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# SOX Security Feature Documentation

## TARA User Guide

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## ***Introduction***

Threat and Risk Analysis. The TARA module of SOX supports you in listing your security needs and assembling security reviews.

SOX provides the following norms and guidelines for determining the security level according to the level definitions from each respective norms.

- SAE J3061 (SAE)
- ISO/SAE 21434 (ISO)

You can work with different variants and operation statuses.

## Step-by-Step Guide

This guide leads you step-by-step through the creation of a Threat and Risk Analysis.

### Creating a new TARA file

*Precondition: A SOX project was created and the workbench perspective is active.*

1. Go to the Repository view and right-click on the TARA folder in the project.

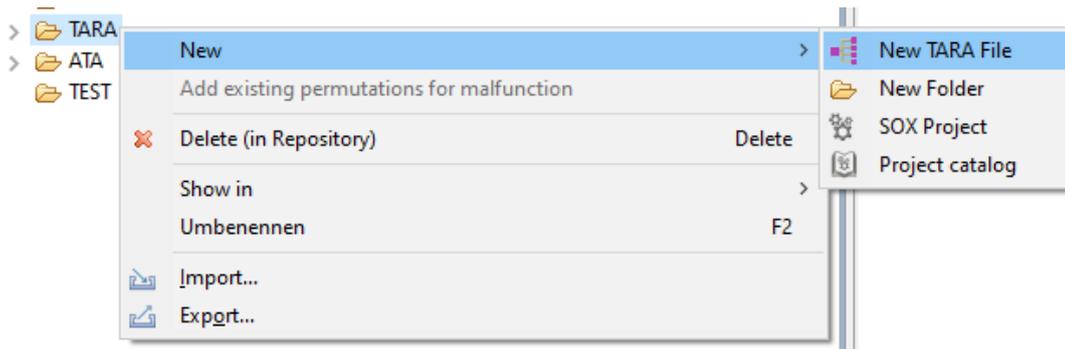


fig. 1 New TARA file context menu.

2. Choose New > New **TARA File**.

► The “New TARA file” dialog opens.

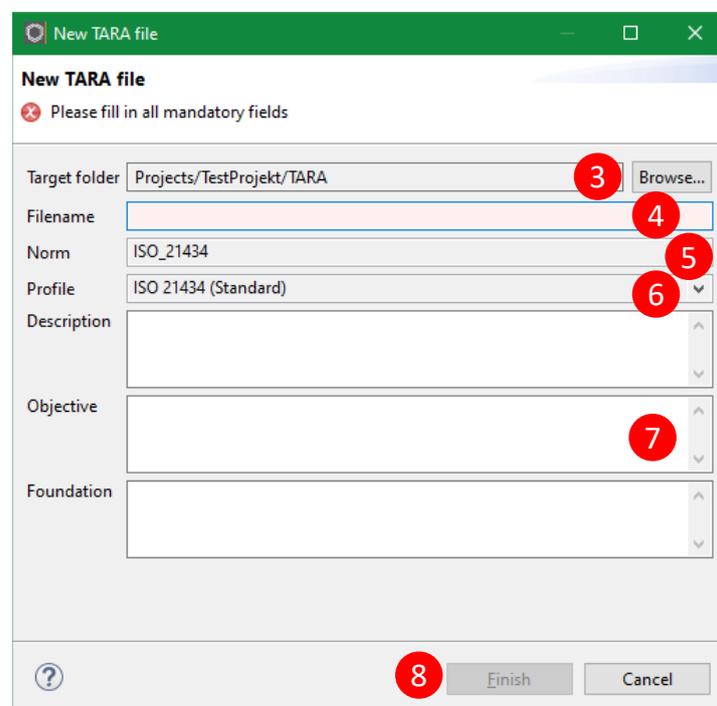


fig. 2 New TARA file dialog.

3. Click on **Browse...** and choose TARA as target folder.
4. Enter a filename for the TARA file.
5. Choose the security norm you want to create your TARA according to.
6. Choose the security profile.

▶ The Standard Security Profile is the implemented Profile from EnCo

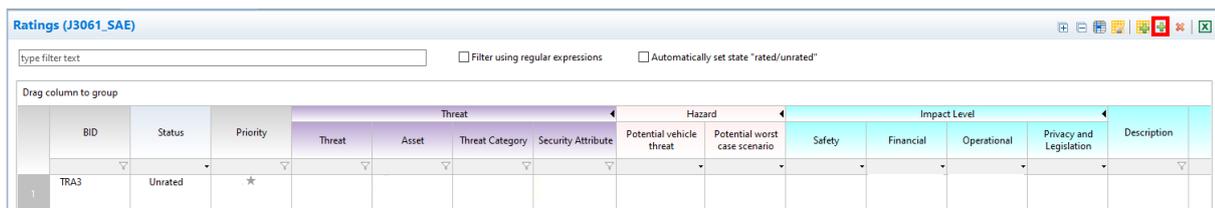
7. The Description, Objective and Foundation fields are optional and can be used for detailed descriptions of the TARA document.
8. Click on **Finish**.

→ A TARA file will be created and added to the TARA folder.

### Creating new Ratings

Before defining Threats and rate them, a new Rating row has to be created.

*Precondition: A TARA file was created and is active.*



BID	Status	Priority	Threat				Hazard		Impact Level				Description
			Threat	Asset	Threat Category	Security Attribute	Potential vehicle threat	Potential worst case scenario	Safety	Financial	Operational	Privacy and Legislation	
TRA3	Unrated	*											

*fig. 3 TARA editor tool bar add empty rating*

Add an empty Rating by clicking the plus icon at the TARA editor tool bar.

## Creating Threats

Threats can be created either directly in the TARA and in the Security Goal View.

*Precondition: A TARA file was created and is active.*

### Creating Threats directly in the TARA

The following steps are explaining how to create a Threat directly in the TARA.

