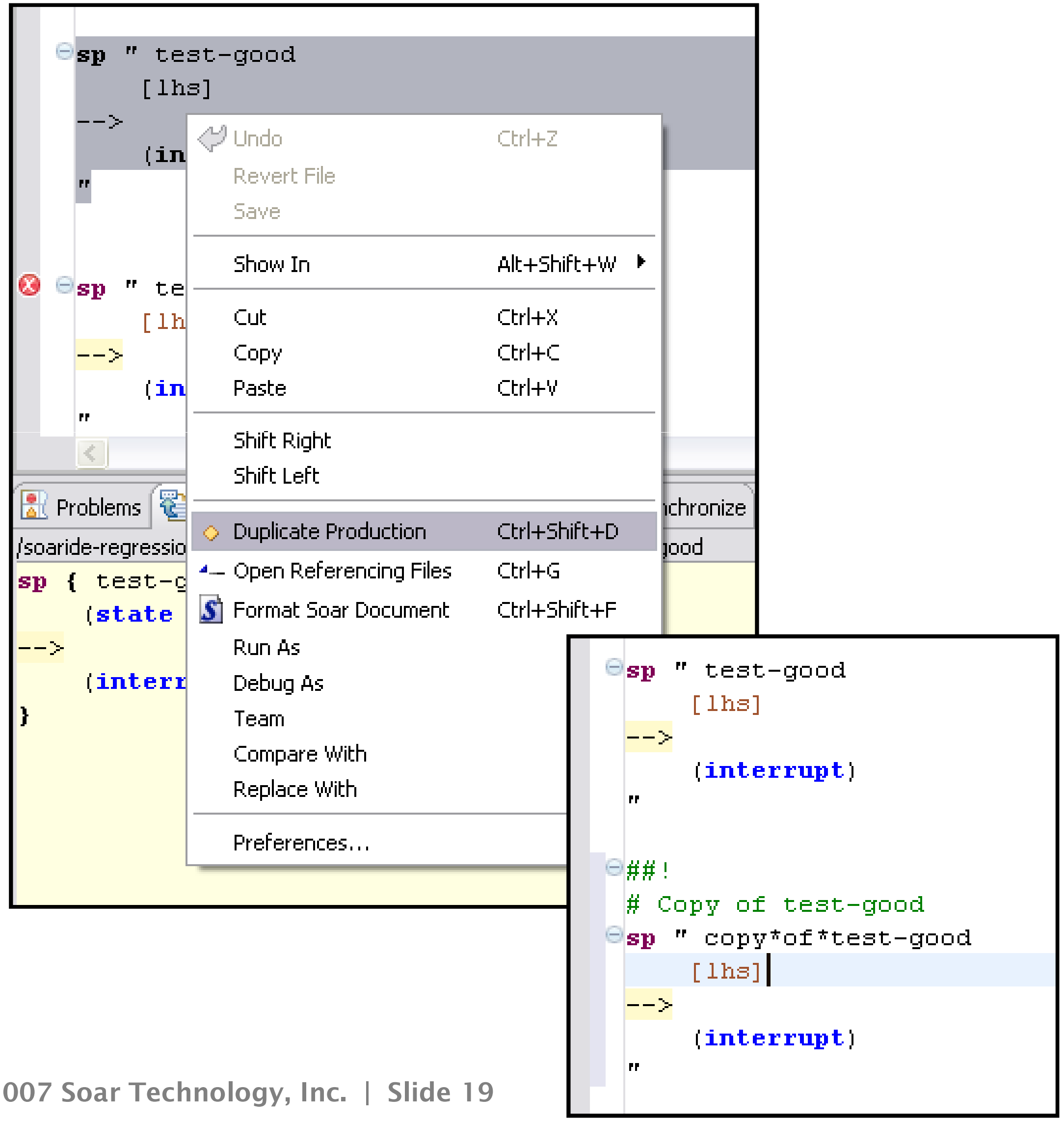


```
sp " test-bad
    [lhs-with-error]
-->
    (interrupt)
"
```

