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## ATA User Guide

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## Introduction

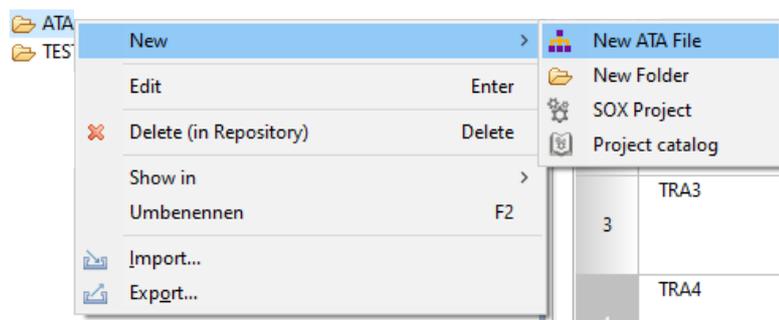
The ATA is a top-down approach to identify attack paths from point of attack to the threat. It allows for a detailed analysis of the attack paths and calculation of the attack feasibility level (AFL) respective Threat Level depending on the norm selected. Track the progress of your analysis with the possibility to consign a status and to assign tasks. The SOX module ATA provides the possibility, besides the option to display variants, to take over the threat from the TARA and to link paths between the threats simply by drag & drop. The attack feasibility level (AFL) calculated in the ATA is adopted in TARA.

## Step-by-Step-Guide

### Creating a new File

*Precondition: A SOX project was created and the Repository view is active.*

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



*fig. 1 New ATA file context menu*

2. Choose New > New **ATA File**
  - ▶ The "New ATA file" Dialog opens.
3. Click on **Browse...** to choose ATA as target folder.
4. Enter a filename for the ATA File.
5. The field "Description" is optional and can be used for detailed descriptions of the ATA document.
6. Choose the security norm the ATA should comply with.
7. Choose the security profile.
8. Choose a threat / threat scenario available in the project or "Create New".
9. Create new threat / threat scenario.
10. Click on **Finish**.

→ An ATA File was created and added to the Repository.

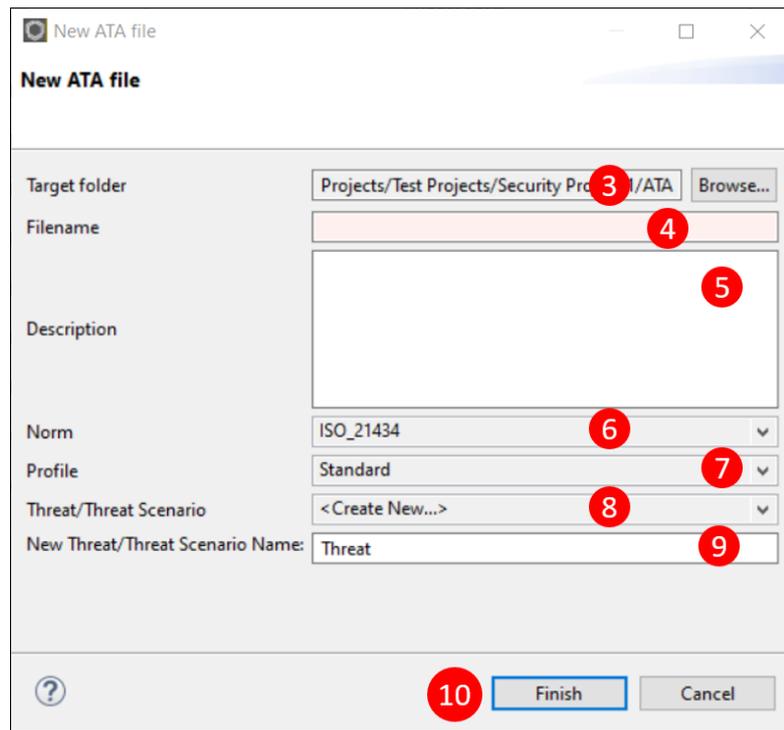


fig. 2 New ATA file dialog

## Creating a Gate

Precondition: An ATA document is selected and the ATA editor is active.