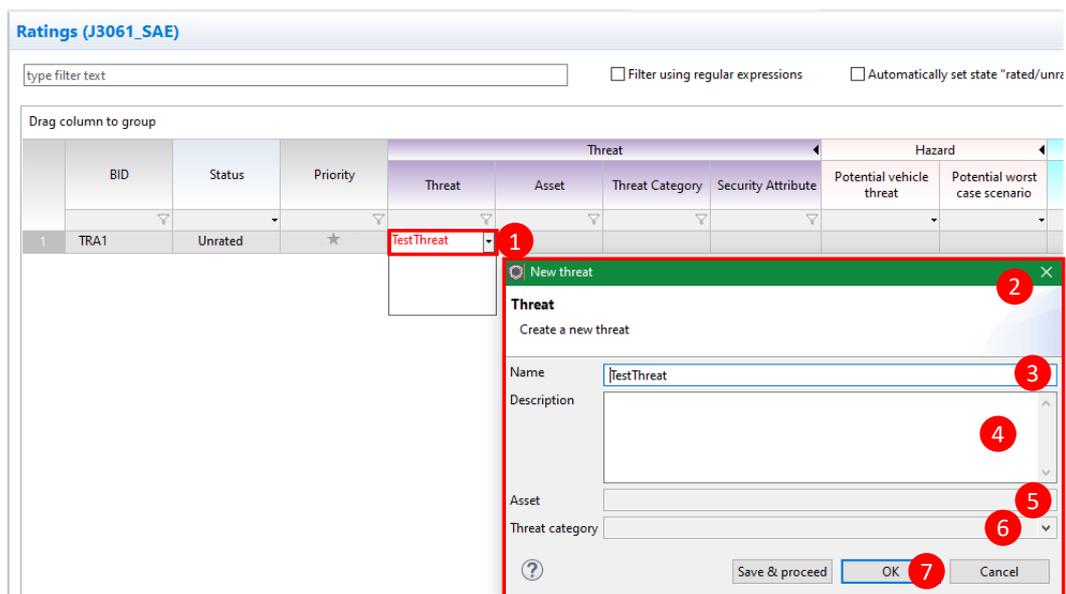


fig. 4 Defining Threats in TARA

1. Double Click on the Threat Cell and fill in the name of the Threat
  - ▶ Confirm the name of the Threat with Shortcut Ctrl + Return or with a click on a free space in the TARA
2. The “New Threat” dialog appears
3. The name of the Threat is automatically filled in
4. Add a Description (optionally)
5. Choose an Asset (if possible)
  - ▶ If Assets were identified before (e.g. in the System Modeler) than choose an Asset
  - ▶ If there are no Assets identified before, don’t choose an Asset and confirm the Threat
6. Select a Threat Category (regarding to STRIDE)
7. Confirm the Threat by clicking on “OK”

▶ A Threat was created with a Threat ID. The Threat is shown in the Security Goal View under the Security Goal “orphaned threats” because there is no Security Goal that is connected with the Threat.

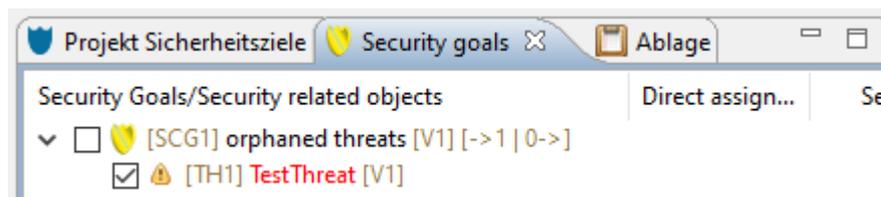


fig. 5 Threat assignment to Security Goal "orphaned threats"

## Creating Threats in Security Goal View

The following steps are explaining how to create a Threat in the Security Goal View.

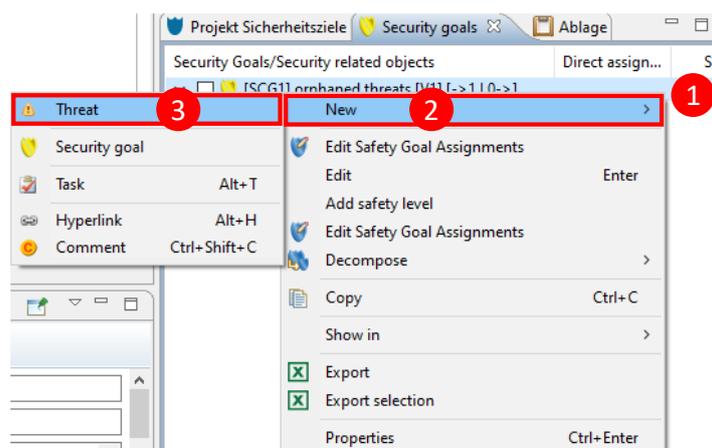


fig. 6 Defining Threat in Security Goal View

1. Right Click on the Security Goal
2. Select "New"
3. Select "Threat"

► The "New Threat" dialog from fig. 4 appears. Fill in the fields to create the Threat.

► The Threat can be chosen now in the TARA in the Threat column

## Creating Assets

Assets can be defined either in the System Modeler and directly in the TARA.

### Creating Assets in the System Modeler

The following steps are explaining how to create an Asset in the System Modeler.

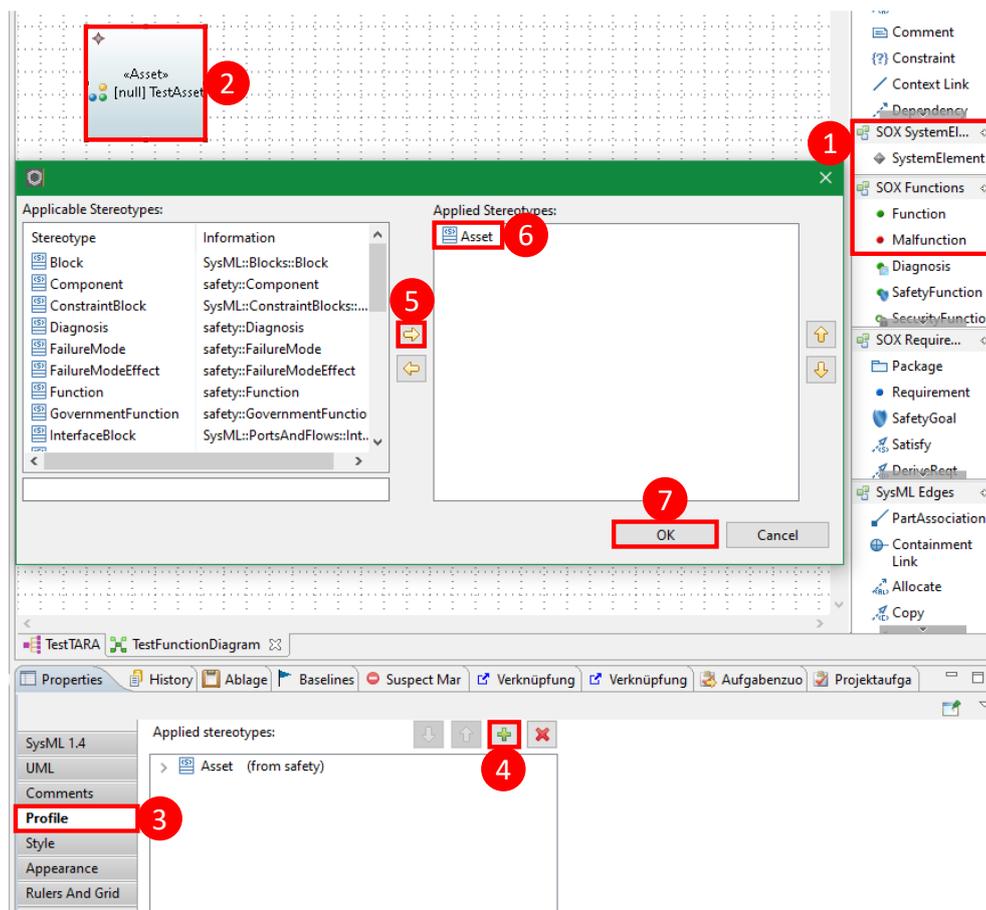


fig. 7 Defining Assets

1. Create an Element in the UML/SysML Modelling Base
2. Name the created Element
3. Select Profile
  - ▶ Asset is a Stereotype. It has to be selected in the Stereotype Selection
4. Click on the plus icon to select the Asset stereotype
5. Select the Asset stereotype in the left box and move it with the arrow that shows to the right box
6. The Asset stereotype was moved to the right box
7. Confirm the choice with "OK".

