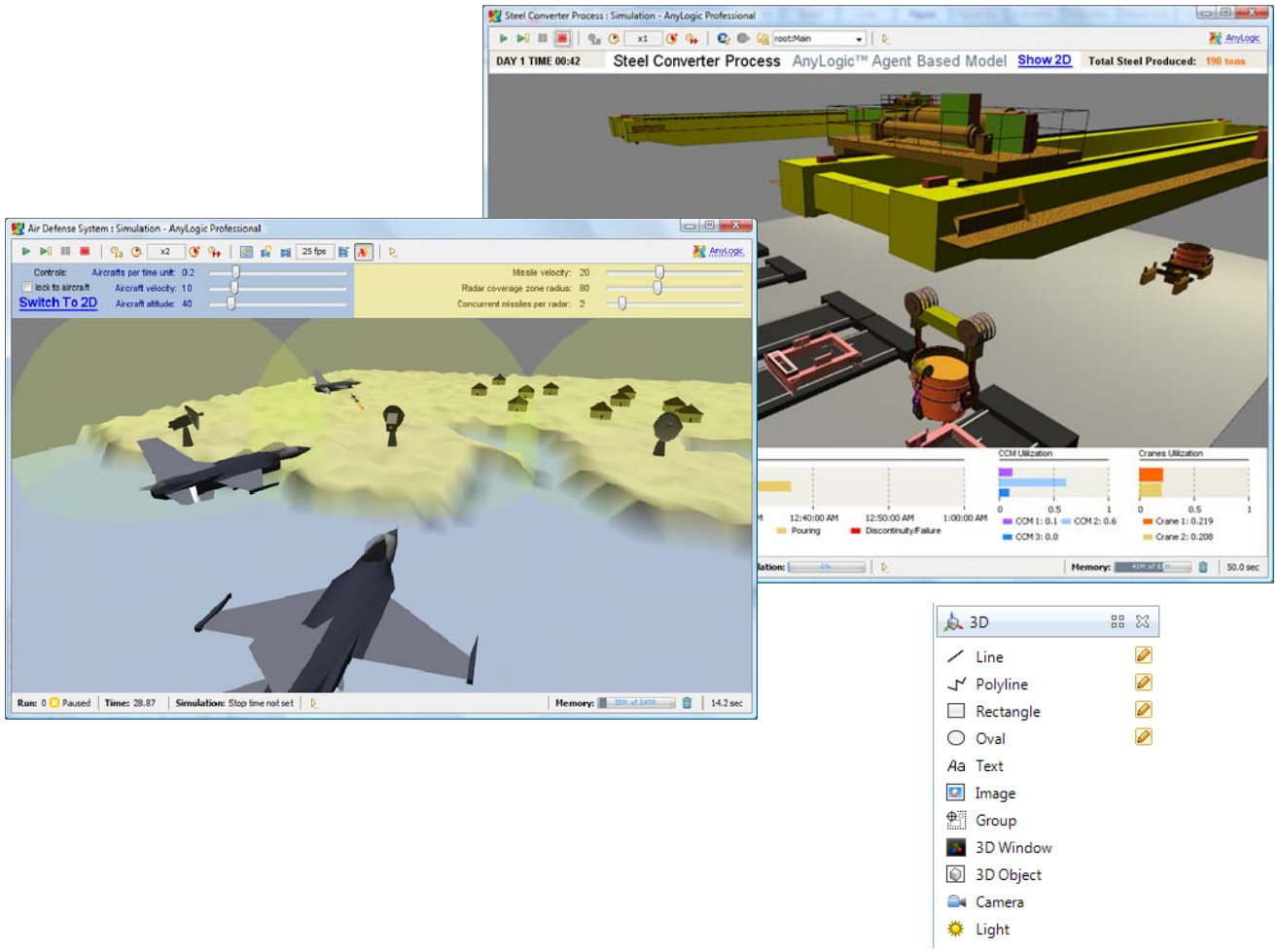
AnyLogic 6.5
New Features

3D animation

You are now able to create 3D animations for your AnyLogic models. The 3D animation framework is a natural extension of the 2D animation, so you do not need to learn a new technology to develop 3D models, and it is very easy to add the third dimension to the existing ones. You can have both 2D and 3D animation in one model, show them at the same time or switch between them. You can define several viewpoints (cameras) for a 3D scene and display them simultaneously from different perspectives.