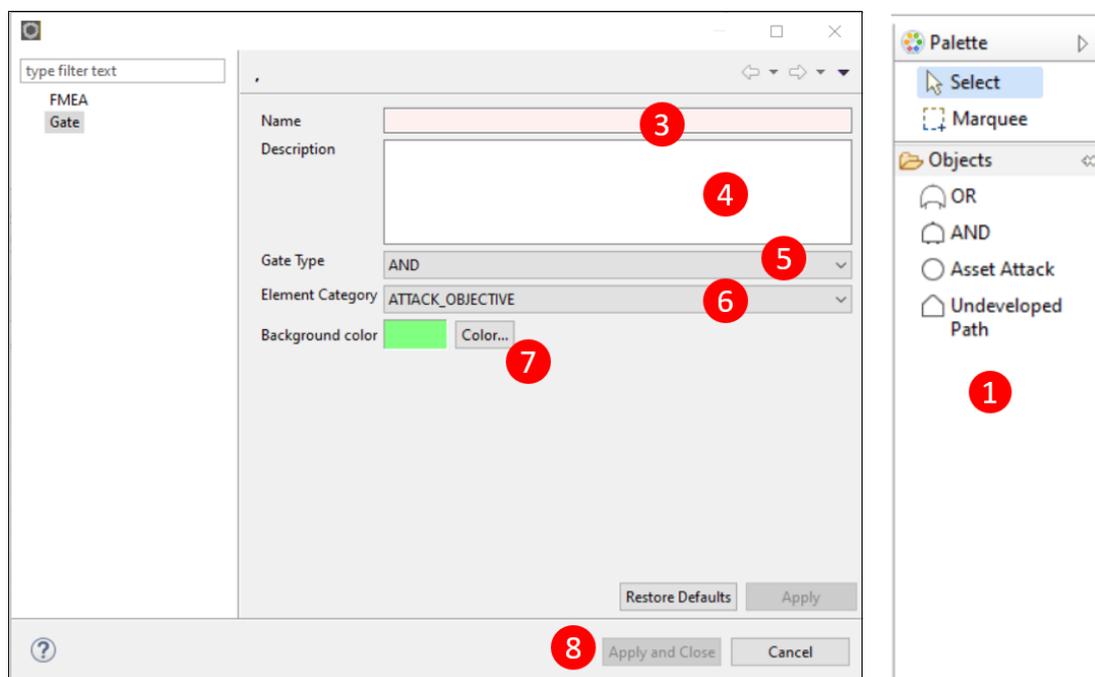


fig. 3 Palette and Element Definition

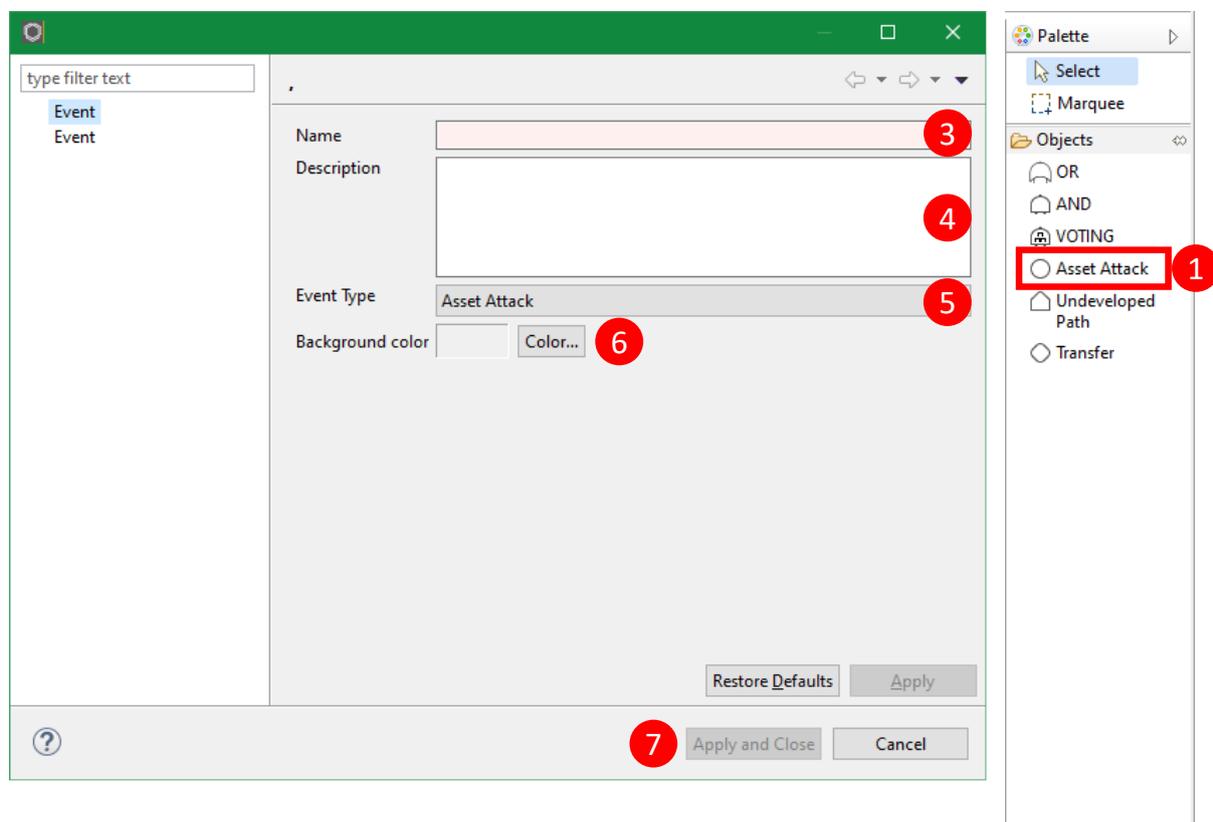
1. To the right of the editor, in the column "Palette", click on the desired gate.
  - The type of Gate is selected.
2. Click on the editor.

- ▶ The Gate dialog opens.
- 3. Enter a name for the gate. This will be **the name of the element**.
- 4. Write a description (optional).
- 5. The Gate Type, which was selected in the Palette is set as Default
  - ▶ The Gate Type can be switched
- 6. Set an Element Category (in accordance with EVITA method)
- 7. Set the color of the element.
- 8. Click on **Apply and Close**.

→ A Gate with the Element was created.

### Creating an Event

*Precondition: An ATA document is selected, the ATA editor is active and gates were created.*



*fig. 4 Palette and Element Definition*

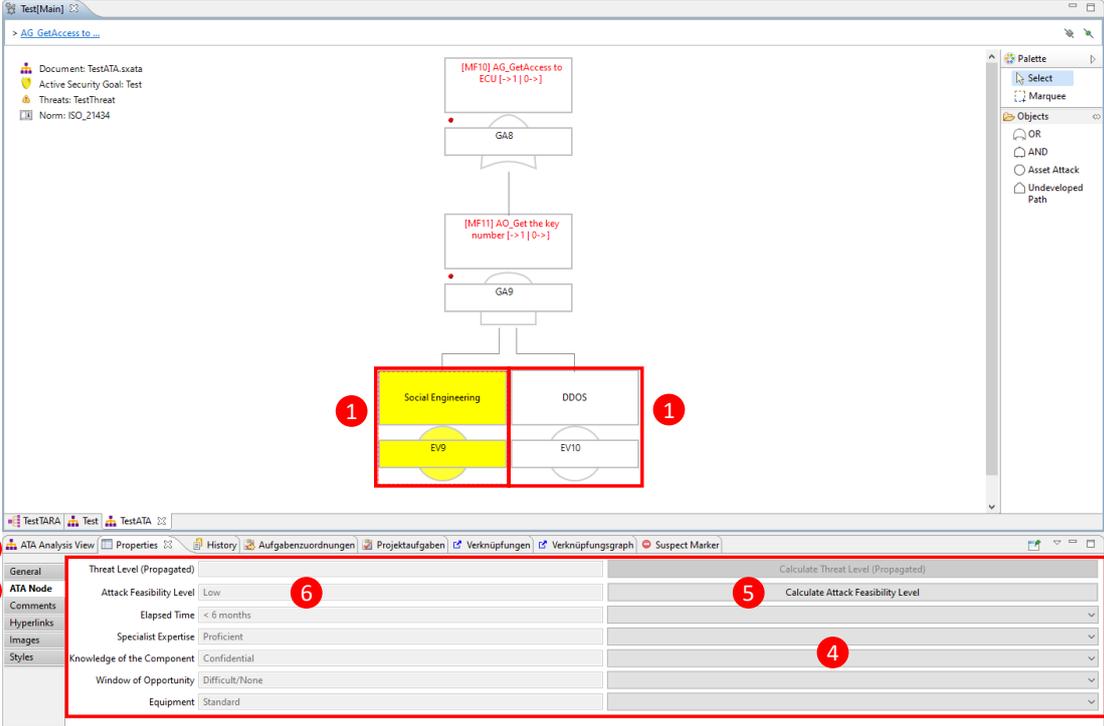
1. Click on the desired gate in the "Palette" located in the sidebar on the right of the editor.
  - ▶ The type of event is selected
2. Click on the editor.
  - ▶ The event dialog opens.
3. Enter a name for the event. This will be **the name of the element**.
4. Write a description (optional).
5. The event type, which was selected in the palette is set as default
  - ▶ The event type can be switched

6. Set a color to adjust a color of the element.
7. Click on **Apply and Close**.

→ An event with the element was created.