▶ The stereotype of the element was switched to Asset and can be used in the TARA for defining Threats

## Creating Assets directly in the TARA

The following steps are explaining how to create an Asset directly in the TARA.

*Precondition: A TARA file was created and is active.*

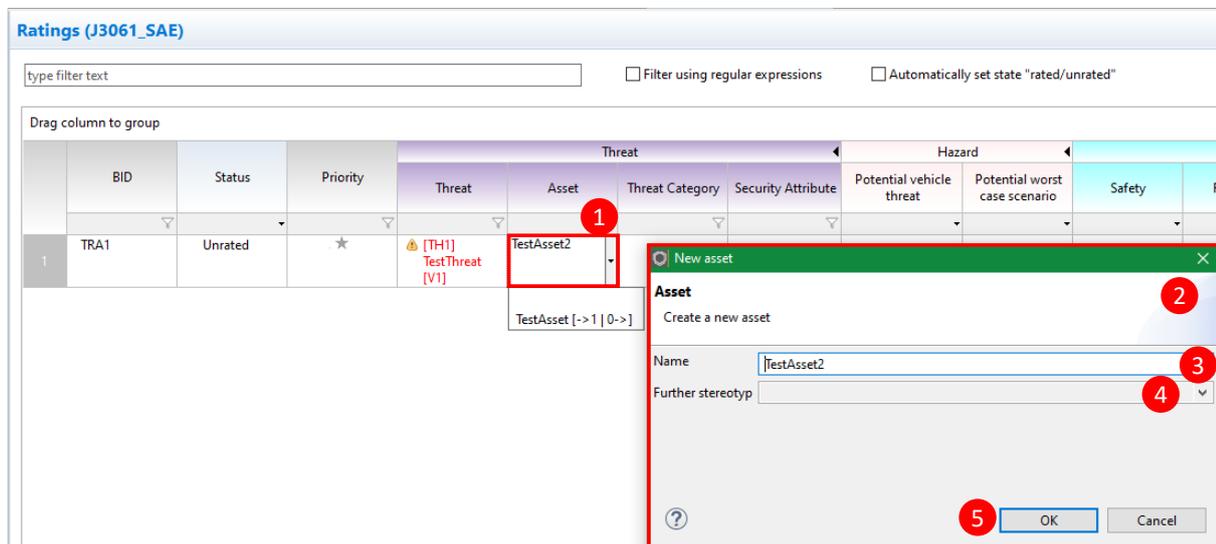


fig. 8 TARA editor tool bar add empty rating

1. Double Click on the Asset Cell and fill in the name of the Asset

► Confirm the name of the Asset with Shortcut Ctrl + Return or with a click on a free space in the

TARA

2. The “New Asset” dialog appears
3. The name of the Asset is automatically filled in
4. Add a further stereotype (optionally)
5. Confirm the Threat by clicking on “OK”

► An Asset was created. The Asset is shown in the PSS View, in the Model Explorer and the Repository View.

► The Asset is automatically connected with the Threat.

## Defining Potential vehicle threats

### Note

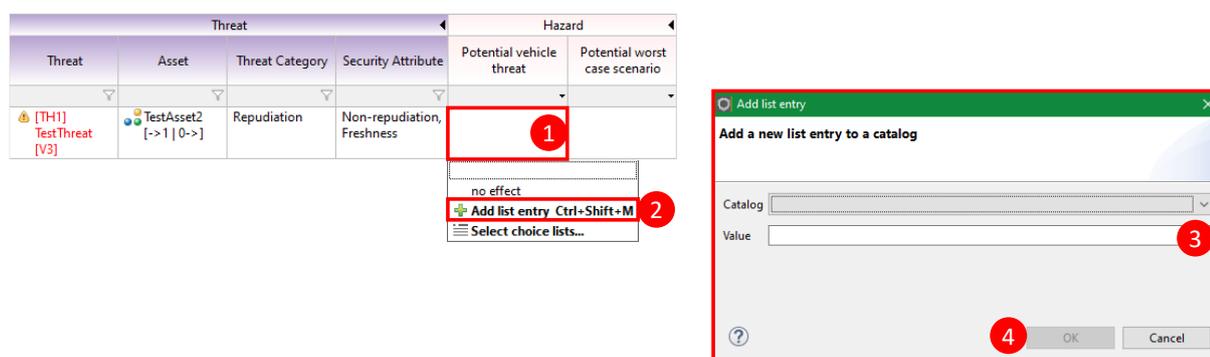
SOX provides catalogs which contain standard values for the situation parameters. But you also can define individually catalogs and values. Read the chapter Customized Choice Lists for more information.

*Precondition: Threats were created.*

Potential vehicle threats can be defined either with or without Choice Lists.

### Defining Potential vehicle threats without a Choice List

By defining potential vehicle threats without a Choice List, the threats can just be used in the SOX Project, where the potential vehicle threats were created.



*fig. 9 Defining potential vehicle threats not with a Choice List*

1. Double Click in the potential vehicle threat cell
2. Select "Add list entry" or use the Shortcut

► When you don't have a safety related Threat (e.g. when the Attacker just want private dates), just select "no effect"

3. Fill in the potential vehicle threat in the value box
4. Confirm the potential vehicle threat with "OK"

### Defining Potential vehicle threats with a Choice List

### Note

Choice Lists are a specific kind of catalogs.

By defining potential vehicle threats with a Choice List, the potential vehicle threats has to be defined one time and can be used across multiple SOX Projects.

Different potential vehicle threat kinds can be defined with the Choice List and only specific potential vehicle threats can be shown.

1. Double Click in the “potential vehicle threat” cell
  2. Select “Select choice lists...”
  3. The “Choice list selection” dialog appears
    - ▶ When they are already created Choice Lists, select them and confirm with “OK”
  4. Select “Add new catalog”
  5. Select the Target folder of the Choice List (with Browse...)
  6. Enter the name of the Choice List
  7. Enter a Description (optionally)
  8. Confirm the choice with “Finish”
- ▶ Select the new created Choice List and confirm with “OK”
9. Select the plus icon to add new potential vehicle threats to the created Choice List
  10. Add the name of the potential vehicle threat
  11. If more potential vehicle threats should be created, select “OK and next”
  12. When no more potential vehicle threats should be created, confirm with “OK”
- ▶ Go back to the TARA to select the new created potential vehicle threats
- ▶ To create new potential vehicle threats in the TARA for the Choice List, select “Add list entry”