Just as with 2D animation, the AnyLogic 3D animation is displayed as the model runs, i.e. it is not a recorded movie but a true reflection of the model dynamics. 3rd party 3D objects can be imported into AnyLogic and used as animations of your entities, resource units or agents.



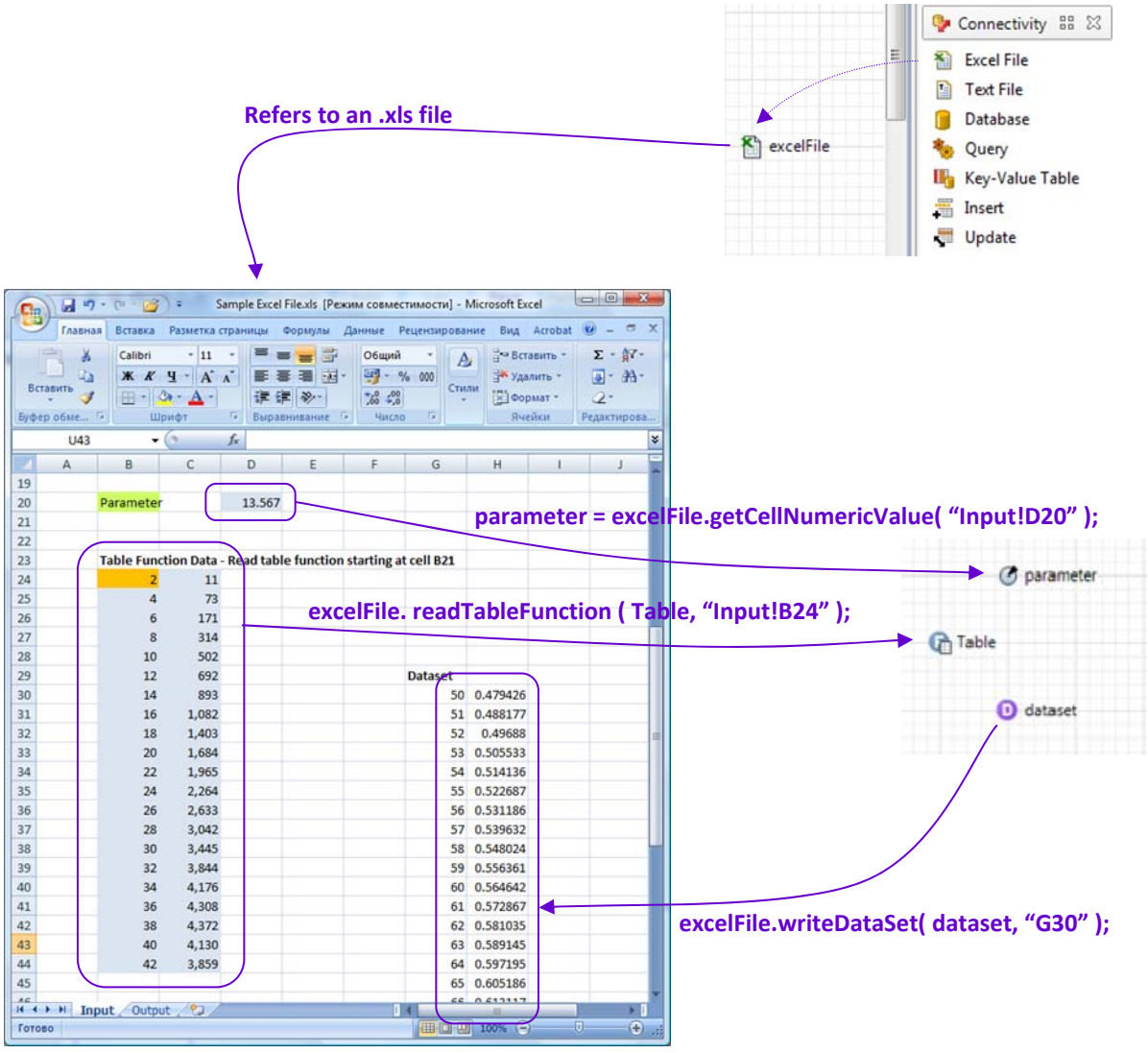
3D animations in AnyLogic models. A new 3D palette