### Calculation of feasibility level at every element

If the feasibility of the threat scenario is not obvious, attack paths should be defined for the assessment. The structure of the attack tree is based on the top-down approach, so that the attack can be created according to the attack of the attacker. For the calculation of the feasibility level at the top element, every element can be assessed with its feasibility. It depends on the selected norm, if the Threat Level (according to SAE J3061) or the attack feasibility rating (according to ISO 21434) is been calculated. The parameters and values of the feasibility rating is the same at every element.



The screenshot displays the ENCO software interface. At the top, a document titled 'TestATA.sxata' is open, showing an active security goal 'Test' and a threat 'TestThreat' under the norm 'ISO\_21434'. The main workspace shows an attack tree diagram. The root node is '[MF10] AG\_GetAccess to ECU [->1] [0->]', which leads to gate 'GA8'. Below 'GA8' is '[MF11] AD\_Get the key number [->1] [0->]', which leads to gate 'GA9'. 'GA9' branches into two paths: 'Social Engineering' (containing event 'EV9') and 'DDOS' (containing event 'EV10'). The bottom of the interface shows the 'ATA Analysis View' with a properties panel. The panel is divided into two sections: 'Threat Level (Propagated)' and 'Calculate Threat Level (Propagated)'. The 'Attack Feasibility Level' is set to 'Low'. The 'Calculate Attack Feasibility Level' section shows various parameters like 'Elapsed Time', 'Specialist Expertise', 'Knowledge of the Component', 'Window of Opportunity', and 'Equipment'.

fig. 5 Likelihood calculation (Threat or Attack Feasibility Level)

1. Select an element (Gate or Event)
2. Select Properties
3. Select ATA Node
4. Insert the values of the parameters
  - The parameters and values of the feasibility rating depend on the selected norm when creating the ATA file
5. Select "Calculate Attack Feasibility Level"
6. The calculated Attack Feasibility Level is displayed

## Propagate feasibility to top-level and exchange rating from ATA to TARA

To derive the feasibility level of a threat scenario, the feasibility of the asset attacks needs to be propagated to the top-level element that defines the connection between the TARA and the ATA (Threat Scenario). The propagation only takes the calculated feasibility level and compares it for the propagation. It depends on the gate type, if the higher or the lower feasibility level will be propagated to the next higher-level element in the attack tree. If the next higher-level element is assigned to an AND gate, the lower feasibility rating is propagated. If it is an OR Gate, the higher feasibility rating is propagated.

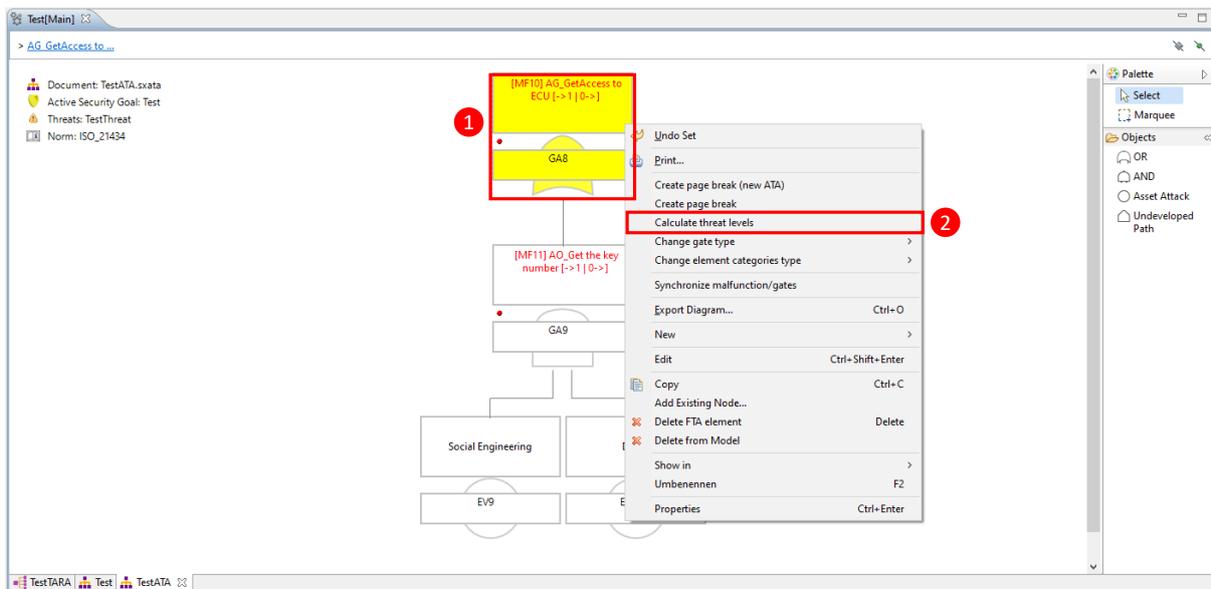


fig. 6 Likelihood propagation context menu (Threat or Attack Feasibility Level)

1. Select the element that should get the propagated feasibility level
2. Open the context menu of the ATA element
3. Select "Propagate Likelihood/Feasibility"

The identified critical path in the attack tree is highlighted with a color corresponding to the attack feasibility rating derived for the threat scenario.

