JOHNS HOPKINS
APPLIED PHYSICS LABORATORY

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A Plugin for Information Security Marking of MagicDraw Models

Version 1.0.1

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DISTRIBUTION STATEMENT A:
Approved for public release.

Agenda

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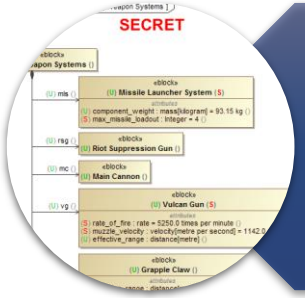
Presentation Objectives


DoD Humanitarian Assistance Activities
Fiscal Year 1996

April 1997

Office of the Assistant Secretary of Defense for Strategy and Requirements

Describe the motivation behind the development of the plugin



Present the latest version of APL's Information Security Plugin for MagicDraw

Generate community interest in the plugin

- Distribute version 1.0.1 to a broader community
- Determine if a model marking standard can be established across the modeling community

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Background

Motivation for the Plugin

In some industries, there are policies and procedures for protecting sensitive information

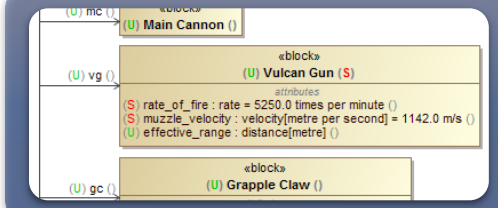
- Example: Department of Defense (DoD) Information Security Program for classified information
- Example: An organization's internal policies and procedures to protect their inventions and trade secrets

Marking is a key component of information security processes

- If the information is properly marked, then it's clear how the information should be handled

Traditional documents and information media have well-defined marking and identification procedures

- Example: DoD has explicit procedures for marking documents, briefing slides, e-mail, web pages and even instant messages (DoD Manual 5200.01 Volume 2)



Marking and identification procedures not as well defined for elements within MBSE models

- Model structures are more complex than traditional documents
- Many information security marking methods are possible, leading to lack of standardization

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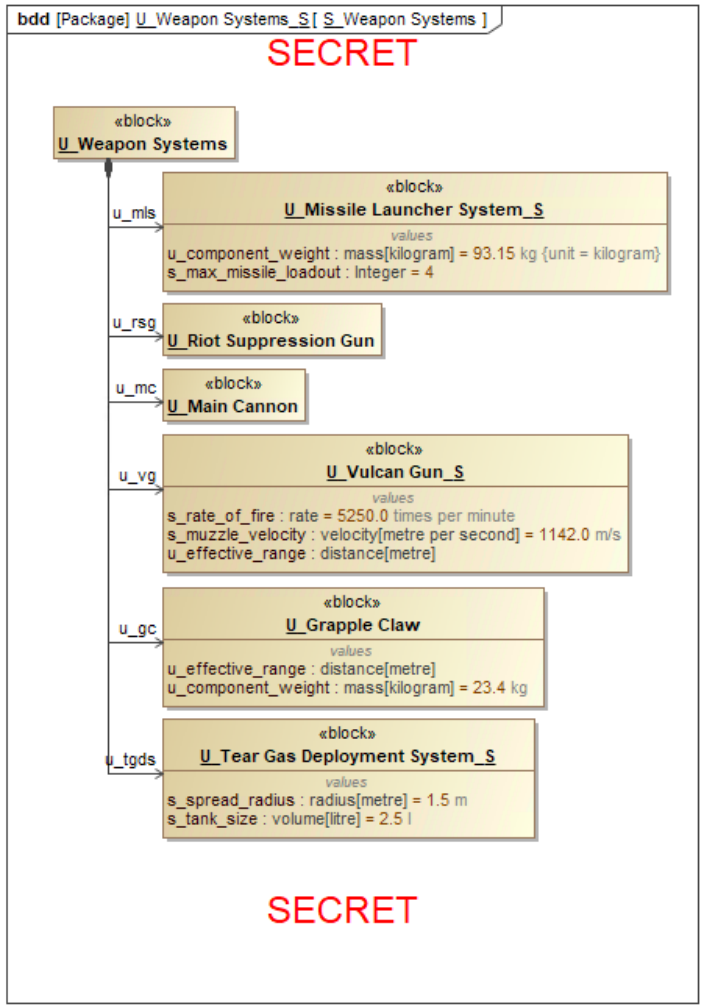
Background

