

ENCO SOFTWARE GMBH I Lortzingstr. 9 I D-81241 MÜNCHEN

ATA User Guide

Inhalt Introduction	2
Step-by-Step-Guide	2
Creating a new File	2
Creating a Gate	3
Creating an Event	4
Calculation of feasibility level at every element	5
Propagate feasibility to top-level and exchange rating from ATA to TARA	6
Link requirements and assets to elements in ATA	7
Creating a Page Brake	9
Editing an ATA	9
Exporting as a Picture	11
Print	12
The User Interface	14
PSS view, Security Goals view, Assets view	14
Miniature View	15
ATA Analysis View	15
ATA Editor	17
Sidebar	17



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.

🕞 ATA		New	>	÷.	New	ATA File
2.23		Edit	Enter	(ک	New	Folder
	×	Delete (in Repository)	Delete	ti ti	Proje	roject ct catalog
		Show in Umbenennen	> F2		3	TRA3
	24 24	<u>I</u> mport Exp <u>o</u> rt				TRA4

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**.

 \rightarrow An ATA File was created and added to the Repository.



O New ATA file				\times
New ATA file				
Target folder	Projects/Test Projects/Security Pro	31/AT/	Brov	vse
Filename			1	
Description			5	
Norm	ISO_21434	6		~
Profile	Standard		- 7	~
Threat/Threat Scenario	<create new=""></create>	8		~
New Threat/Threat Scenario Name:	Threat		9	
?	10 Finish		Cancel	

fig. 2 New ATA file dialog

Creating a Gate

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

۲					😳 Palette	\triangleright
type filter text	,		<	╞╺╶╬╸╸	Select	
FMEA Gate	Name		3		[]] Marquee	
	Description				🗁 Objects	
			4			
					AND	
	Gate Type	AND		5 ~	Asset Attack	
	Element Category Background color	ATTACK_OBJECTIVE	6	~	C Undeveloped Path	
		7	Restore Defaults	Apply	1	
?		8	Apply and Close	Cancel		

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.

 \rightarrow 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.

0			– 🗆 🗙	😲 Palette 🛛 🗅
type filter text	,		⇔・⇔・・	Select
Event				
Event	Name		3	🗁 Objects 🛛 🗠
	Description			
				🗋 AND
			-	OTING
				Asset Attack
	Event lype	Asset Attack	5	Undeveloped Path
	Background color	Color 6	_	○ Transfer
		Restore <u>D</u> e	faults <u>Apply</u>	
?		7 Apply and Clo	ose Cancel	
		•		

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.

 \rightarrow 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.



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.

> AG Gebaccessta La > AG Gebaccessta La Image: Control of the status of the	💱 Teet(Main) 🕴	- 0
Coursent TestAlA.cada Active Security Goal: Test Create page break Change gate type Change diement Categories type Security Goal: Test Secur	> AG GelAccesto	¥ ¥
	Document Test/A.sxata Active Security Goals Test Active Security Goals Test Test/Test/Test/A.sxata Test/Test/Test/Test/Test Test/Test/Test/Test/Test/Test/Test/Test/	 ▲ Pelette ▶ Select > Marquee > Objects > OR > AND > Asset Attack > Undeveloped > Path

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.

© ENCO



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.

ATA Analys	sis View 🔲 Properties 🛛 👔	🛛 History 🗟 Aufgabenzuordnungen	🖉 Projektaufgaben 🖸 Verknüpfungen	🕑 Verknüpfungsgraph 🗢 Suspe	tt Marker 📑 🗸 🖓 🗖
General		Feasibility Level (calculated)	Feasibility Level (propagated)	
ATA Node	-	Not Calculated Yet	Very Low	Calculate Feasibility Level	Clear Calculated Feasibility Level
Comments	Elapsed Time		> 3 years		~
Images	Specialist Expertise		Multiple experts		~
Styles	Knowledge of the Component		Strictly Confidential		~
	Window of Opportunity		Difficult/None		~
	Equipment		Multiple bespokes		~