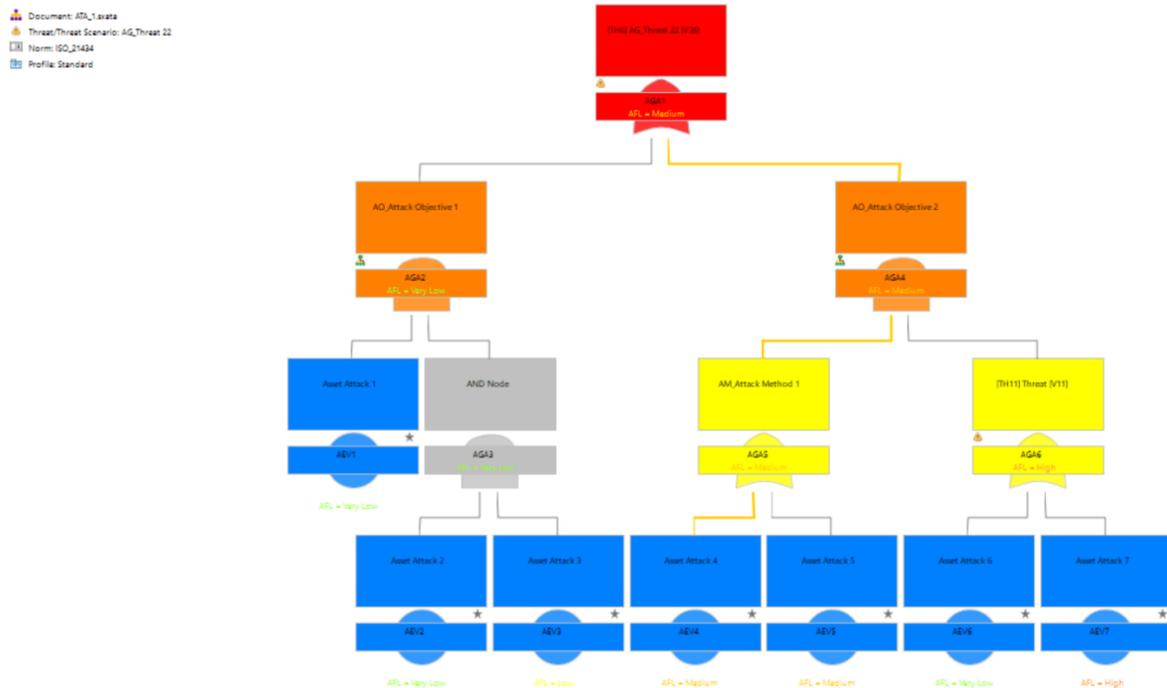


fig. 7 Propagated feasibility and critical path

For any element selected in the editor the propagated feasibility level of is shown in the tab “ATA Node” of the Properties view.

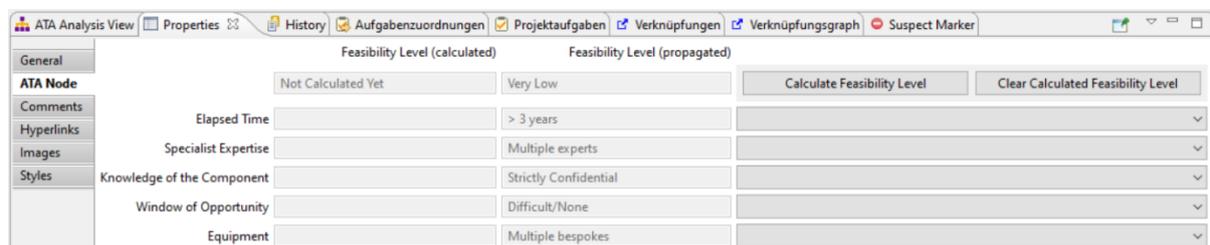


fig. 8 Propagated feasibility (Threat or Attack Feasibility Level)

If the threat evaluated in ATA is used in column “Threat” / “Threat Scenario” of the TARA the attack feasibility rating is adopted in TARA.

**Note:** It is possible to manually overwrite the propagated feasibility level at each gate. If doing so, the feasibility needs to be propagated to the top-level again.

### Link requirements and assets to elements in ATA

**Requirements** can be assigned to any element in the ATA by drag and drop. This is indicated by the small requirement icon at the selected element (blue dot) as shown in fig. 9. The allocated requirement is also listed in the tables for gates and elements in ATA Analysis View (see section *ATA Analysis View* on page 15). The views “Traces” and “Trace Graph” provide more detailed information about connections and relationships of an element selected in the editor (fig. 10).

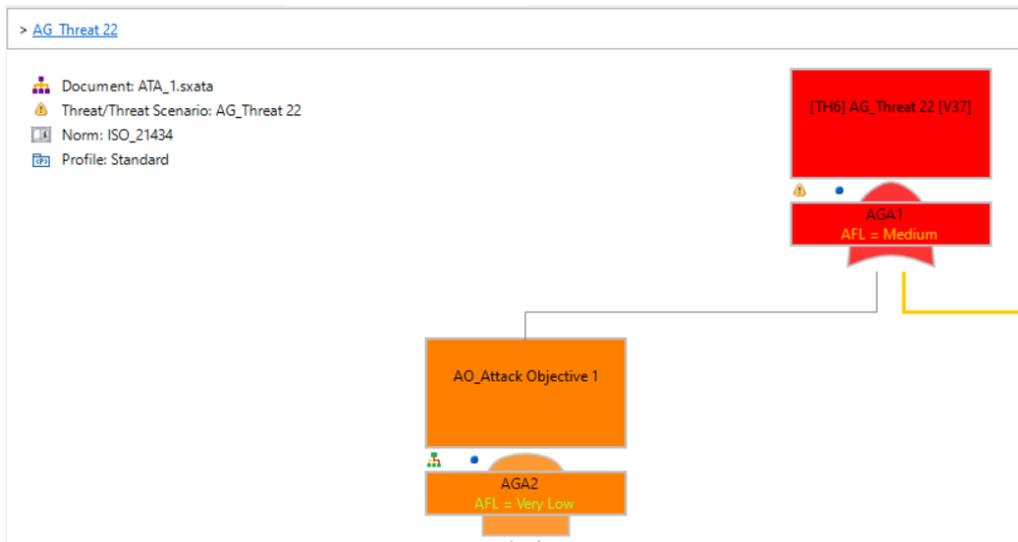


fig. 9 Requirements allocated to an element are indicated by a blue dot

Connected Element	Direction	Relation Type	Resource
[AGA2] Gate AO_Attack Objective 1 [V4]			
Incoming			
SEC_Test	<-	<<Requirement>>	cd://repo/Sprojects/Test Projects/Security Project 1/RM/Module 1.srm
Outgoing			

fig. 10 The relationship between requirement and element is shown in the Traces view

**Assets** created in the project are shown in the Assets view (See section PSS view, Security Goals view, Assets view on page 14). They can be assigned to any element in the ATA by drag and drop. The name of the asset is presented in the element as shown in fig. 11.

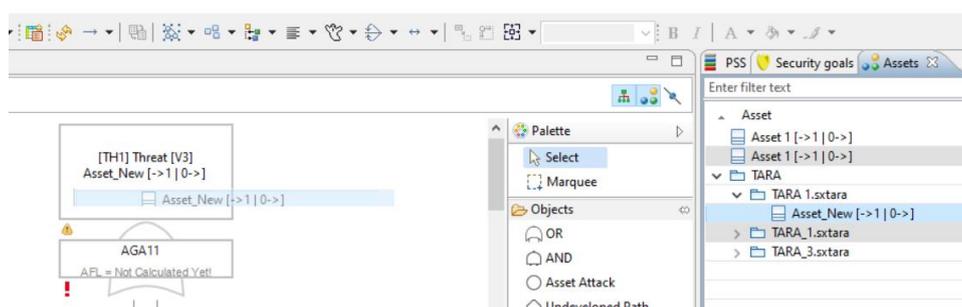
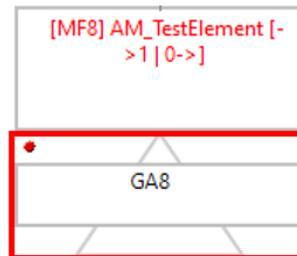


fig. 11 Assign assets to an element

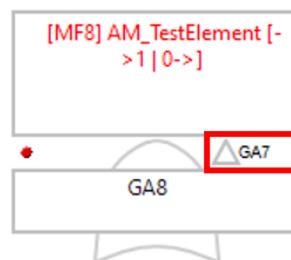
## Creating a Page Brake

**Note:** Page breaks are useful to get a better overview over your FTAs. The page breaks will not influence the Threat Level Calculation of the whole system.