/soaride-regression-tests/tcl-error-reporting/productions.soar test-bad

```
can't read "error": no such variable
    while executing
"return "(state <s> ^superstate $error)""
    (procedure "recurse" line 2)
    invoked from within
"recurse"
    invoked from within
"return [recurse]"
    (procedure "lhs-with-error" line 2)
    invoked from within
"lhs-with-error"
    invoked from within
"return " test-bad
    [lhs-with-error]
-->
    (interrupt)
""
    (in namespace eval "::" script line 1)
    invoked from within
"namespace eval :: {return " test-bad
    [lhs-with-error]
```

Simple refactoring support – duplication support

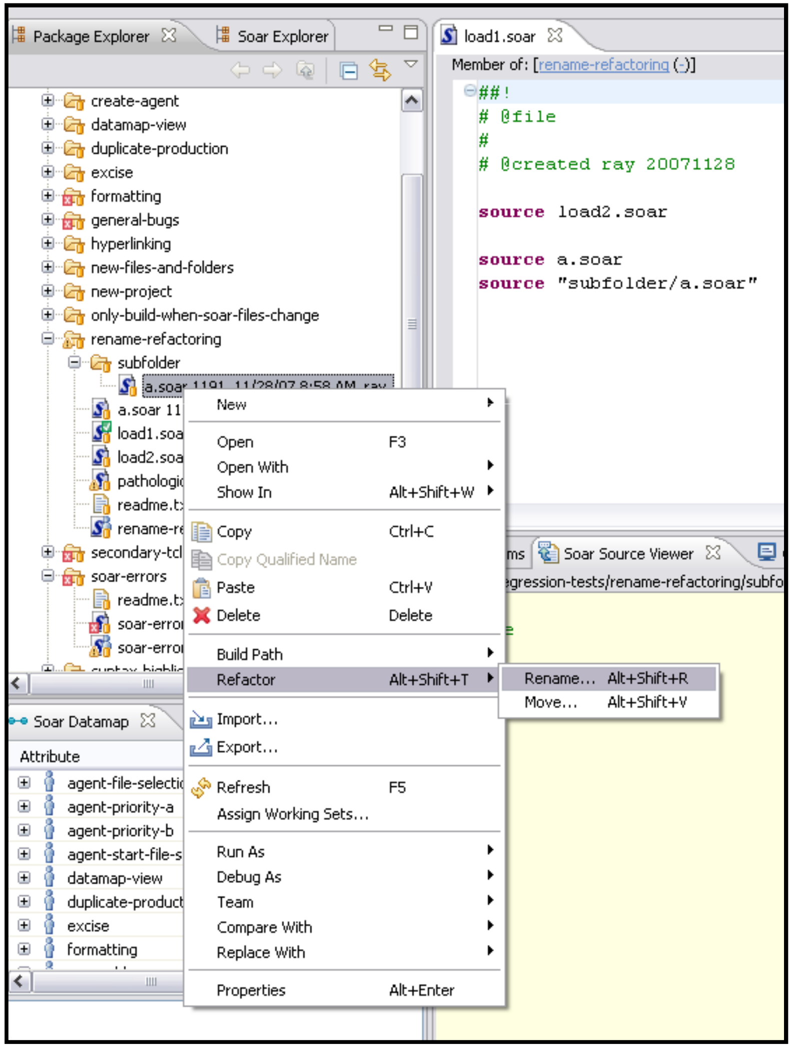


```
sp " test-good
    [lhs]
-->
    (in
"

sp " te
    [lh
-->
    (in
"
```