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

Document: ATA_1.sxata

Threat/Threat Scenario: AG_Threat 22

Norm: ISO_21424

Profile: Standard

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

🚠 ATA Analysis View 🔲 Properties 🗐	History 🛃	Aufgabenzuordnungen	🖉 Projektaufgaben 🗹 Traces 🛛 🖸 Trace Graph 🗢 Suspect Marker	·
♦ [AGA2] Gate AO_Attack Objective 1 [V4]			
Connected Element	Direction	Relation Type	Resource	
 SEC_Test 	<-	< <requirement>></requirement>	cdo://repo/\$projects/Test Projects/Security Project 1/RM/Module 1.srm	
្មិ¦ _ឌ 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.

[MF8] AM_TestElement [- >1 0->]
GA8

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.

🗸 🗁 ATA			
> 🚠 les 👝 Test		New Add existing permutations for malfunction	>
		Open Open with	>
	×	Delete (in Repository)	Delete
		Umbenennen	F2
	2	Import	
	4	Exp <u>o</u> rt	
		Document properties	

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



type filter text	ATA1	← ▼ ⇒
ATA Document ATA module FMEA	Sequential number Description	1 override i
	Norm	ISO_21434
	Profile	Standard
	Threat/Threat Scenario	[TH6] Threat AG_Threat 22 [V25] ([ATA1] ATA_1.sxata)
	New Threat/Threat Scenario Name:	AG_Threat 22
		Restore Defaults Apply

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.

pe filter text	ATA 🗢 🗘 🛪
ATA Document ATA module FMEA	ATA Editor Ignore page breaks Hide header data Hide event data
	Display Decimal places 2 Restrict minimal cut sets to length of (0 for no restriction) 0 Calculation CCF Betafactor Model: adjust independent Q i Diagram Node state
	Node style
	Schriftart Segoe UI-regular-9 Change Restore Defaults Apply

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.

O AO_Attack O	bjective 1	— 🗆 X
type filter text	AGA2	
FMEA Gate	Name Description Gate Type Element Catego Background colo	AO_Attack Objective 1 AND AND ATTACK_OBJECTIVE Color
		Restore Defaults Apply
?		Apply and Close Cancel
Gate Type At Element Category Of	ID D	Element Category ATTACK_OBJECTIVE Background color NONE ATTACK_GOAL ATTACK_METHOD ATTACK_OBJECTIVE

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 menue.

AO_Attack Ob	jecti	ve 1	
	۵	Print	
AGA2		Create page break (new ATA)	
AFL = Vén		Create page break	
		Propagate Likelihood/Feasibility	
		Change gate type)
		Change element categories type	>
		Export Diagram	Ctrl+0

- 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.

 \rightarrow 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.

© ENCO

۵	Print	
	Export Diagram	Ctrl+O
	New	>
	Show in	>

fig. 18 Context menu for printing

- 2. Choose Print...
 - ► The "Print preview and preferences" dialog opens.

Print preview and	d preference	5		
Figure All Selected (only s	ingle-selecti	on)	Print preview	for first page:
Size				Canada an
Scaling:	Width:	1.0 ~		
O Custom size:	Width:	10.0		and and a strength
Fixed aspect rat	Height: io	5.752212389380531		S buyinn Mandanis Manda
Position Left margin: Top margin: Center image	0.0			N Report 199
Units O cm (a) inches Affects "Position"	and "Size - C	ustom"		Page(s) to prin
		Change P	inter O	K Cancel

fig. 19 Dialog "Print previews and preferences"

- 3. Change the print settings as needed.
- 4. Click on **OK**.

 \rightarrow The ATA will be printed with the chosen preferences.