1. In the editor, right-click on the desired gate where the page break should be.
  - ▶ The context menu opens.
2. Choose **Create page break**.
  - ▶ The page break will be shown as triangle.



3. Double-click on the triangle to open the page break.

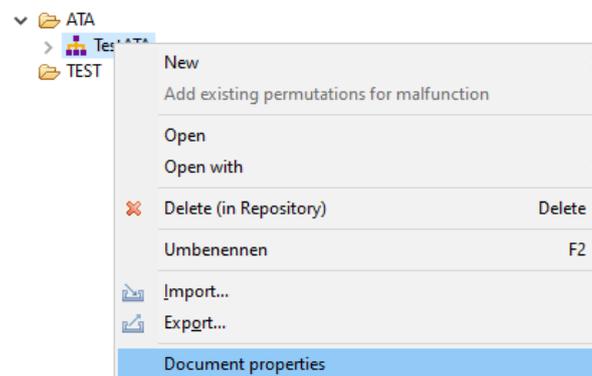


4. Double-click on the triangle under the gate to get a level above.

## Editing an ATA

The ATA can be edited on document, module and object level.

1. In the Repository view, right-click on the ATA document.



*fig. 12 Context menu for document properties*

2. Choose **Document properties**.
  - ▶ The properties for dialog with the entries "ATA Document" and "ATA module" opens

## Document

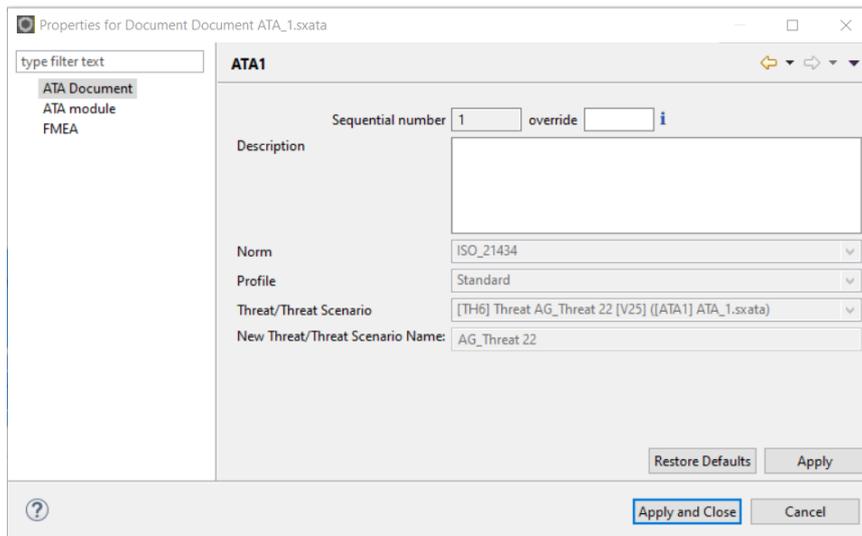


fig. 13 Dialog "Properties for ATA Document"

In this dialog the basic settings of the ATA document are presented, and the description can be edited.

## Module

**Note:** The changes will be active for every ATA Document.

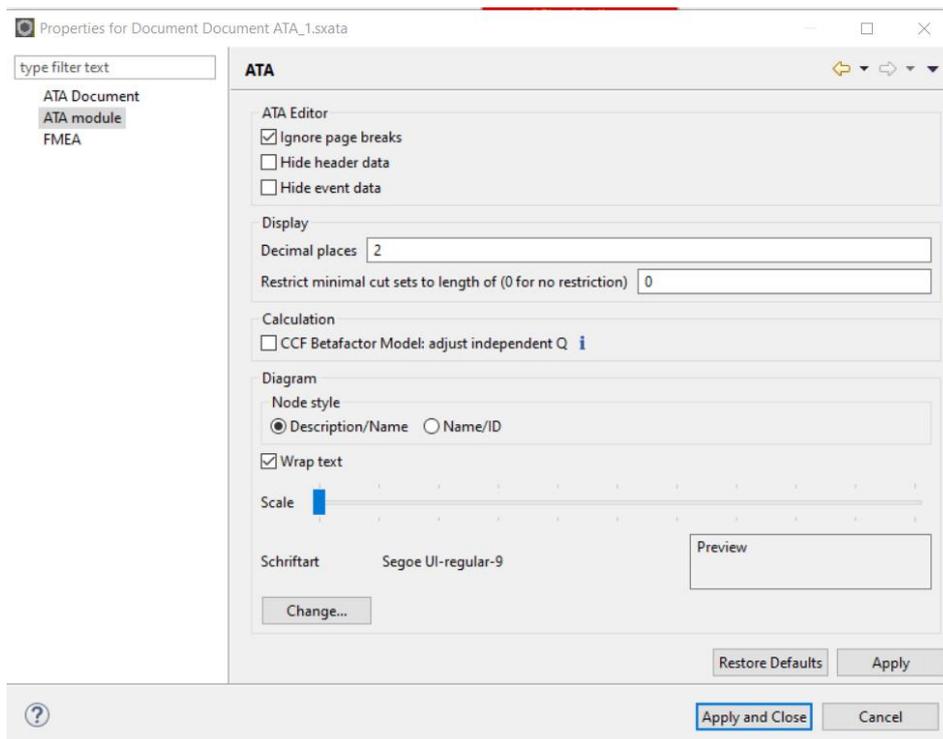


fig. 14 Dialog "Properties for ATA Module"

In this dialog the general ATA module properties can be changed.

## Object

Right-click on a gate/event and choose **Properties**.

- ▶ The gate dialog opens.
- ▶ The event dialog opens.

If only the type of the object should be changed, right-click on a gate/event and choose **Change gate/event type**.