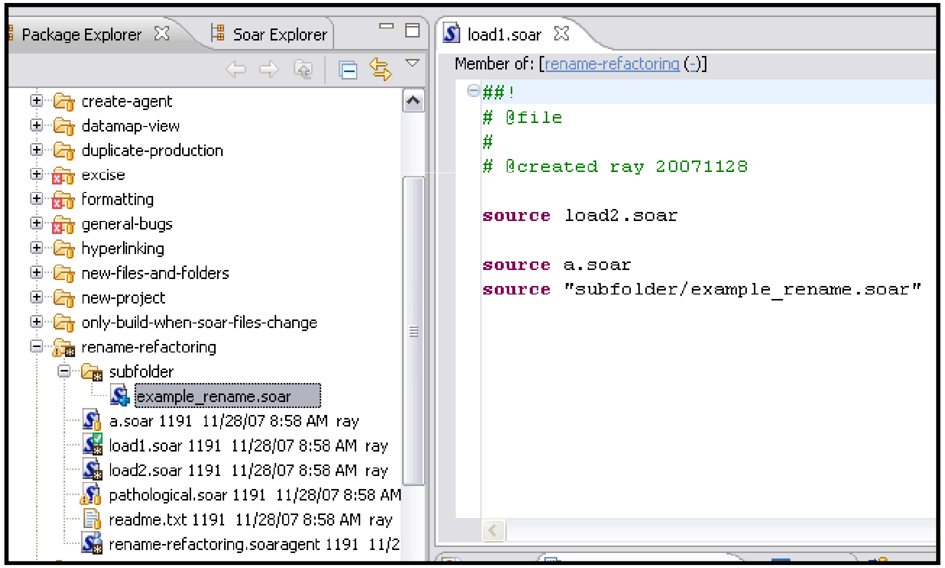
```
sp { test-g
    (state
-->
    (interr
}
```

```
sp " test-good
    [lhs]
-->
    (interrupt)
"

##!
# Copy of test-good
sp " copy*of*test-good
    [lhs]
-->
    (interrupt)
"
```

Simple refactoring support – automatic renaming



```
##!
# @file
#
# @created ray 20071128

source load2.soar

source a.soar
source "subfolder/a.soar"
```