Easy access to MS Excel files on all platforms

We've added a new object "**Excel File** "(available in the **Connectivity** palette) which provides easy access to MS Excel files from AnyLogic models on all platforms: Windows, Mac, Linux. The object supports Excel 1997-2007 file format (extension .xls). The new Excel File object allow you to:

- Read Excel files and explore their content
- Read individual cell values and formulas of different types
- Read AnyLogic table function contents
- Read AnyLogic 1D and 2D [hyper]arrays
- Create new cells
- Write to individual cells and change their type
- Write AnyLogic datasets to Excel spreadsheets
- Save modified spreadsheets

Some of the use cases with Excel File object can be found in the example model **Reading and Writing Excel Files** that can be found in the (also new) collection of **How to** models. See the next section for details!



Excel File object and examples of its API

"How to…" models and other materials to support learning

We have developed and included over **60** small models explaining how to use various elements and features of the AnyLogic modeling language. The techniques used in the models can be easily reproduced or copied into your own projects. These are some examples:

- A typical statechart for modeling purchasing behavior
- How to create a context-sensitive callout that is shown with a mouse click
- How to measure time in system for an entity in a discrete event model
- How to define an event that occurs when a system dynamics stock reaches a certain threshold

These models are available in the **Sample Models** section of the **Welcome** page.

The list of "How to" models in the Welcome page and "How to" articles in AnyLogic Help

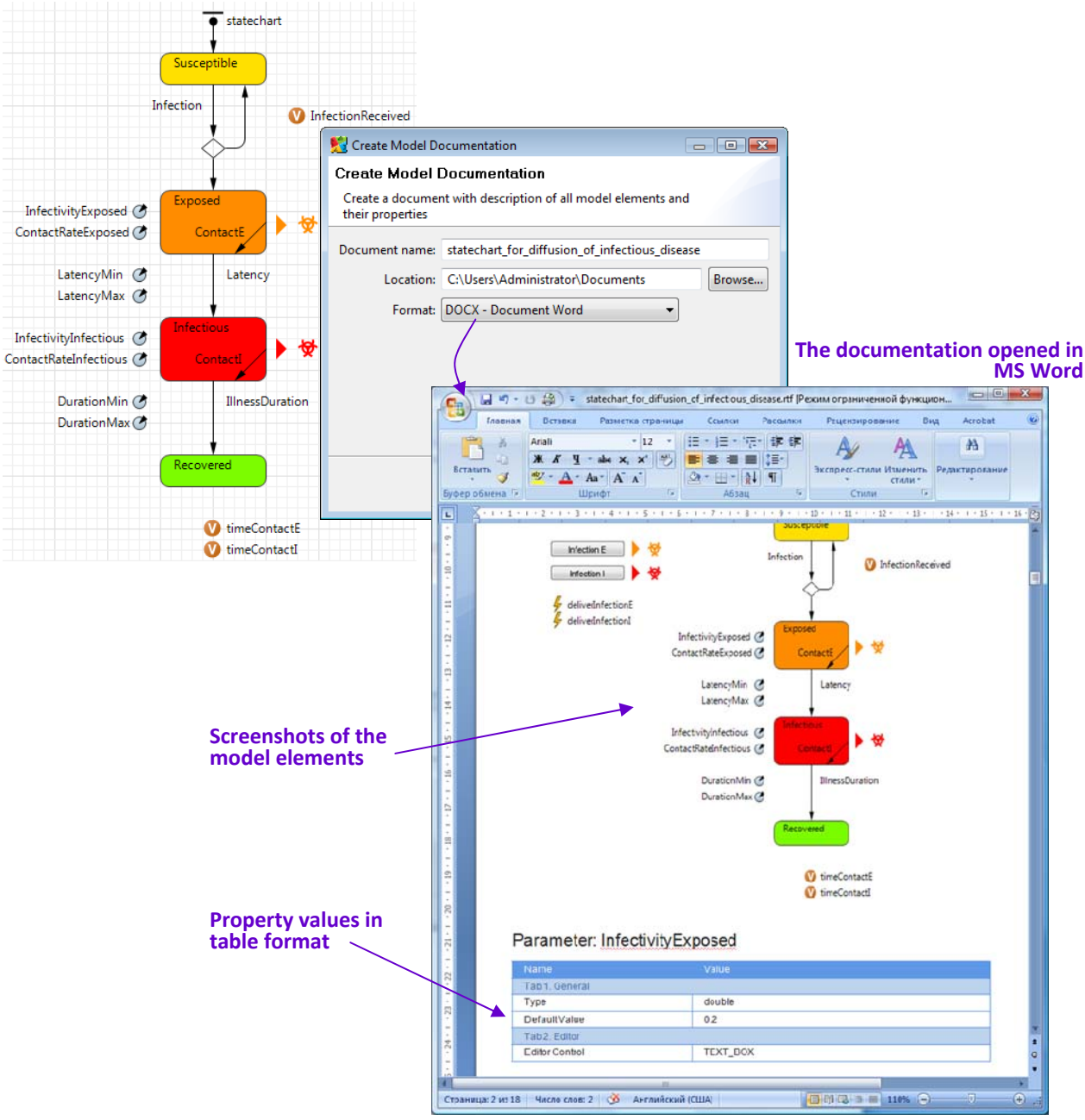
AnyLogic Help system now includes the F.A.Q. section with a large number of articles explaining how to achieve a certain effect/behavior in the model or how to resolve an issue. The articles were accumulated by our support team during several years of service for thousands of AnyLogic users. The F.A.Q. section is the first item under AnyLogic Help group (see the Figure).