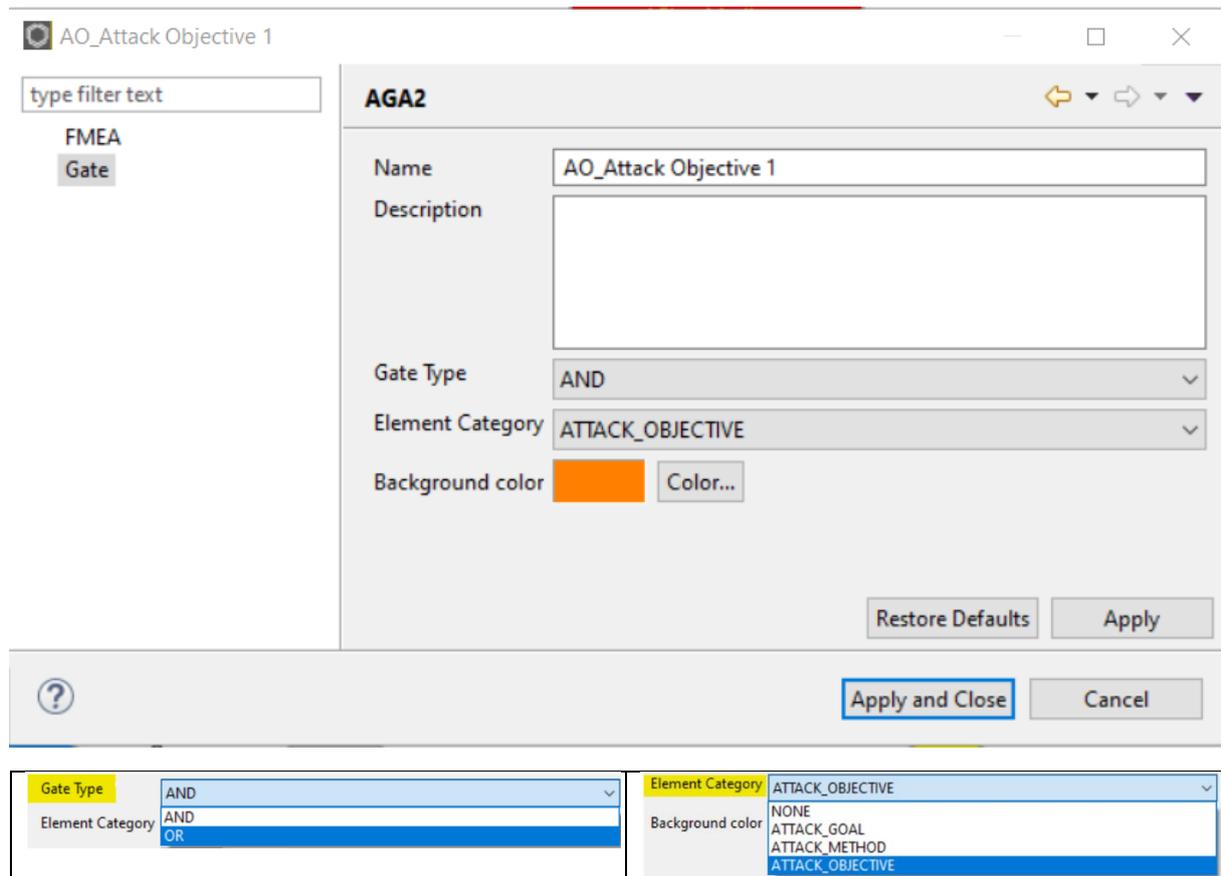


fig. 15 Context menu for changing gate/event type

## Exporting as a Picture

Precondition: The desired ATA is open.

1. Right-click in the ATA editor.
  - ▶ The context menu opens.

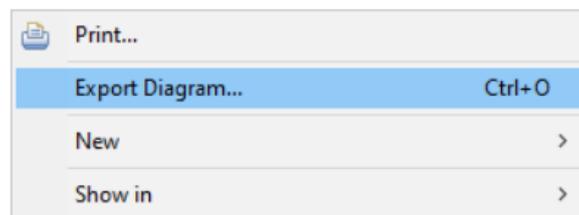


fig. 16 Context menu for exporting diagrams

2. Choose **Export Diagram...**

- ▶ The “Export Diagram” dialog opens.

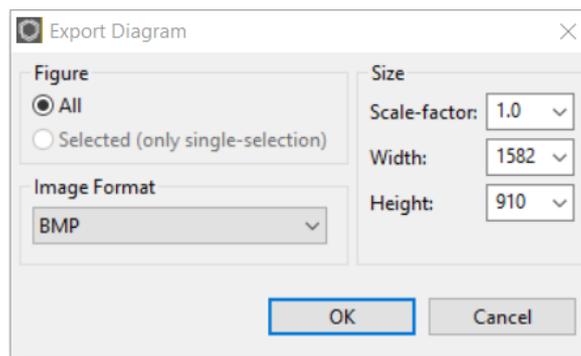
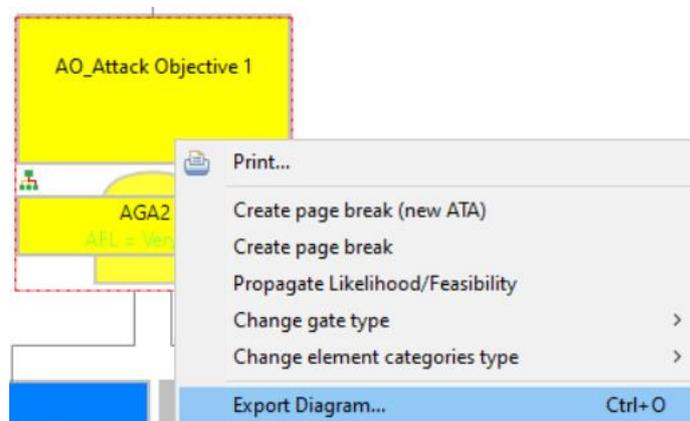


fig. 17 Dialog “Export Diagram”

### Note

To export a single object, do a right-click on it and choose “Export Diagram” from context menu.



3. Set image format and size:  
Image formats:

- BMP (Window Bitmap)
- GIF (Graphic Interchange Format)
- JPG (Joint Photographic Experts Group)
- PNG (Portable Network Graphic)
- RLE (Run-Length encoding)
- SVG (Scalable Vector Graphic) – the SVG-File will only be converted properly to PDF if Inkscape (File → Save as...) is used – printing the file to PDF (with any tool) did not perform very well.

Use a higher Scale-factor (Pixel), for a more detailed resolution.

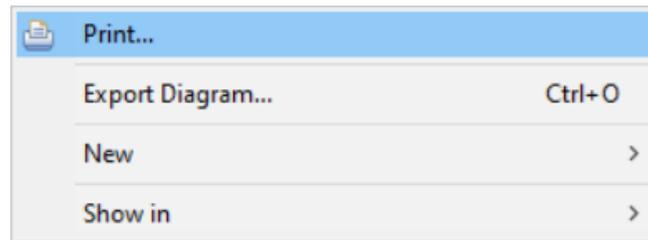
4. Click on **OK**.
5. Choose a file path.

→ The ATA is exported with the chosen preferences.