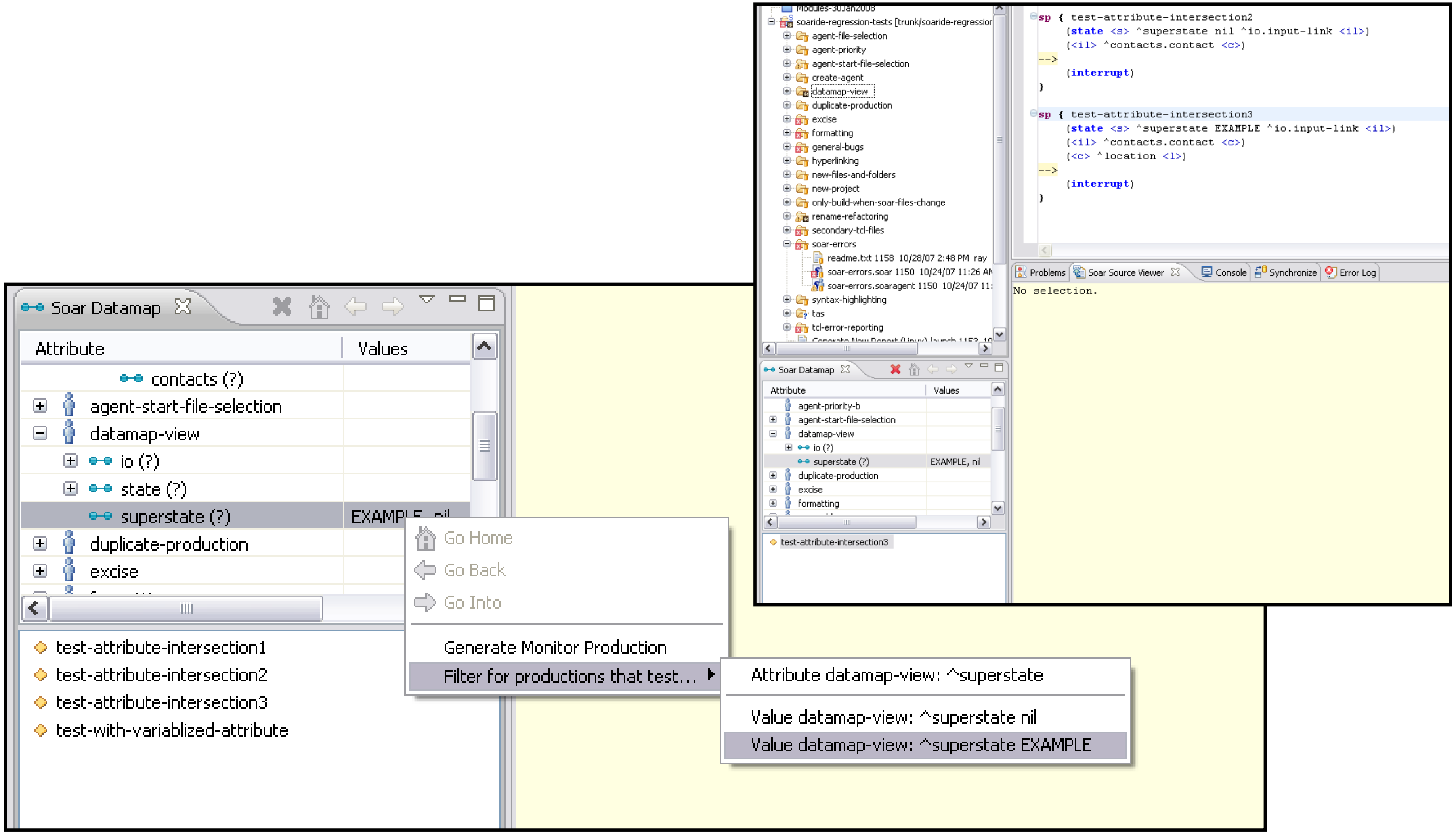


Package Explorer
Soar Explorer
load1.soar
Member of: [rename-refactoring (-)]
create-agent
datamap-view
duplicate-production
excise
formatting
general-bugs
hyperlinking
new-files-and-folders
new-project
only-build-when-soar-files-change
rename-refactoring
subfolder
example_rename.soar
a.soar 1191 11/28/07 8:58 AM ray
load1.soar 1191 11/28/07 8:58 AM ray
load2.soar 1191 11/28/07 8:58 AM ray
pathological.soar 1191 11/28/07 8:58 AM
readme.txt 1191 11/28/07 8:58 AM ray
rename-refactoring.soaragent 1191 11/2

```
##!
# @file
#
# @created ray 20071128

source load2.soar

source a.soar
source "subfolder/example_rename.soar"
```

Soar Technology
Thinking *inside* the box.

Filterable datamap display



```
sp { test-attribute-intersection2
    (state <s> ^superstate nil ^io.input-link <il>)
    (<il> ^contacts.contact <c>)
-->
    (interrupt)
}

sp { test-attribute-intersection3
    (state <s> ^superstate EXAMPLE ^io.input-link <il>)
    (<il> ^contacts.contact <c>)
    (<c> ^location <l>)
-->
    (interrupt)
}
```

No selection.

Attribute	Values
contacts (?)	
agent-start-file-selection	
datamap-view	
io (?)	
state (?)	
superstate (?)	EXAMPLE, nil
duplicate-production	
excise	

- test-attribute-intersection1
- test-attribute-intersection2
- test-attribute-intersection3
- test-with-variablized-attribute

Attribute	Values
agent-priority-b	
agent-start-file-selection	
datamap-view	
io (?)	
superstate (?)	EXAMPLE, nil
duplicate-production	
excise	
formatting	

- test-attribute-intersection3

Soar Datamap
Go Home
Go Back
Go Into
Generate Monitor Production
Filter for productions that test...
Attribute datamap-view: ^superstate
Value datamap-view: ^superstate nil
Value datamap-view: ^superstate EXAMPLE
Modules-30Jan2008
soaride-regression-tests [trunk/soaride-regressior
agent-file-selection
agent-priority
agent-start-file-selection
create-agent
datamap-view
duplicate-production
excise
formatting
general-bugs
hyperlinking
new-files-and-folders
new-project
only-build-when-soar-files-change
rename-refactoring
secondary-tcl-files
soar-errors
readme.txt 1158 10/28/07 2:48 PM ray
soar-errors.soar 1150 10/24/07 11:26 AM
soar-errors.soaragent 1150 10/24/07 11:
syntax-highlighting
tas
tcl-error-reporting
Problems
Soar Source Viewer
Console
Synchronize
Error Log

Soar Technology
Thinking *inside* the box.