Information Security Plugin History

- APL developed the Information Security Plugin for MagicDraw initially during a 2019 internal research and development project
- The original plugin provided several capabilities:
  - Leveraged element names to capture portion and containment markings
  - Validated element containment markings based on child portion markings
  - Validated diagram portion markings based on the portion markings of displayed elements
  - Implements markings database XML file to define available markings and rules for how they are applied and formatted
- Version 0.1 Beta was released to several organizations for beta testing
  - Additional beta releases followed with incremental improvements
- Several improvements were requested as a result of beta testing and conferences presentations
  - Improved marking performance and appearance
  - Automated marking options
  - Usability improvements

Version 0.1 Beta



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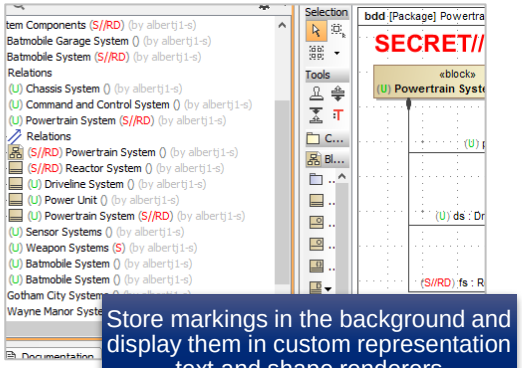
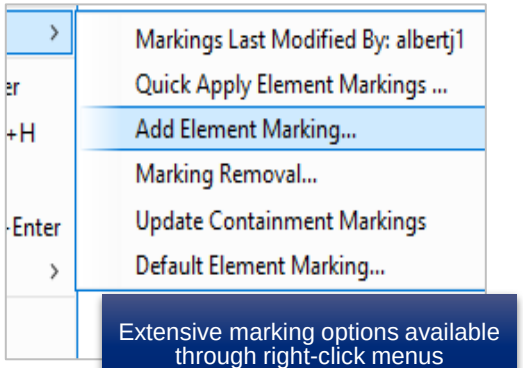
Highlights of Latest Plugin Version



Store markings in the background and display them in custom representation text and shape renderers



Extensive marking options available through right-click menus

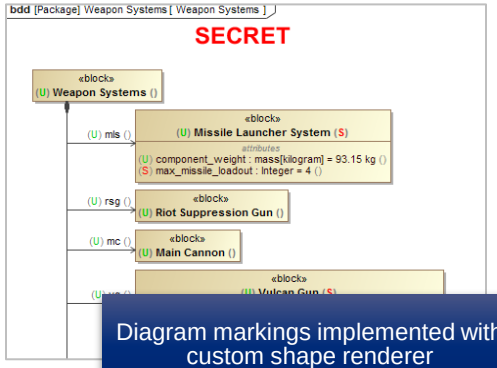
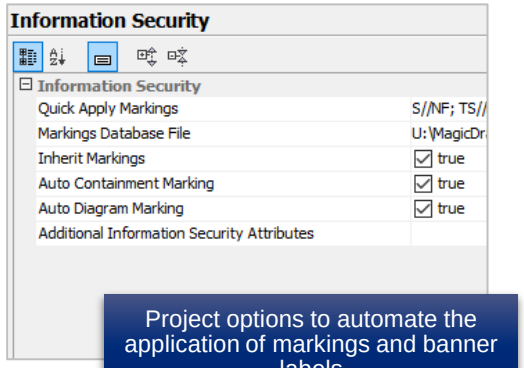
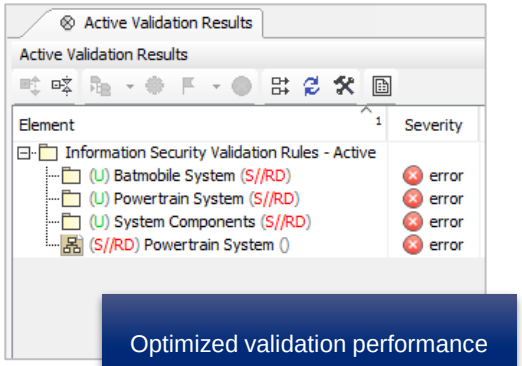


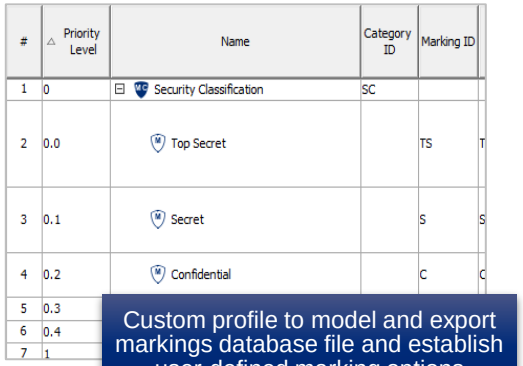
Diagram markings implemented with custom shape renderer