### Print

*Precondition: The desired ATA has to be opened.*

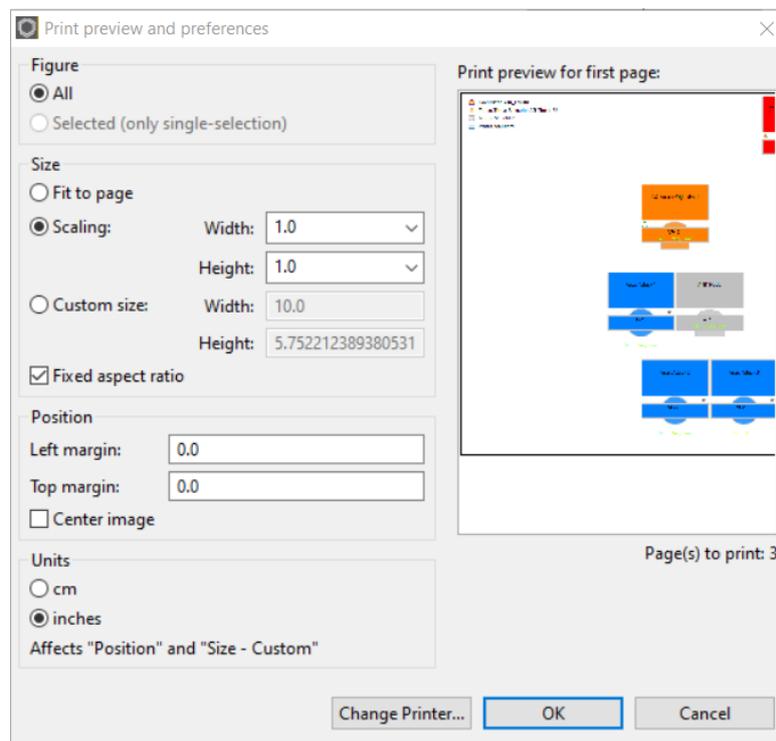
1. Right-click somewhere in the ATA editor.
  - ▶ The context menu opens.



*fig. 18 Context menu for printing*

2. Choose **Print...**

▶ The "Print preview and preferences" dialog opens.



*fig. 19 Dialog "Print previews and preferences"*

3. Change the print settings as needed.

4. Click on **OK**.

→ The ATA will be printed with the chosen preferences.

## The User Interface

This is the default ATA perspective:

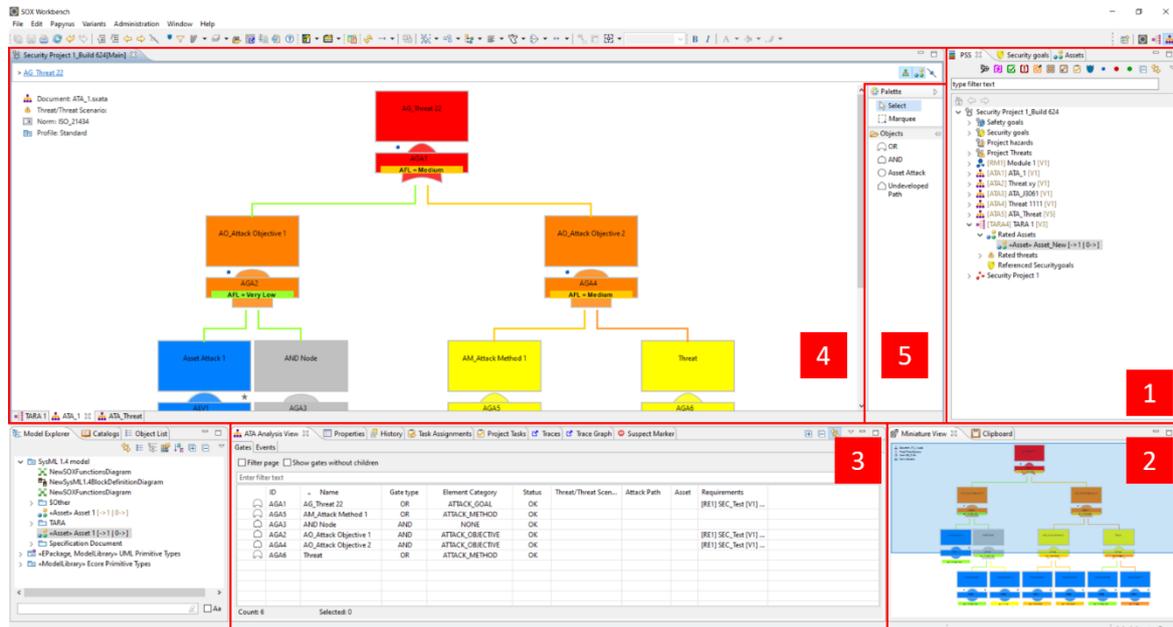


fig. 20 The User Interface

- [1] PSS view, Security Goals view, Assets view
- [2] Miniature view of the opened ATA document
- [3] ATA Analysis view
- [4] ATA Editor
- [5] Sidebar

### PSS view, Security Goals view, Assets view

The Project System Structure view (PSS) provides an overview of all documents that belong to the project.

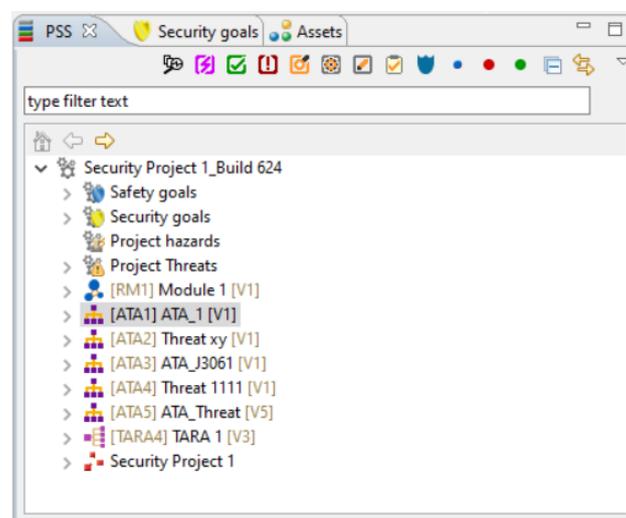


fig. 21 „PSS“ view

The **Security Goals** view shows all created security goals of the project. They can be edited here.

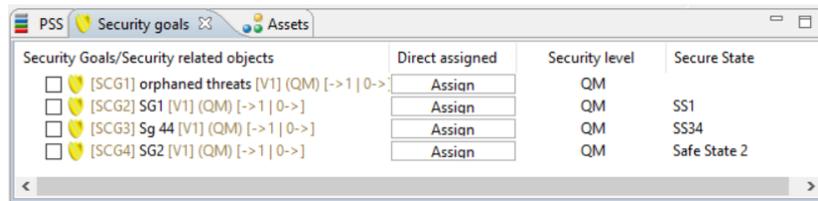


fig. 22 "Security Goals" view

The **Assets** view shows all created assets of the project. An asset can be assigned to any element in the ATA from here by drag and drop.