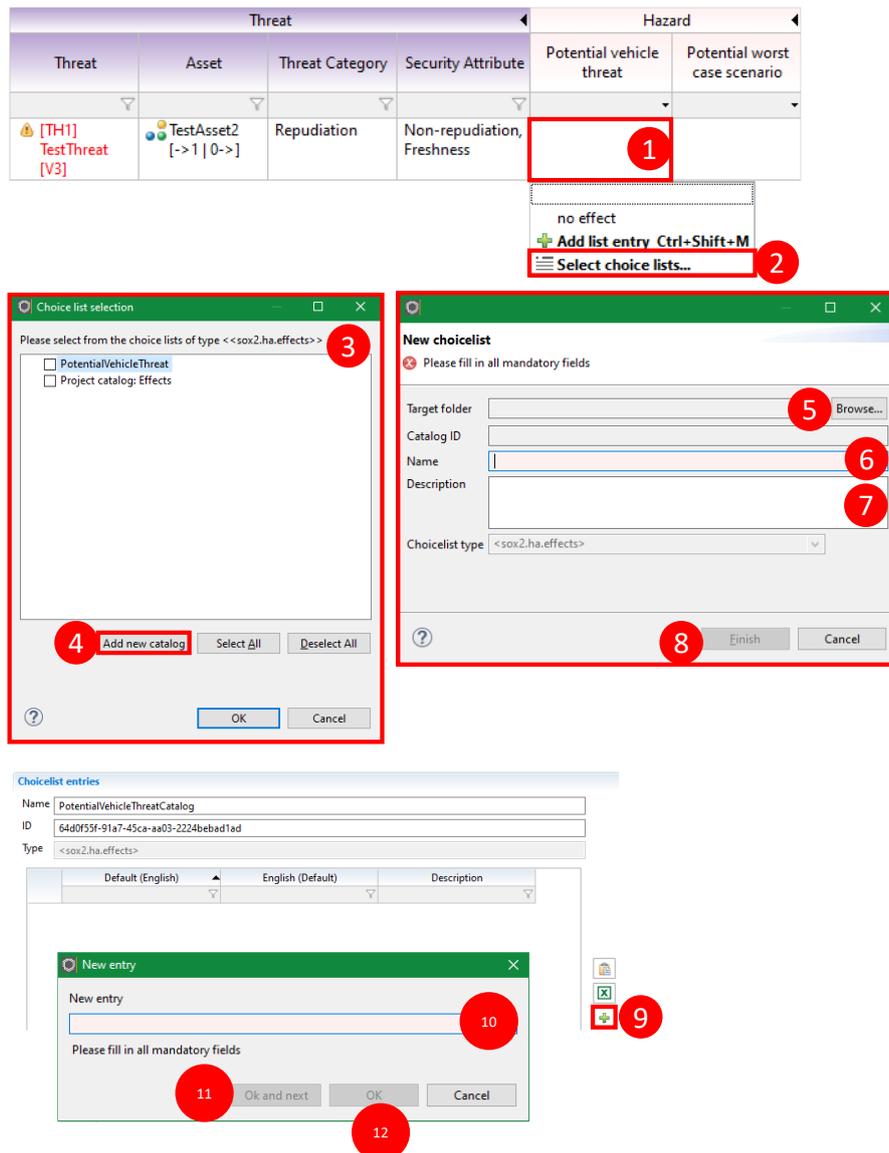


fig. 10 Defining potential vehicle threats with Choice Lists

## Defining Hazards

### Note

SOX provides catalogs which contain standard values for the situation parameters. But you also can define individually catalogs and values. Read the chapter Customized Choice Lists for more information.

*Precondition: Threats were created.*

Hazards can be defined either with or without catalogs.

## Defining Hazards without a catalog

By defining potential vehicle threats without a Choice List, the threats can just be used in the SOX Project, where the potential vehicle threats were created.

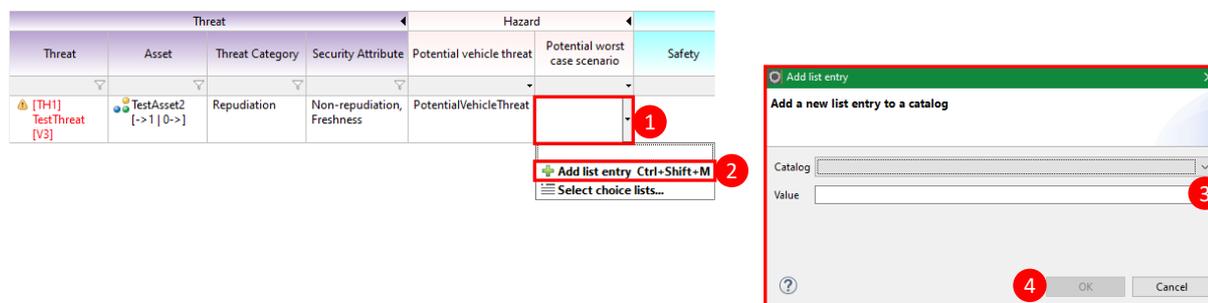


fig. 11 Defining Hazards not with a catalog

1. Double Click in the Hazard cell
2. Select “Add list entry” or use the Shortcut

► When you don’t have a safety related Threat (e.g. when the Attacker just want private dates), don’t entry a value to the cell and let it unfilled.

3. Fill in the Hazard in the value box
4. Confirm the Hazard with “OK”

## Defining Hazards with a catalog

By defining Hazards with a catalog, the Hazards has to be defined one time and can be used across multiple SOX Projects and in the HARA. Hazards, that were defined in the HARA, can be used in the TARA as well by activating the catalog and selecting the needed Hazards.

Different Hazard kinds can be defined with the catalog and only specific Hazards can be shown.

1. Double Click in the “potential vehicle threat” cell
2. Select “Select choice lists...”
3. The “Choice list selection” dialog appears

► When they are already created catalogs, select them and confirm with “OK”

4. Select “Add new catalog”
5. Select the Target folder of the catalog (with Browse...)
6. Enter the name of the catalog
7. Enter a Description (optionally)
8. Confirm the choice with “Finish”

- ▶ Select the new created catalog and confirm with “OK”
  
- 9. Select the Hazard icon to add new Hazards to the created catalog
- 10. Add the name of the Hazard
- 11. Add a Description
- 12. If more Hazards should be created, select “OK and next”
- 13. When no more Hazards should be created, confirm with “OK”
  
- ▶ Go back to the TARA to select the new created Hazards
  
- ▶ To create new Hazards in the TARA for the catalog, select “Add list entry”