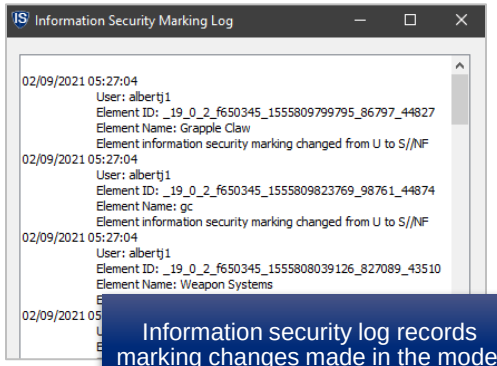
Project options to automate the application of markings and banner labels



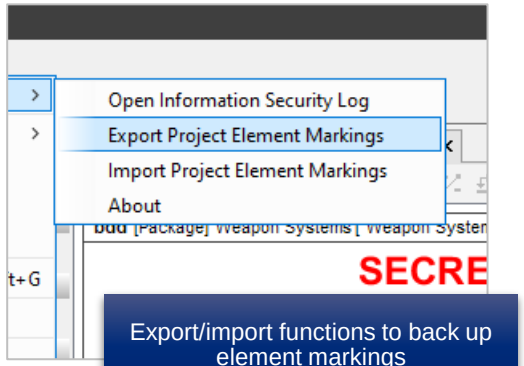
Optimized validation performance



Custom profile to model and export markings database file and establish user-defined marking options



Information security log records marking changes made in the model



Export/import functions to back up element markings

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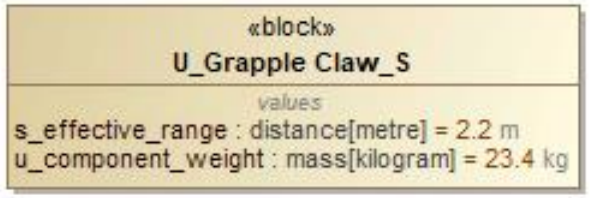
Plugin Capabilities

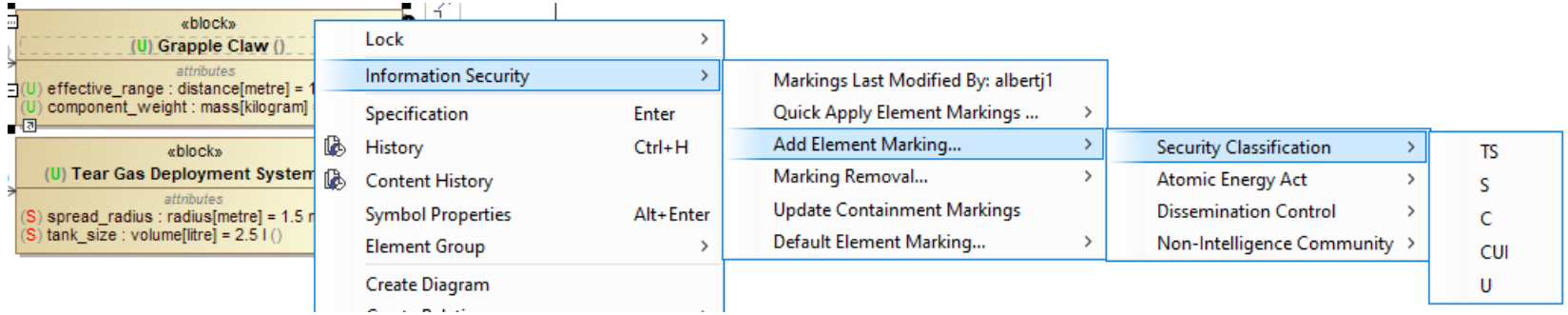
Element Marking

- Version 0.1 Beta used the element name field to capture portion and containment markings
  - Not all element types have names
  - May not want to modify the name of an element just to include information security markings
- In version 1.0.1, markings are now stored in the background as an invisible project option
  - Works for all element types
  - No need to modify any element properties
  - Modifiable through menu actions
  - Made visible through custom representation text and shape renderers
- Additional marking capabilities
  - Quick marking application
  - Default marking for new elements
  - Marking removal