AnyLogic 6.5 also includes all the system dynamics models from the definitive text on the subject "**Business Dynamics: Systems Thinking and Modeling for a Complex World**" by John Sterman, © 2000 McGraw-Hill.

Finally, there is a new tutorial on building a "**Combined Agent Based and System Dynamics Model**" and a new example **Exposure to Radiation** where an agent (a car) has to visit several locations near radiation emission areas, and its total exposure to radiation is calculated by a system dynamics stock and flow diagram.

One-click model documentation

AnyLogic can now automatically generate detailed model documentation which includes the complete structured information about all model elements: active objects, statecharts, flowcharts, events, graphics, etc. with their properties. The documentation is available in your choice of the most popular formats: PDF, DOCX, and HTML. It can be printed, attached to other documents, or published on the web. It's so easy to do, just select the model and choose **File | Create Documentation**.

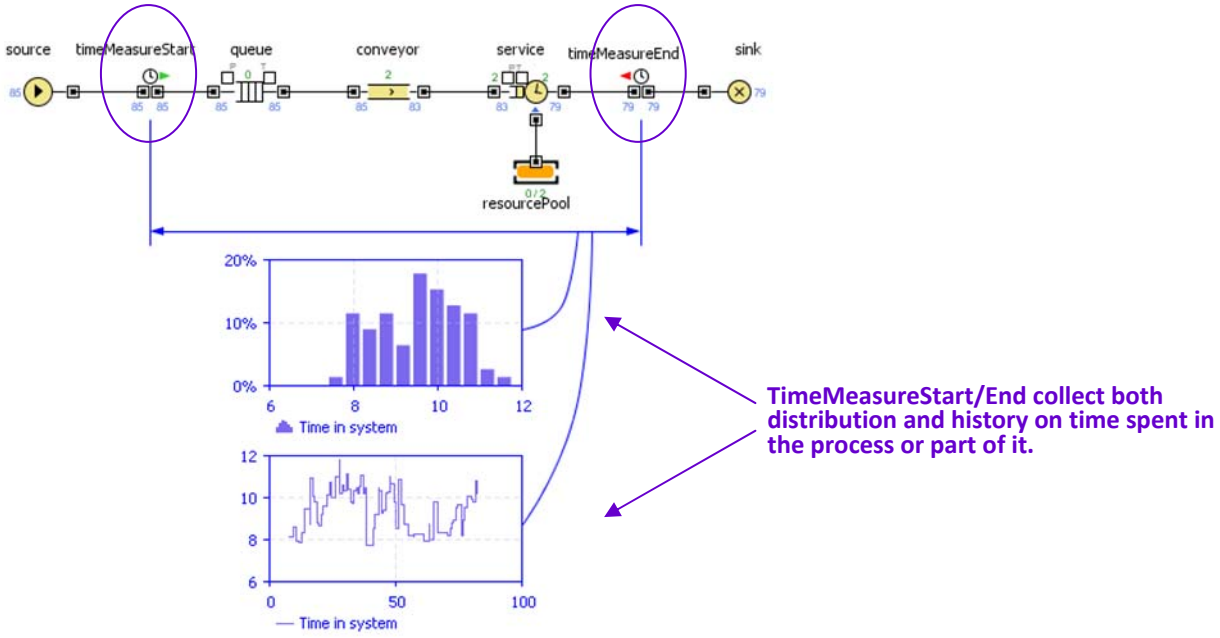


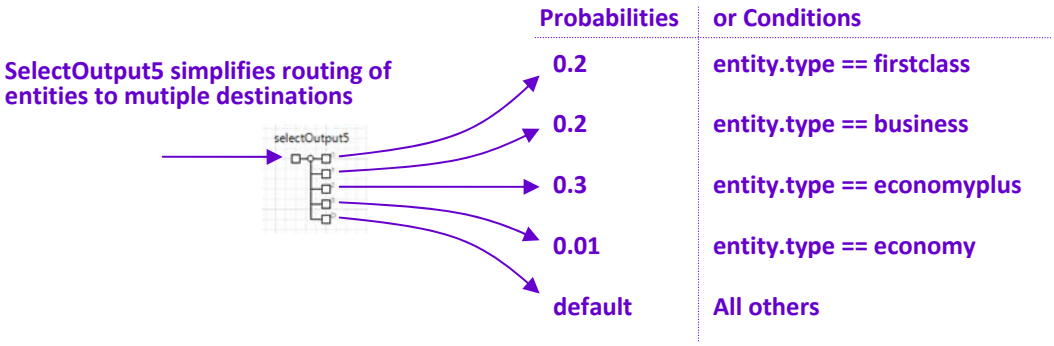
The documentation wizard and the generated .DOCX file opened in MS Word

In case you need to make just a screenshot of some particular model elements, you can simply select those elements in the graphical editor and copy them. In this case the image containing the selected elements is generated and copied into the Clipboard. You can easily paste it later into any other application as a bitmap image.

New objects and improvements in the Enterprise Library

There are new objects in the Enterprise Library: **SelectOutput5**, **TimeMeasureStart** and **TimeMeasureEnd**. **SelectOutput5** routes the incoming entities to one of the five output ports depending on (probabilistic or deterministic) conditions. The pair **TimeMeasureStart** / **TimeMeasureEnd** measure the time entities spend in the process flowchart between those objects, which can be "time in system", "length of stay", etc.