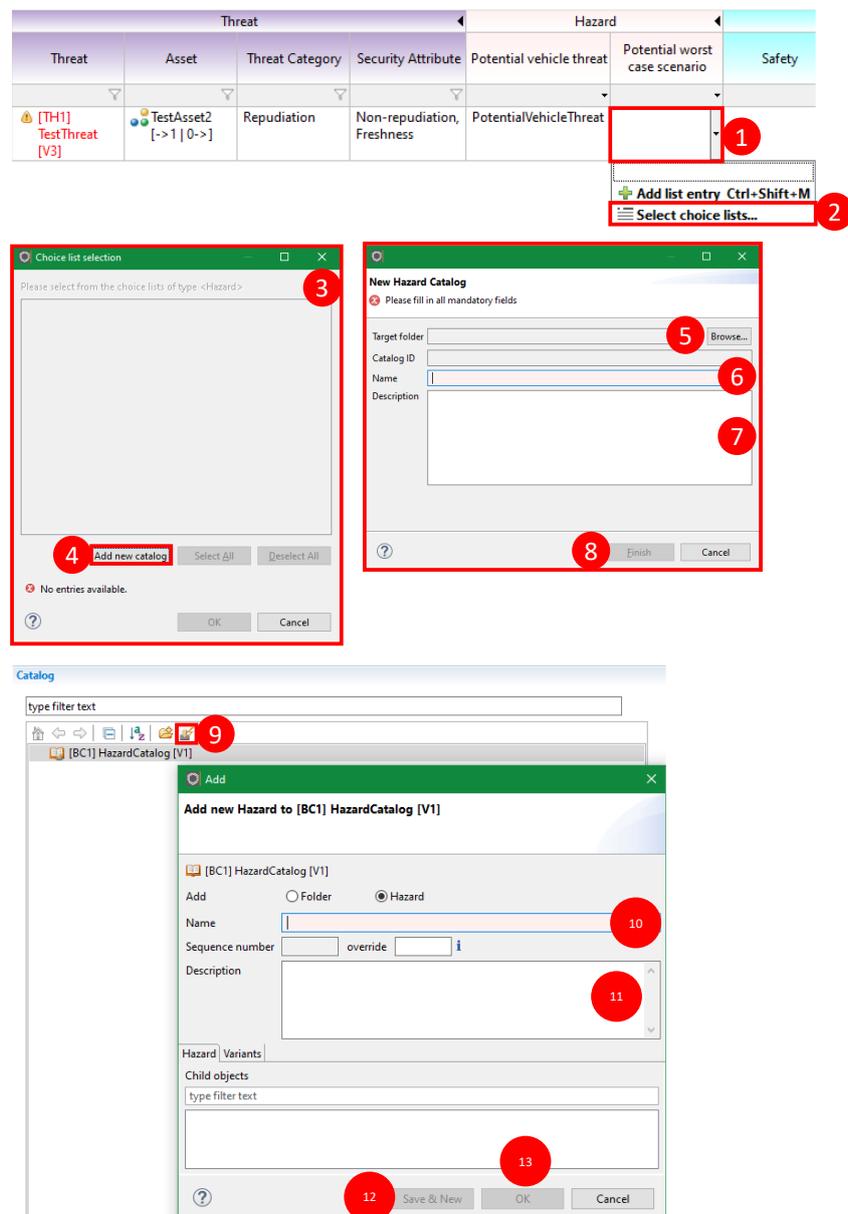


fig. 12 Defining Hazards with Catalogs

## Note

Note that the Hazards are shown in the PSS View. To reuse Hazards in other SOX Projects, you have to create in the Public folder (Choice-List) a Hazard Catalog. Then just add the catalog in the TARA.

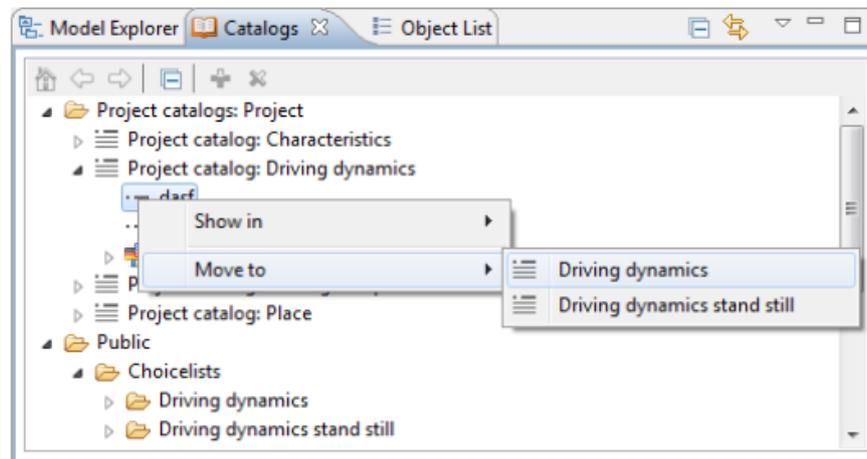


fig. 13 Context menu Move to.

## Evaluation of the Security-/Performance Level

SOX will have two different TARAs according to two different norms and guidelines:

- SAE J3061 (SAE)
  - Evaluations for Impact Level
    - Safety
    - Financial
    - Operational
    - Privacy and Legislation
  - Evaluations for Threat Level
    - Expertise
    - Knowledge about TOE
    - Window of Opportunity
    - Equipment
- ISO/SAE 21434 (ISO)
  - Evaluations for Impact Level
    - Safety
    - Financial
    - Operational
    - Privacy and Legislation
  - Evaluations for Attack Feasibility Level
    - Elapsed Time
    - Expertise
    - Knowledge about TOE

- Window of Opportunity
- Equipment

Make a double-click to into the cell to edit the value to the key parameters (for Impact, Threat and Attack Feasibility Level) for the TARA according to SAE J3061 and ISO/SAE 21434.

**Impact Level and Threat Level Rating according to SAE J3061**

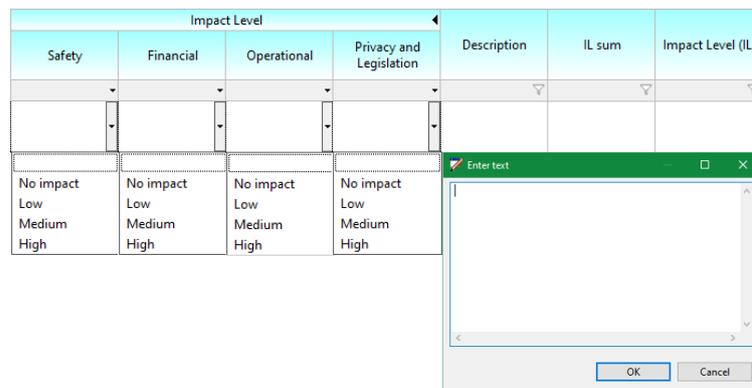


fig. 14 Impact Level Rating parameter values and Description text entry (for SAE J3061 and ISO/SAE 21434)

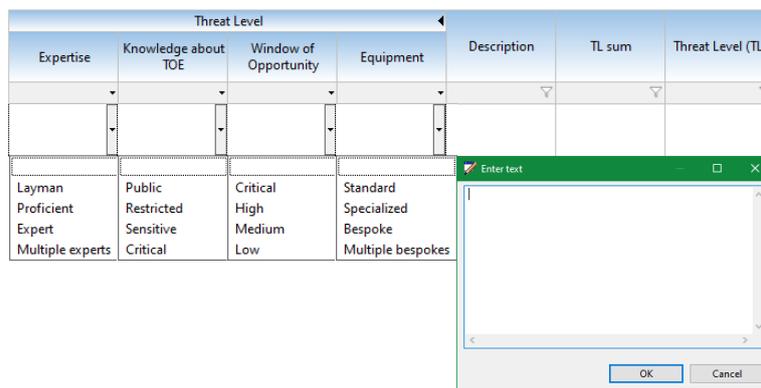


fig. 15 Attack Level Rating parameter values and Description text entry (for SAE J3061)