Version 0.1 Beta



Version 1.0.0



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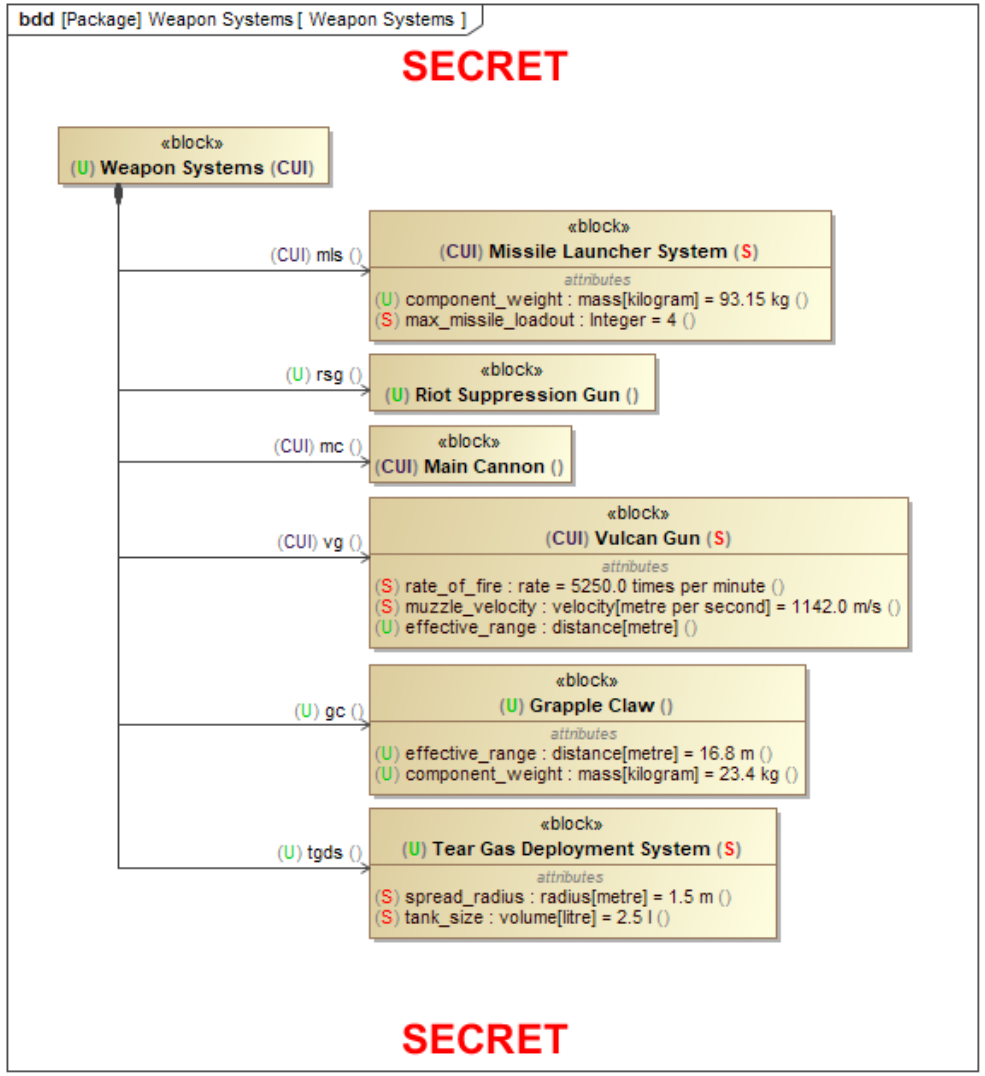
Plugin Capabilities

Diagram Banner Labels

- Banner labels automatically applied to diagrams, based on diagram portion marking
- Version 0.1 Beta used text boxes on diagram to apply labels
  - Text box content and position were modifiable by the user
  - Issues with updating banner labels when other text boxes were on the diagram
- Version 1.0.1 uses a custom diagram shape renderer to apply banner labels
  - Not modifiable by the user without changing diagram markings
  - Labels appear on all diagrams (with exceptions of diagrams like tables and relationship maps)
  - Labels appear in diagrams exported from the model, such as in reports generated from the Report Wizard



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Plugin Capabilities

Specifying Available Markings

- Available markings are specified in the Markings Database XML file
- Database file includes rules that enforce marking patterns and formatting
- Project option is used for specifying the location of the database file
- A profile (with included report template) is provided for modeling a marking database and exporting the XML file

```
<markingsDatabase>
    <markingCategories>
        <markingCategory id="SC">
            <name>Security Classification</name>
        </markingCategory>
        <markingCategory id="AEA">
            <name>Atomic Energy Act</name>
        </markingCategory>
        <markingCategory id="DC">
            <name>Dissemination Control</name>
        </markingCategory>
        <markingCategory id="NIC">
            <name>Non-Intelligence Community</name>
        </markingCategory>
    </markingCategories>
    <markings>
        <marking id="TS" category="SC">
            <bannerMarkingFull>TOP SECRET</bannerMarkingFull>
            <bannerMarkingShort>TOP SECRET</bannerMarkingShort>
            <portionMarking>TS</portionMarking>
            <dontUseInSuffix>false</dontUseInSuffix>
            <overmarks>
                <overmark>S</overmark>
                <overmark>C</overmark>
```