Examples of usage of TimeMeasureStart/End and SelectOutput5 objects

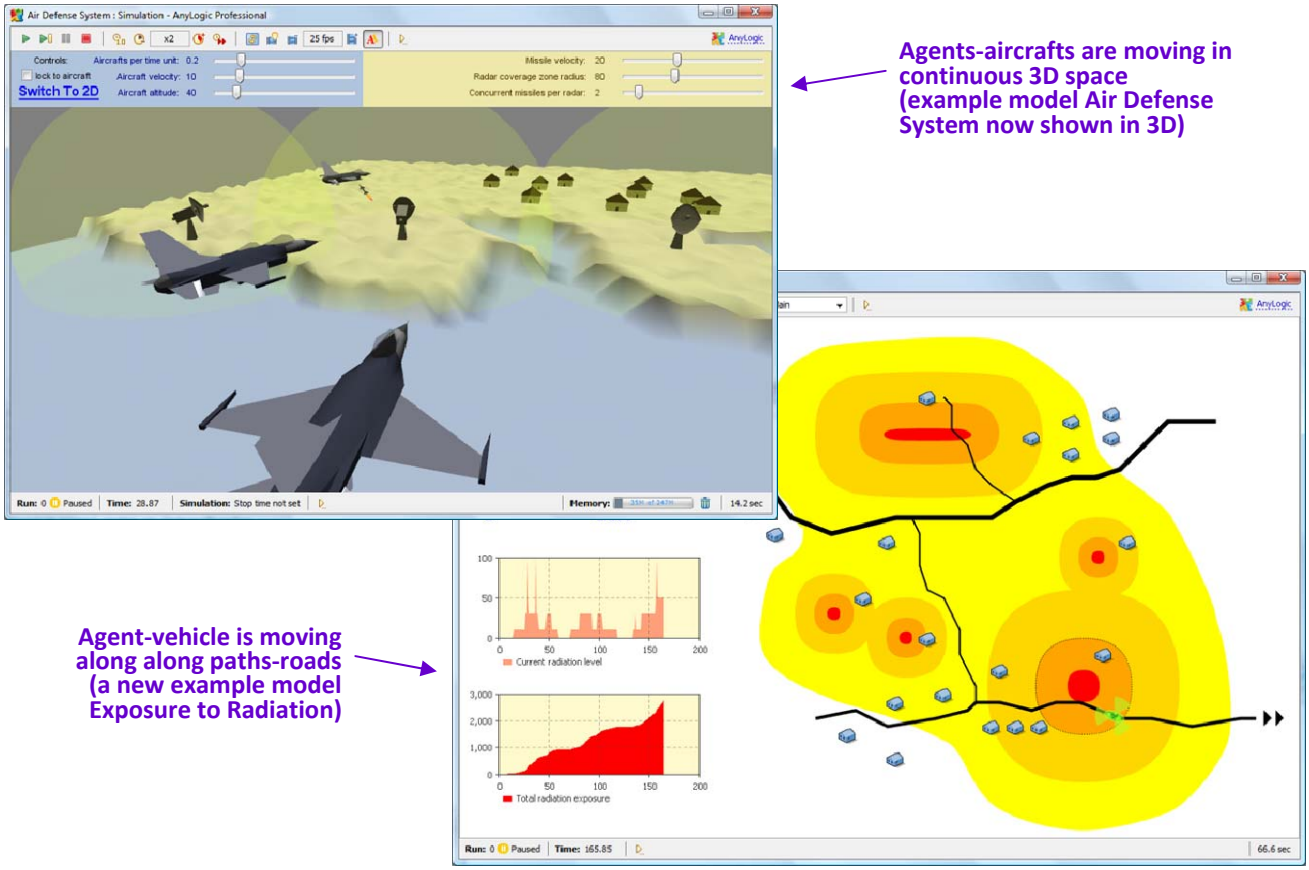
Entities and resources can now be animated in **3D space**: you can associate a 3D object with e.g. a customer, a truck, a doctor, etc. and let it move along a 3D path.

Finally, a minor improvement: we have added the method `getAbsPosition()` to the `Entity` and `ResourceUnit` classes. The method obtains the coordinates of the item's animation relative to the active object coordinate origin for both simple and network based animation. This can be used to develop complex animations or to detect mouse clicks over entities and resources (the latter is demonstrated in the example model **Detecting Mouse Clicks On Entities And Resources**, which you can find in the new collection of **How to** models).

New features to support agent based modeling

Now that AnyLogic now supports 3D animation we have develop a new space type for agents: **Continuous 3D** space. All space-related functionality such as movement, distance calculation, layout, etc. now supports three dimensions.

Please note that the space type defined in the agent should match the space type define in the agent environment. Please review your models.



Agents in 3D space and agents moving along paths

The behavior of agents is often defined in the form of statecharts, so the messages that are received by an agent should in many cases be routed to the agent's statecharts. Starting with version 6.5 this can be easily done by checking the appropriate checkboxes in the section **Forward message to** of the **Agent** page of the active object properties. The code field **On message received** can still be used.

Another similar improvement related to agents and statecharts is the new type of transition trigger: **Arrival**. The with this trigger type is activated when the agent arrives to the destination point after `moveTo()` has been called.