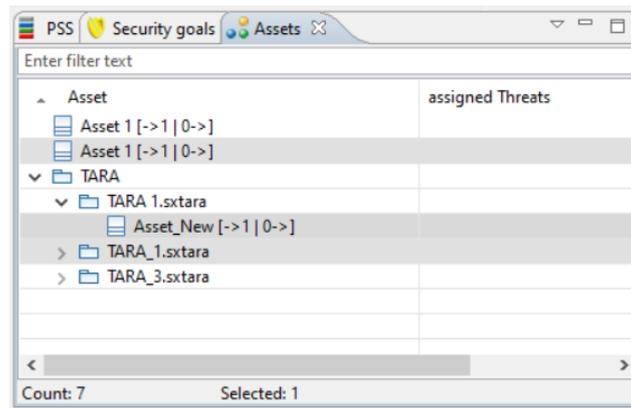


fig. 23 "Assets" view

### Miniature View

The miniature view shows the active ATA or active page breaks. The miniature view is synchronized with the editor, so you can use the view to navigate in the ATA.

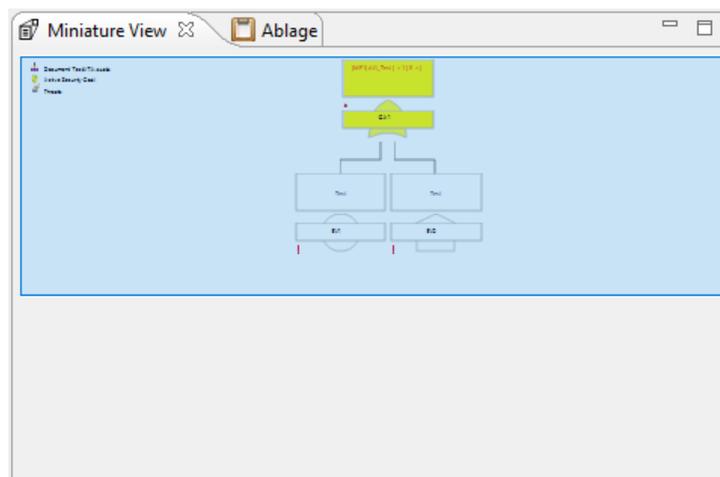
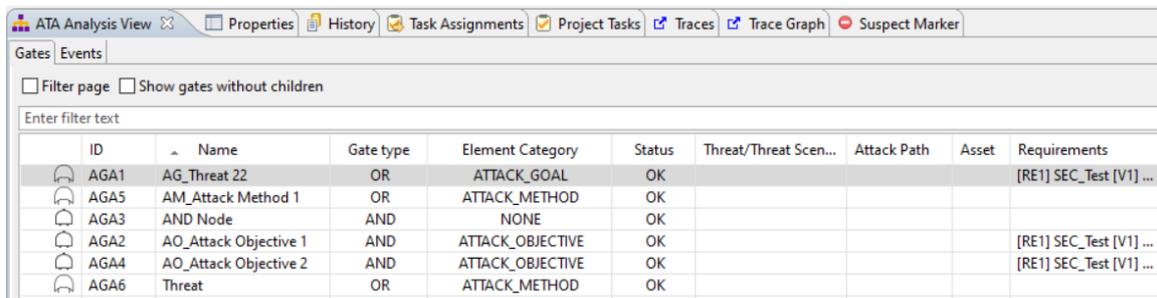


fig. 24 "Miniature" view

### ATA Analysis View

- **Gates:** The tab „Gates“ of the ATA Analysis View provides information on gate settings and objects associated / connected to it.



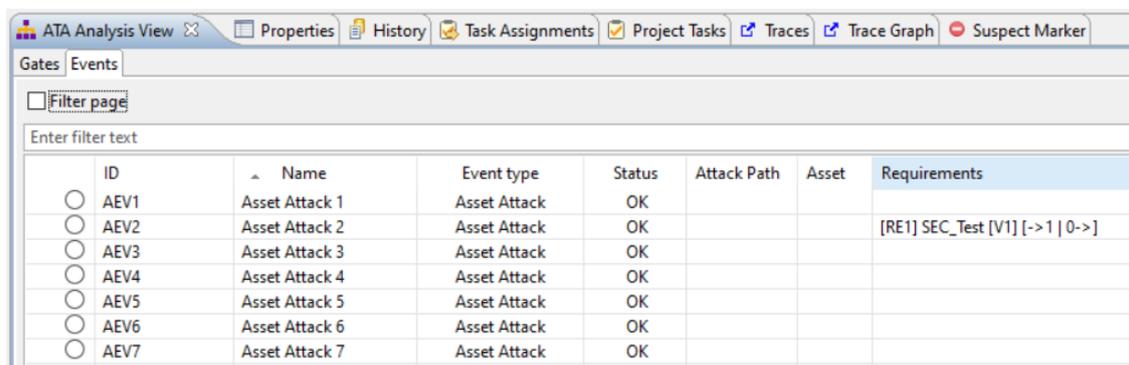
ID	Name	Gate type	Element Category	Status	Threat/Threat Scen...	Attack Path	Asset	Requirements
AGA1	AG_Threat 22	OR	ATTACK_GOAL	OK				[RE1] SEC_Test [V1] ...
AGA5	AM_Attack Method 1	OR	ATTACK_METHOD	OK				
AGA3	AND Node	AND	NONE	OK				
AGA2	AO_Attack Objective 1	AND	ATTACK_OBJECTIVE	OK				[RE1] SEC_Test [V1] ...
AGA4	AO_Attack Objective 2	AND	ATTACK_OBJECTIVE	OK				[RE1] SEC_Test [V1] ...
AGA6	Threat	OR	ATTACK_METHOD	OK				

fig. 25 Gates

If the "Filter page" function is activated by a check mark, only the gates will be shown which are part of the active page break.

If the "Show gates without children" function is active by a check mark, only the gates without an Asset Attack, Undeveloped Path or Transfer Event will be shown.

- **Events:** The tab „Events“ of the ATA Analysis View provides information on event settings and objects associated / connected to it.



ID	Name	Event type	Status	Attack Path	Asset	Requirements
AEV1	Asset Attack 1	Asset Attack	OK			
AEV2	Asset Attack 2	Asset Attack	OK			[RE1] SEC_Test [V1] [-> 1   0->]
AEV3	Asset Attack 3	Asset Attack	OK			
AEV4	Asset Attack 4	Asset Attack	OK			
AEV5	Asset Attack 5	Asset Attack	OK			
AEV6	Asset Attack 6	Asset Attack	OK			
AEV7	Asset Attack 7	Asset Attack	OK			

fig. 26 Events

If the "Filter pages" function is active, only the events will be shown which are part of the active page break.

## ATA Editor

The ATA Editor shows the ATA, the Security Goal that should protect the Main Element from the Threat.

## Sidebar

- Palette

 Select	Select individual objects
 Marquee	Select several objects

- Objects