## Impact Level and Attack Feasibility Rating according to ISO 21434

Damage Scenario	Impact Level				Description	IL sum	Impact Level (IL)
	Safety	Financial	Operational	Privacy and Legislation			

Negligible	Negligible	Negligible	Negligible
Moderate	Moderate	Moderate	Moderate
Major	Major	Major	Major
Severe	Severe	Severe	Severe

fig. 16 Damage Scenario, Impact Level Rating parameter values and Description text entry (for ISO 21434)

Threat Scenario	Attack Feasibility Rating					Description	Attack Feasibility Sum	Attack Feasibility Level
	Elapsed Time	Specialist Expertise	Knowledge of the Component	Window of Opportunity	Equipment			

< 1 week	Layman	Public	Unlimited	Standard
< 1 month	Proficient	Restricted	Easy	Specialized
< 6 months	Expert	Confidential	Moderate	Bespoke
<= 3 years	Multiple experts	Strictly Confidential	Difficult/None	Multiple bespokes
> 3 years				

fig. 17 Threat Scenario, Attack Feasibility Rating parameter values and Description text entry (for ISO 21434)

### Note

The Impact, Threat and Attack Feasibility Level will calculate automatically after the Level Ratings. The columns “x sum” will show the sum of the parameter values and the “x Level” will show the Level according to the calculation matrix.

## Creating Security Goals

Security Goals can be created either directly in the TARA and in the Security Goal View.

*Precondition: Threat was created and the Security Level was calculated (values of parameter of Impact and Threat/Attack Feasibility Rating were selected).*

### Creating Security Goals directly in the TARA

The following steps are explaining how to create a Security Goal directly in the TARA.

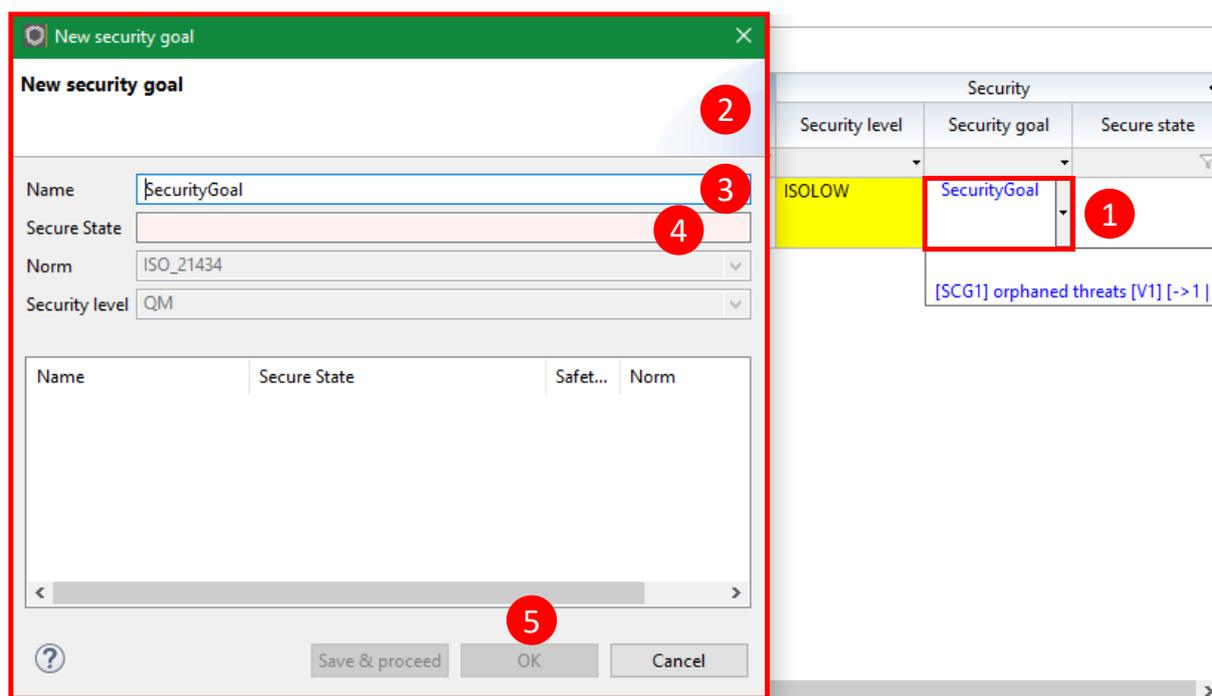


fig. 18 Creating Security Goals directly in the TARA

1. Double Click on the Security Goal cell and fill in the name of the Security Goal
  - ▶ Confirm the name of the Security Goal with Shortcut Ctrl + Return or with a click on a free space in the TARA
2. The “New security goal” dialog appears
3. The name of the Security Goal is automatically filled in
4. Add a Secure State
  - ▶ The Norm is automatically filled in and is according to the Norm of the TARA
  - ▶ The Security Level is set per Default on QM because it will inherit the Security Level from the Rating automatically

5. Confirm the Security Goal by clicking on “OK”

► A Security Goal was created with a Security Goal ID. The Security Goal is shown in the Security Goal View and the Threat that is connected in the Rating with the Security Goal. The Security Level is been inherited from the Rating of the Threat in the TARA.

► The Threat moves automatically to the Security Goal after connecting the Security Goal to the Rating

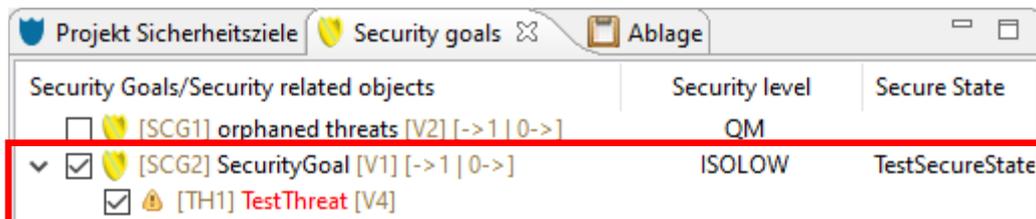


fig. 19 Security Goal in Security Goal View after creating Security Goal in TARA

### Creating Security Goals in Security Goal View

The following steps are explaining how to create a Threat in the Security Goal View.