© ENCO

The User Interface

This is the default ATA perspective:

			Long L M.			1						1
1	• 👺 📷 🗐 🗐 🥲	1 🖸 🗶 🖬 🖌 🛄 🦑 1	→ • @ \$>	(• %) • ∰ • ⊯ •	8.9.	· · · · · · · · · · · · · · · · · · ·		× 1	3 I A * ⊕ * J *	0.8	E are the literature of the second	
Project (_Build dua[mein] 23											Security goals → Assets	•• •
str.22 comment ADL Lustra methodes Execution sites Societard sites Societard	O, Attack Objective 1 AGA2 ATL - Very Low		AQ Door	42 New		AD, Attack Objective AGM	.2			A is 3 O Pener Oren O	Profile Disk Disk <thdisk< th=""> Disk Disk <</thdisk<>	
Aust Attack 1	AN *	D Node		AM, Attack Me	thod 1			Threat		4 5		1
Aust Attal \ Automatical \ Automat	AN * AN Getes Events Filter page [] : Enter filter text	D Node GA3 w S1 Properties P	History 😪 Tasi	AM, Attack Me AGAS K. Assignments) 🕑 Project	thod 1 t Tasks) Cf 1	aces) & Trace Graph) is	 Suspect Mark 	Threat AGA6		4 5	Coptorel	
Aust March 1	* A	GA3 w II Properties Properties Automatication of the second seco	History 🛞 Tasi Gate type OR	Add, Attack Me AGAS AGAS AGAS Rasignments) © Project Biennent Category attack Mithaon	thed 1 Tasks) Of 1 Status OK OK	aces] Ef Trace Graph] 1	Suspect Mark	Threat AGA6 ar Asset	Bepirments [R1]14C_E4[Y]_	4 5		
And Attack	* * *	D Node GA3 w II Properties P show gates without children - Name Add, Threat 2 Add, Thr	History 😒 Tast Gate type OR AND	Ad, Atack Me Arska Adsignments	thed 1 t Tasks Cf 1 Status OK OK	aces) of Trace Graph) is	Suspect Mark	AGA6	Represents RELISECTON	4 5		
And Heart	ANN * * * * * * * * * * * * * * * * * *	SAJ	History 😒 Tast Gate type OR OR AND AND	AM_Attack Me	thed 1 t Tasks Cf 1 Status OK OK OK OK	aces) 65 Trace Graph) -	Suspect Mark	AGA6 aer Asset	(0) Regularments (RE) SEC_Sec (V1) [RE1105C = Sec V11	4 5		
Aust Attack Add. Add. Cattery E Operium Operium Operi	* * * * * * * * * * * * * * * * * * *	D Node	History 😪 Tasl Gate type OR AND AND AND OR	AM, Attack Me ASA3 ASA3 Assignments Project Biomore Category ATGAC, GOAL ATGAC, GOAL ATGAC, GOAL ATGAC, GOAL ATGAC, GOAL ATGAC, GOAL ATGAC, GOAL ATGAC, GOAL ATGAC, GOAL	thed 1 Status OK OK OK OK OK	acts] of Trace Graph] is	Suspect Mark	AGA6 er]	Requirements [R1] SC_Vec(1)][R1] SC_Vec(1)]_[R1] SC_Vec(1)]_[R1	4 5		
And Hank	* * *	GA3 GA3 * 37 Properties Properties And Proce 22 And Proce 23 And Proce 24 And And And And And And And And And And	Hatery 🗟 Tast Gate type OR AND AND OR OR	AM, Attack Me AGAS (Assignment) Project Blement Category aTTaCK, 00AL ATTaCK, 00AL ATTaCK, 00AC/THE ATTaCK, 00BC/THE ATTaCK, 04BC/THE	thed 1 Status OK OK OK OK OK	aces] Ef. Trace Graph] 1	Suspect Mark	AGA6	(1) Reportments (R1) SEC_Son (V1) (R1) SEC_Son (V1) (R1) SEC_Son (V1)	4 5		
Aust Attack 1	AN AAA Analysis Vie Gene [ceres] — Repage [] Gene friet tot — Adds — Add	D Node	History 😪 Tasi Gate type OR OR AND AND OR	Ad, Attack Me AGAS Assignments ? Project attack, withhop NONE attack, withhop	Status OK OK OK OK OK	aces) of Trace Graph) -	Suspect Mark	AGA6	Requirements PR111SEC_Text(YT)	4 5		
And Hanks	AN * * * * * * * * * * * * * * * * * * *	SA3 SA3 II Properties Properties A Annene Annene A Annene A Annene Annene A Annene A Annenene Annene A Ann	History 🛞 Tasl Gate type OR AND AND OR	Adjutack Me Adjutack Me Adjutack Abaigmmeth © Project ATBAC (Adjutack) ATBAC (Adjutack) ATBAC (Adjutack) ATBAC (Adjutack) ATBAC (Adjutack)	thed 1 Tasks Cf 1 Status OK OK OK OK	Ren of Teer Graph	Suspect Mark	AGA6	() Reportments (R1) SEC_Sea (V1) - (R1) SEC_Sea (V1) - (R1) SEC_Sea (V1) -	4 5		