#	Priority Level	Name	Category ID	Marking ID	Banner Marking Full	Banner Marking Short	Portion Marking	Dont Use In Suffix	Overmarks	Incompatible With	Marking Color Red Value	Marking Color Green Value	Marking Color Blue Value
1	0	Security Classification	SC										
2	0.0	Top Secret		TS	TOP SECRET	TOP SECRET	TS	false	0.1 Secret 0.2 Confidential 0.4 Unclassified 0.3 Controlled Uncl		255	128	0
3	0.1	Secret		S	SECRET	SECRET	S	false	0.2 Confidential 0.4 Unclassified 0.3 Controlled Uncl		255	0	0
4	0.2	Confidential		C	CONFIDENTIAL	CONFIDENTIAL	C	false	0.4 Unclassified 0.3 Controlled Uncl		0	0	205
5	0.3	Controlled Unclassified Information		CUI	CUI	CUI	CUI	false	0.4 Unclassified		60	27	88
6	0.4	Unclassified		U	UNCLASSIFIED	UNCLASSIFIED	U	true			0	205	0
7	1	Atomic Energy Act	AEA										
8	2.0	Restricted Data		RD	RESTRICTED DATA	RESTRICTED DATA	RD	false			0	0	0
9	2.1	Formerly Restricted Data		FRD	FORMERLY RESTRICTED DATA	FORMERLY RESTRICTED DATA	FRD	false			0	0	0

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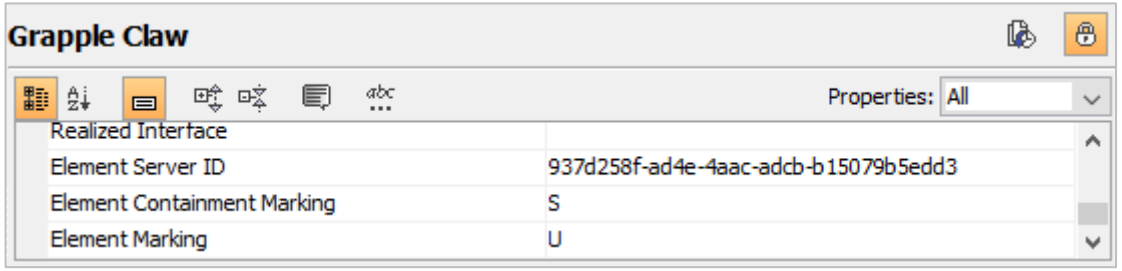
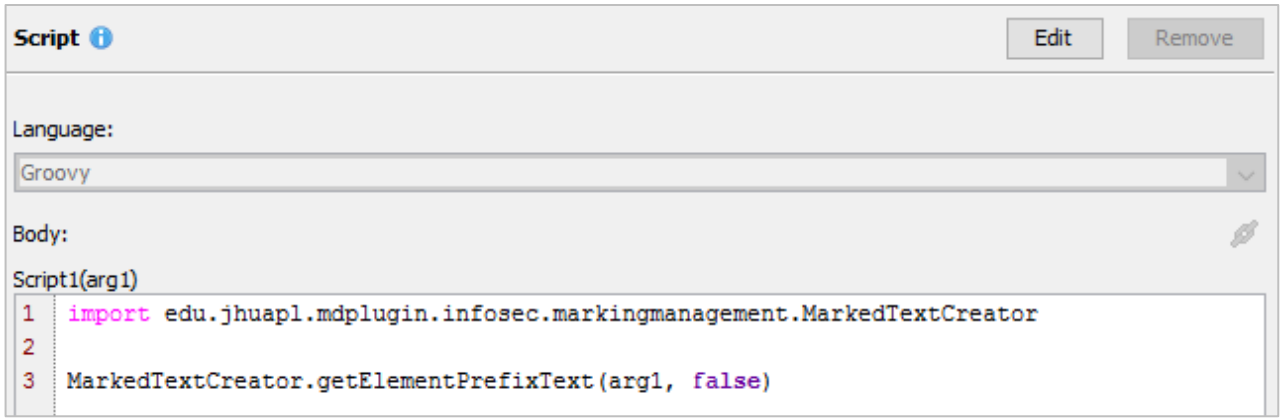
Plugin Capabilities