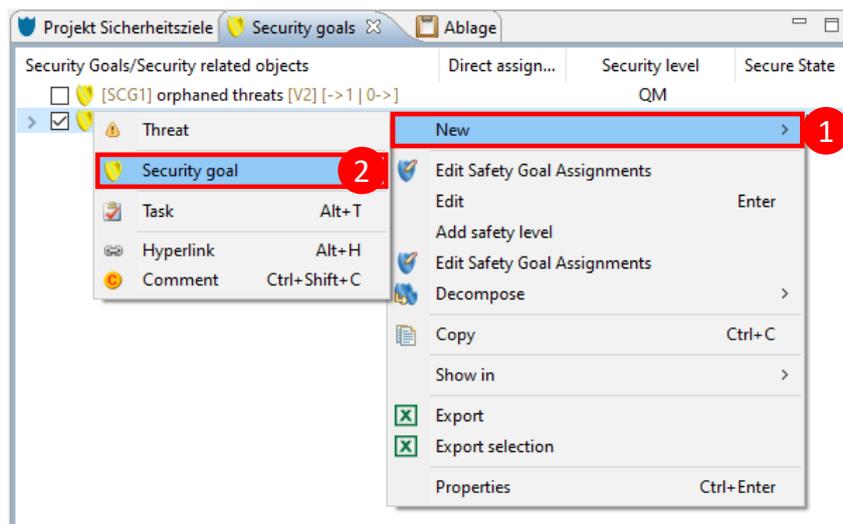


fig. 20 Defining Threat in Security Goal View

1. Right Click in the Security Goal View
2. Select “New”
3. Select “Security Goal”

► The “New security Goal” dialog from fig. 18 appears. Fill in the fields to create the Security Goal.

► If several Security Goal should be created, select instead of “OK” “Save & proceed”.

► The Security Goal can be chosen in the TARA in the Security Goal column.

## The User Interface

Below you see all the standard view in the TARA perspective. Remember that you can always (re-) open views by going to the menu bar and clicking **Window > Show View**. You can also arrange the views with drag & drop.

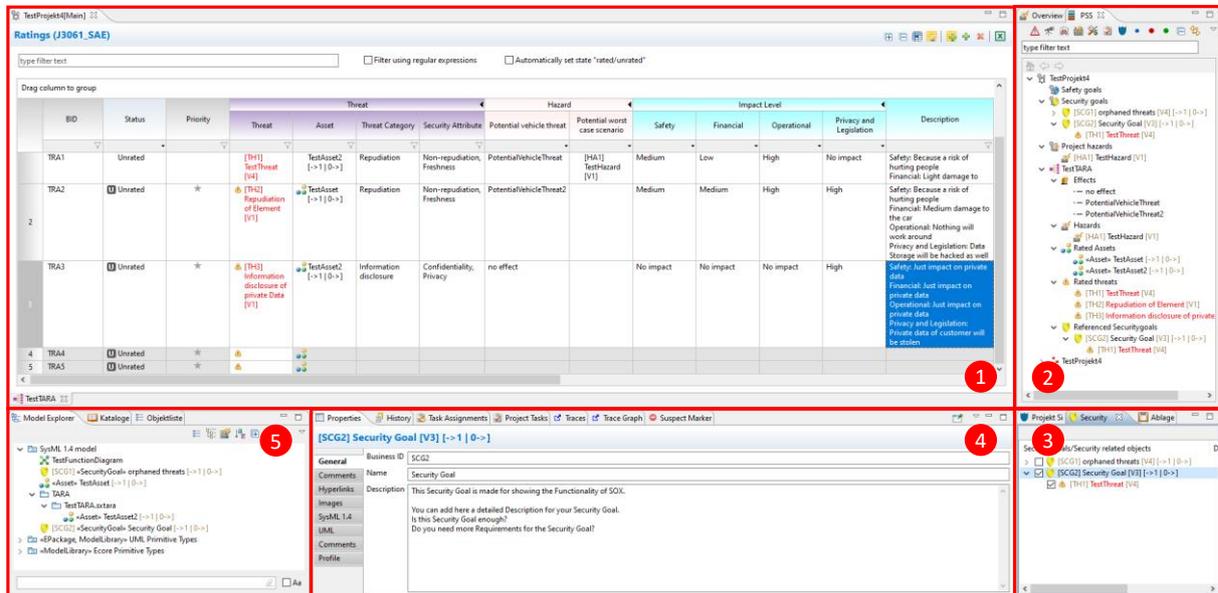


fig. 21 The User interface of the TARA module

[1] TARA Editor

[2] Overview/PSS

[3] Security Goals View

[4] Properties / History / Task Adjustments / Project tasks / Traces / Trace Graph / Suspect Marker

[5] Model Explorer / Catalogs / Object lists

## TARA Editor [1]

### TARA explanation

\*for TARA just according to SAE J3061

\*\* for TARA just according to the ISO/SAE 21434

\*\*\* for TARA according to the SAE J3061 and ISO 21434

\*\*\* There is a prioritization of each line in the “Priority” column (It is just for the User):

- 1 star (low)
- 2 stars (medium)
- 3 stars (high priority).

\*\*\* In the TARA editor the whole TARA is shown.

\*\*\* Threats have to be defined. Threats are a combination of Assets and the Threat Category.

Currently STRIDE Threat Categories are available.

\*\* The Damage Scenario has to be determined. The Damage Scenario is an association between potential vehicle threats and the Hazards. The assessment of the Damage Scenario is carried out through the Impact Level.

\*\* The Threat Scenario has to be determined. The assessment of the Threat Scenario is carried out through the Attack Feasibility Rating.

\*\*\* The Security Goal has to be defined. The Security Goal is determined as the inverse of a Threat. The Security Goal can be created directly in the correct cell. Add Security Goals and then their Secure State will be shown as well. The Threat will be automatically moved to the Security Goal in the Security Goal View.

## Context Menu of TARA

The Context Menu of the TARA shows a couple of functions.

*Precondition: TARA was created, Threats and Assets were defined*



*fig. 22 Context menu in the TARA editor*

### New



*fig. 23 Context menu "New"*

When clicking at "New" in the Context menu of the TARA, new Tasks, Hyperlinks and Comments can be added.

### Edit

With Edit the cell can be edited.

### Change State

With Change State the state of the Rating can be switched. It shows the User in which state the Rating is in the current time. The Default state machine rules is shown in fig. 24. The order and the selection of the states can be individualized as well.