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.

📕 PSS 💛 Security goals 🖾 💦 Assets							
Security Goals/Security related objects	Direct assigned	Security level	Secure State				
[SCG1] orphaned threats [V1] (QM) [->1 0->	Assign	QM					
🔲 💛 [SCG2] SG1 [V1] (QM) [->1 0->]	Assign	QM	SS1				
🔲 💛 [SCG3] Sg 44 [V1] (QM) [->1 0->]	Assign	QM	SS34				
🔲 💛 [SCG4] SG2 [V1] (QM) [->1 0->]	Assign	QM	Safe State 2				
<				>			

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.

📕 PSS 💛 Security goals 💦 Assets 🛛	~
Enter filter text	
Asset	assigned Threats
Asset 1 [->1 0->]	_
Asset 1 [->1 0->]	
🗸 🛅 TARA	
✓ ☐ TARA 1.sxtara	
Asset_New [->1 0->]	
> 🛅 TARA_1.sxtara	
> 🛅 TARA_3.sxtara	
Count: / Selected: 1	

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.

1	f Miniature View 🕴 🔲 Ablage	
	al EncenthetTians	

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.



📥 ATA Ar	🛔 ATA Analysis View 🛛 🔲 Properties 📳 History 🗟 Task Assignments 🖉 Project Tasks 🗹 Traces 🗹 Trace Graph 🗢 Suspect Marker								
Gates Eve	ates Events								
Filter	Filter page Show gates without children								
Enter filt	Enter filter text								
	ID	Name	Gate type	Element Category	Status	Threat/Threat Scen	Attack Path	Asset	Requirements
6	AGA1	AG Threat 22	OR	ATTACK GOAL	OK				[RE1] SEC Test [V1]
A	AGA5	AM_Attack Method 1	OR	ATTACK_METHOD	ОК				
Ĥ	AGA3	AND Node	AND	NONE	OK				
Ĥ	AGA2	AO_Attack Objective 1	AND	ATTACK_OBJECTIVE	OK				[RE1] SEC_Test [V1]
Ĥ	AGA4	AO_Attack Objective 2	AND	ATTACK_OBJECTIVE	OK				[RE1] SEC_Test [V1]
9	AGA6	Threat	OR	ATTACK_METHOD	OK				

119. 2) Outes	fiq.	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.

📩 ATA Ar	nalysis View 🕅	📃 Properties 🔒 Hist	tory 🛃 Task Assignmen	ts 📝 Projec	t Tasks 🗹 Trac	es 🗹 Tr	ace Graph	Suspect Marker
Gates Eve	tes Events							
Filter	Filter page							
Enter filt	er text							
	ID	Name	Event type	Status	Attack Path	Asset	Require	ments
0	AEV1	Asset Attack 1	Asset Attack	ОК				
0	AEV2	Asset Attack 2	Asset Attack	OK			[RE1] SE	C_Test [V1] [->1 0->]
0	AEV3	Asset Attack 3	Asset Attack	OK				
0	AEV4	Asset Attack 4	Asset Attack	OK				
0	AEV5	Asset Attack 5	Asset Attack	OK				
0	AEV6	Asset Attack 6	Asset Attack	OK				
0	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

읃 Objects	\Leftrightarrow
🗋 AND	
OTING	
🔿 Asset Attack	
C Undeveloped Path	
○ Transfer	