Access to Element Marking Information

- In addition to visual display of element markings, marking data can be accessed through two additional means:
  - Derived properties provided in Element meta class customization in the validation rule model



  - Plugin API



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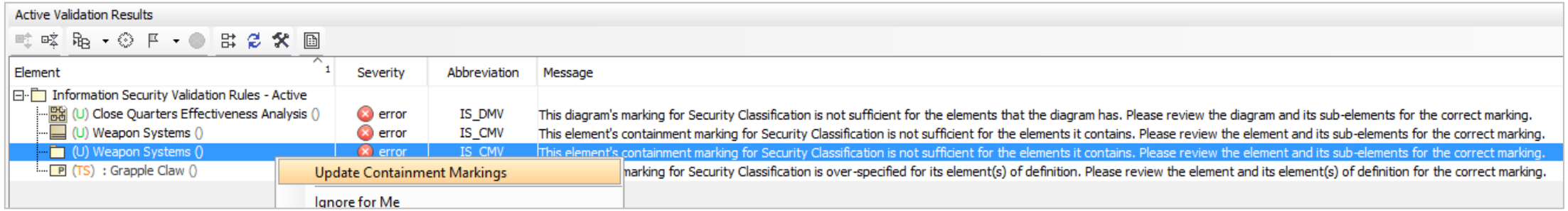
Plugin Capabilities

Marking Verification

- Validation rules are provided to verify some marking aspects
  - Corrective actions are included
- Containment marking verification
  - Verify that an element's containment marking is consistent with the strictest portion markings of all of its child elements, recursively
- Diagram marking verification
  - Verify that a diagram's portion marking (and banner labels) are consistent with the strictest portion markings of all of the elements depicted in the diagram
- Usage element marking verification
  - Verify that an element of usage (part property, call behavior action, etc.) has a portion marking that is consistent with the marking of its element of definition (type, activity, etc.)
  - Only active when the "Inherit Markings" project option is enabled



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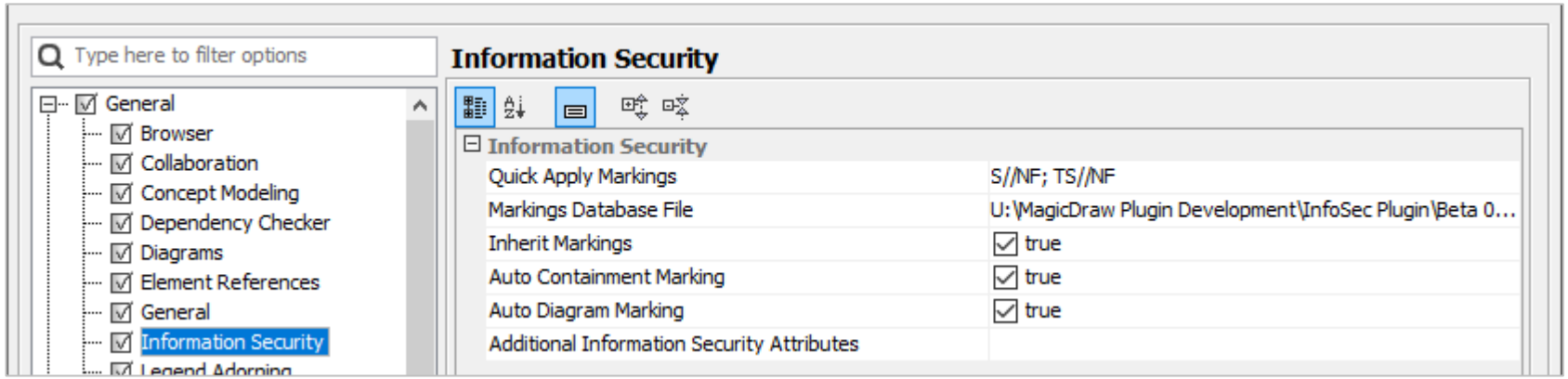
Plugin Capabilities

Automation Options

- Several project options available to automate the application of information security markings
- Inherit Markings
  - Elements of usage (types elements, call behavior actions, etc.) inherit prefix markings from their elements of definition (types, activities, etc.)
- Auto Containment Marking
  - Element containment markings will automatically update as child element prefix markings change
- Auto Diagram Marking
  - Diagram prefix markings update as prefix markings of elements in the diagram change
  - Does not currently work for certain diagram types like tables and relationship maps