QUESTIONS?

For more information…

- Webpage: http://www.soartech.com/downloads.soar-ide.php
- Listserv: http://webmail.soartech.com/mailman/listinfo/soar-ide
  soar-ide@soartech.com
- Contacts: {knudsen, ray, gmorgan} @soartech.com

BACKUP SLIDES

Soar Editors and Development Environments

- A (very incomplete) list of development support tools for Soar …

TAQL (5?) CMU, 1989	High-level language and toolset for Soar development	Operator templates
Soar Development Environment (6) UM, 1995	Emacs-based editor & debugger	Integrated editing and debugging; leveraged power of Emacs
TSI (7, 8) UM, 1998	Tcl/Tk-based debugging	Command macros; GUI-based commands
viSoar (7, 8?) Portsmouth, 1999	GUI-based editing environment	Early approach to datamap; explicit support for teamwork/STEAM
Visual Soar (8) UM, 2000	Full-featured editor * Prototype integration with Eclipse	Explicit support for ONC hierarchy idiom; datamap
HLBRL (8) PSU	High-level language and toolset for generation/creation of Soar programs	Explicit support for explanation,
Soar IDE (8) Soar Tech	Eclipse-based editor (Future debugging environment)	THIS TALK ☺

"Building application domains creates a community with a large investment in ease of use, and hence with a willingness to expend the effort to make the tools to make [supporting and invigorating a theory] happen."

[Newell, *UTC*]

How is Soar IDE different from Visual Soar?

- Soar IDE benefits from being an Eclipse plugin
  - Increasingly seems to be a significant advantage
  - 100s of features in Eclipse base
  - 1000s of features easily adopted from other Eclipse language plugins
- In-place TCL code expansion
  - Killer feature from SoarTech's perspective, but does anyone else use TCL for Soar anymore?
- No constraints on directory structure
  - Really useful for pulling in legacy code
- No constraints on UofM operator style
  - But also no benefits
- Dynamic datamap generated as you type
  - But…not partitioned by operator/problem space
  - Just a big representation of working memory. Still useful, but may be extended in the future to handle filtering by operator

Technical Hurdles

- Tcl parsing
  - Tcl is an extremely flexible language, difficult to find errors with just a basic parse.
  - A random block of Java code is probably valid Tcl :)
- Tcl expansion on the fly and how to present it to the user
  - Previous experience with integrating Tcl with SML made this less painful.
- Creating a parser that gives useful error information
  - File/line/column style error reports are ok for command-line tools
  - Eclipse works much better when given character ranges. Allows for nice underlying of bugs.
- Significant modifications to Visual Soar parser
  - Errors reported as ranges rather than line/column
  - Parse production bodies individually. Essential for parsing results of Tcl expansion.
- Performance
  - Cache parse information and other metadata (necessary for large projects like TacAirSoar)

First Impressions from Soar Programmers

- Eclipse learning curve is steep
  - … Because the environment is so rich. File histories, integrated CVS/Subversion access, visual diffs, maintenance of warnings and to-do’s, make it worth learning. And many people use Eclipse already.
- Soar IDE editing features are *outstanding*
  - Especially useful for larger projects,
  - Tcl-heavy projects, Integration projects (e.g., Java & Soar), and
  - projects with multiple developers (due to browsing features and integration w/ version control)
- Just starting to benefit from Dynamic Datamap
  - Soar developers really like it
  - Still learning how to best take advantage of it
  - Rich source of feature requests
- Could use tighter integration with Java Soar Debugger
  - Doug?