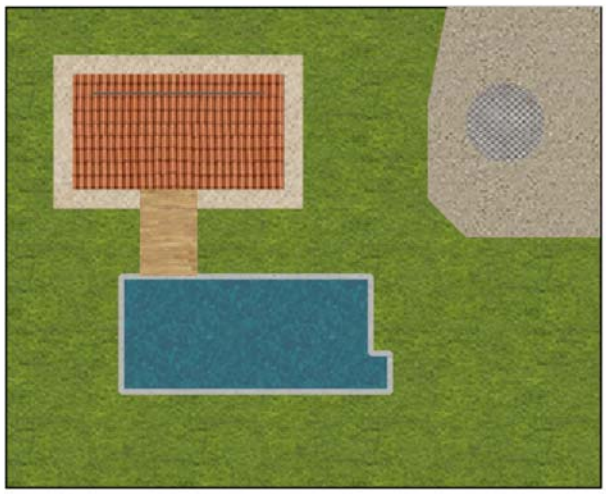
Since version 6.5 agents now move along a given 2D or 3D polyline. Two new methods have been added to the agent API:

```
moveTo( x, y, path2D )
moveTo( x, y, z, path3D )
```

If the origin and/or the destination point is not on the path, the agent moves to/from the path using the shortest route.

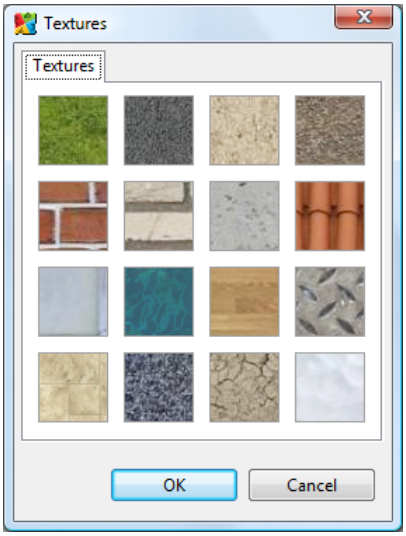
Support of textured surfaces for shapes

AnyLogic graphical shapes now support textured surfaces in addition to solid strokes and fills. The set of materials includes grass, sand, concrete, metal, brick, wood, carpet, water, etc. The materials can be used both in 2D and in 3D animation.



2D animation

3D animation

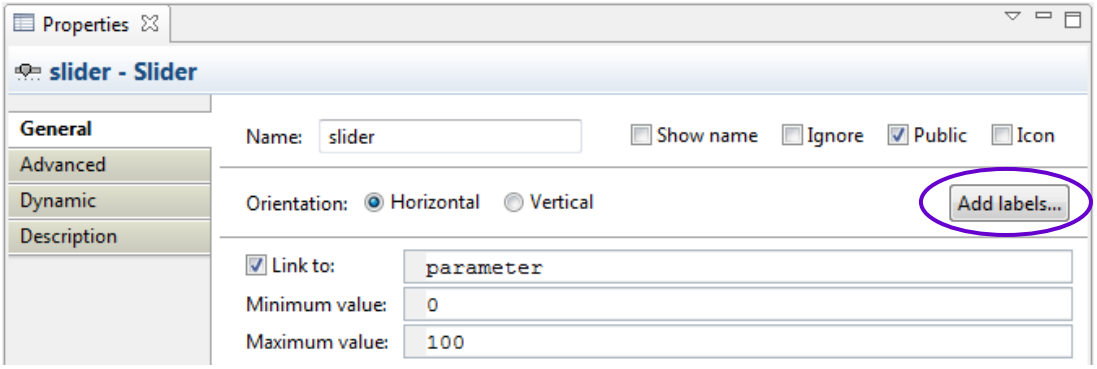


The textures palette

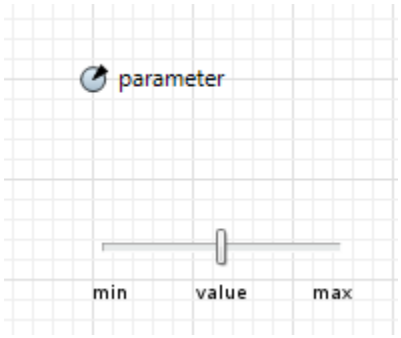
A sample scene created with standard shapes using textures

Auto labels for slider

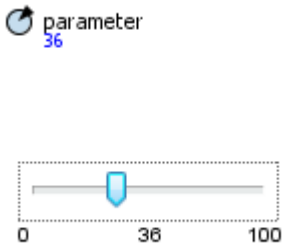
The new command **Add labels** available in the slider properties creates three text labels for the slider displaying its minimum, maximum and current values. These labels are automatically updated when the slider state changes at runtime. This feature can save you some development time. The labels are regular text shapes and can be modified or deleted if needed.



Design time



Run time



Slider labels created using Add labels command