NOTE: Enabling automated options will negatively impact application performance



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Case Study Example

Batmobile Development Program

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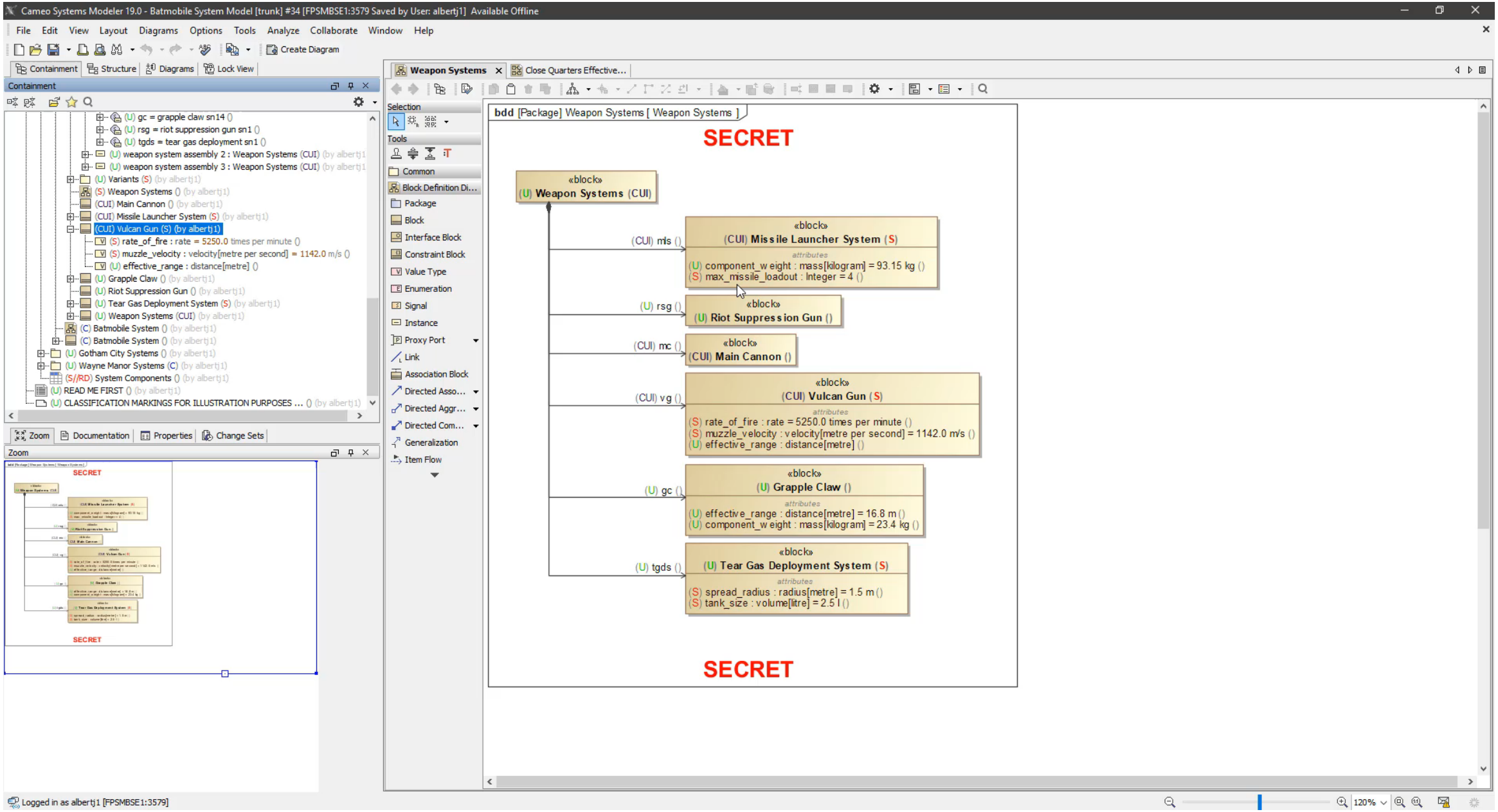