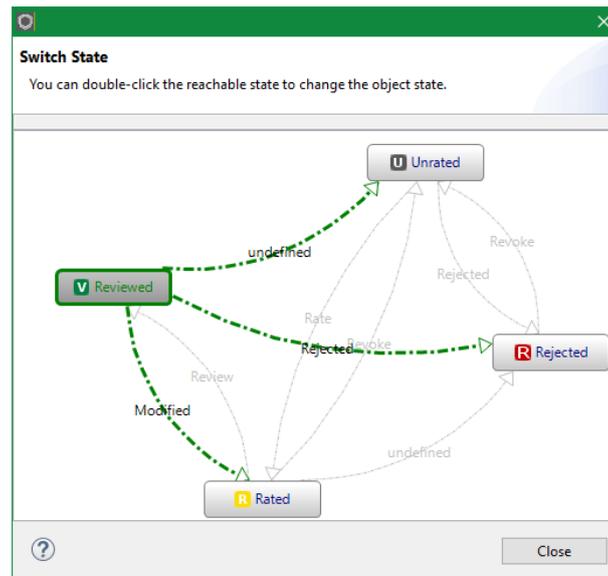


fig. 24 Default state machine rules

### Show in

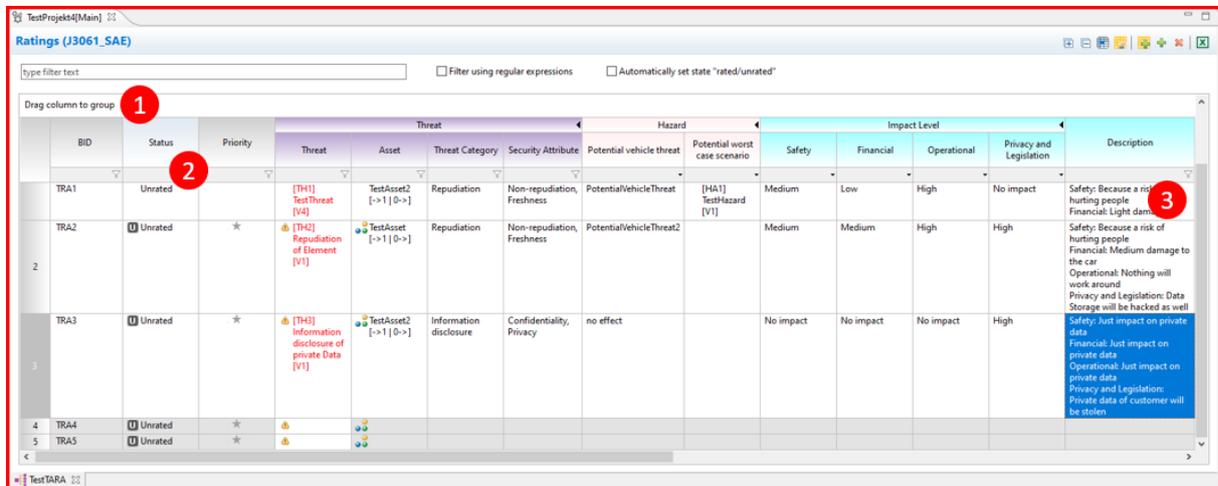
With show in, the Diagrams, where e.g. the Assets are shown, can be selected and the Assets will be shown directly in the Diagrams e.g. a FMEA.

### No effect

With no effect the potential vehicle threat status will be switched to "no effect" and the rating of the Impact and Threat/Attack Feasibility Level will be deleted.

## Drag column to group

Same values of the columns can be displayed in groups. For this drag a column [2] and drop it to the corner upper left [1].



BID	Status	Priority	Threat				Hazard		Impact Level				Description
			Threat	Asset	Threat Category	Security Attribute	Potential vehicle threat	Potential worst case scenario	Safety	Financial	Operational	Privacy and Legislation	
TRA1	Unrated		[TH1] TestThreat [V4]	TestAsset2 [=> 1] [0->]	Repudiation	Non-repudiation, Freshness	PotentialVehicleThreat	[HA1] TestHazard [V1]	Medium	Low	High	No impact	Safety: Because a risk hurting people Financial: Light damage
TRA2	Unrated	*	[TH2] Repudiation of Element [V1]	TestAsset2 [=> 1] [0->]	Repudiation	Non-repudiation, Freshness	PotentialVehicleThreat2		Medium	Medium	High	High	Safety: Because a risk hurting people Financial: Medium damage to the car Operational: Nothing will work around Privacy and Legislation: Data Storage will be hacked as well
TRA3	Unrated	*	[TH3] Information disclosure of private Data [V1]	TestAsset2 [=> 1] [0->]	Information disclosure	Confidentiality, Privacy	no effect		No impact	No impact	No impact	High	Safety: Just impact on private data Financial: Just impact on private data Operational: Just impact on private data Privacy and Legislation: Private data of customer will be stolen
TRA4	Unrated	*											
TRA5	Unrated	*											

fig. 25 TARA editor with grouped column

Greyed rows with the corresponding group names, displayed at the first column, will appear. They contain the corresponding ratings in a tree structure [3]. According to this groups can be expanded and collapsed. Further columns can be added to the groups' selection [1]. To ungroup, right-click on a group selection [1] and select ungroup by.

## Overview and PSS View [2]

The Overview View is a part of the PSS View. The PSS View shows the whole Project Elements whereas the Overview View show only the elements implemented in the TARA. The Overview View of the TARA shows the same Categories like the Repository View of the TARA:

- Effects
- Hazards
- Rated Assets
- Rated Threats
- Referenced Security Goals

## Security Goal View [3]

The Security Goal View shows:

- Threats without an allocated Security Goal
  - ▶ These Threats are shown in Security Goal “orphaned Threats”
- Security Goal with no Threats
- Security Goal allocated with Threats from Rating
- Security Goal with created Threats (not to mix up with Threats from Rating)
- If Security Goal is assigned in a Threat

### Note

A Security Goal can be allocated with multiple Threats but only one Threat can be allocated with one Security Goal

## Model Explorer / Catalogs / Object lists [5]

### Model Explorer

The Model Explorer shows every element and connection, that was defined. If elements encapsulated within each other, like a block has multiple parts in it, like in a standard Internal Block Diagram, than the overall Element is shown and you can click on the arrows on the left site of the element, to see the encapsulated elements. When elements are created in methods, like the TARA, there are folders with the methods names that inherits the created elements.

The Model Explorer shows:

- Folder of Methods
- Diagrams
- Security Goals
- Elements (e.g. Assets and Systemelements)(Stereotypes)
- Functions
- Malfunctions
- Connection between Elements

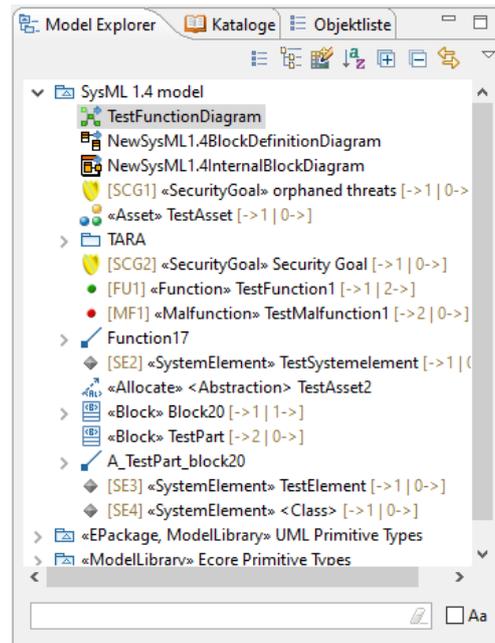


fig. 26 Model Explorer

## Catalogs

There are three types of catalogs:

- Project catalogs
  - ▶ Specific catalogs for the SOX Project
- Public catalogs
  - ▶ Editable catalogs and catalogs, which were created in the SOX Project
  - ▶ These catalogs can be used in every SOX Project in a Repository
- System catalogs
  - ▶ These catalogs are not editable in SOX
  - ▶ They are just editable by downloading them and manipulating them with an Editor and importing them again