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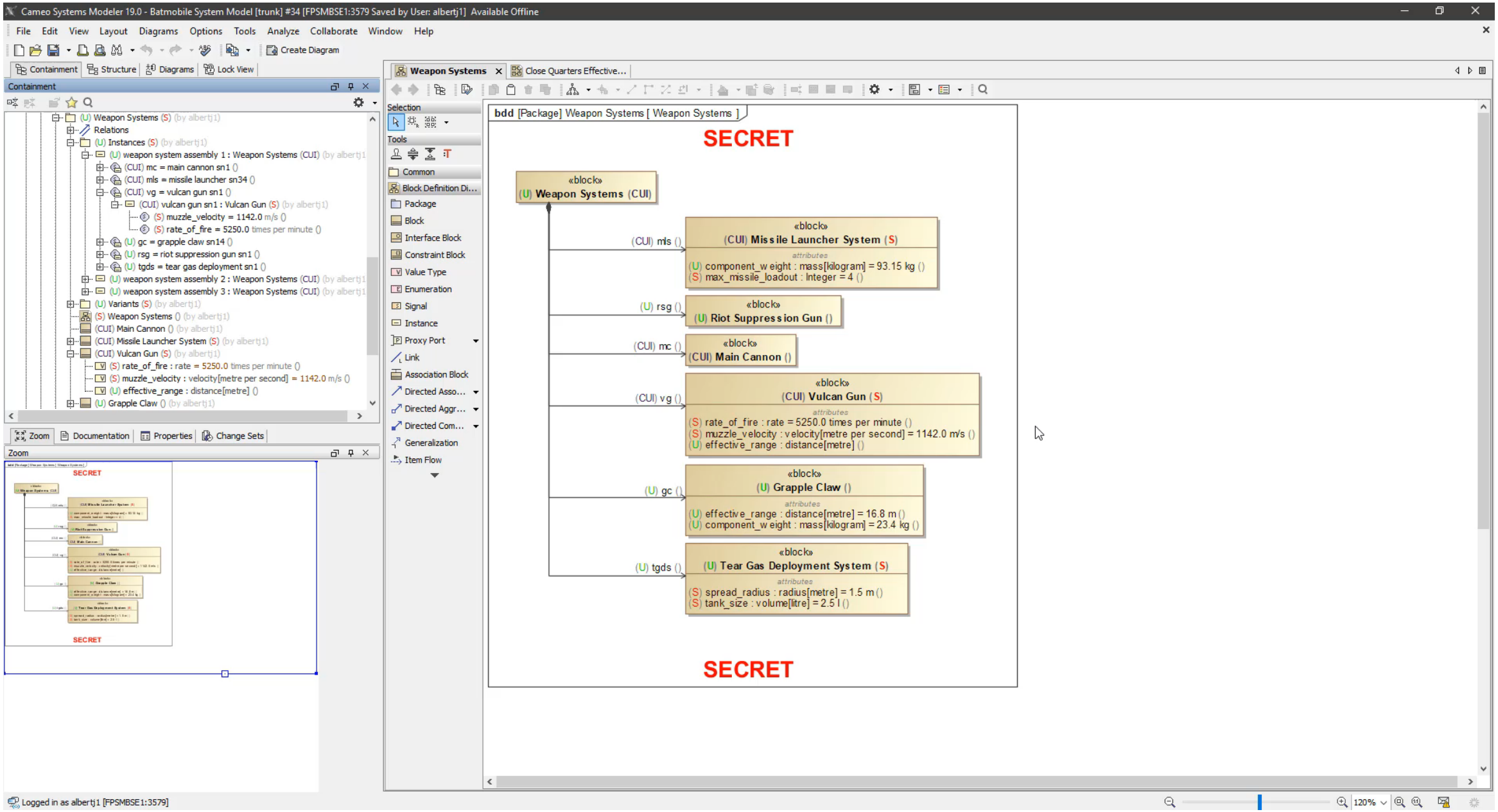

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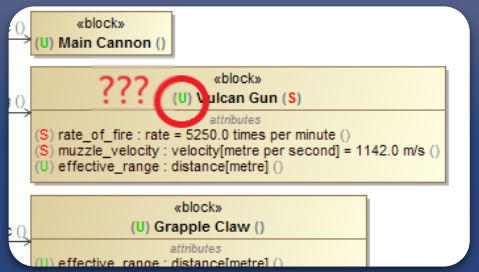
Future Development

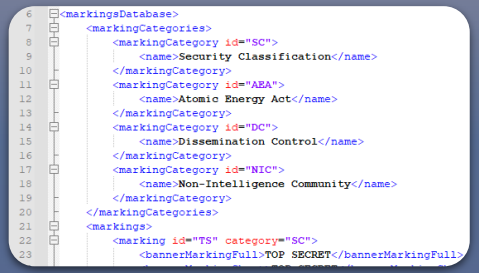
Improve performance, update capabilities, and fix bugs

- Leverage feedback from 1.0.1 release
- Interested in plugin performance for large models
- Identify new feature and capability requests



Verify element *portion markings*

- Integrate a machine readable digital classification guide
- Infer element classification based on it its properties and context within the model
- Notify the user when element portion markings may be in conflict with classification guidance
- Currently in development



Establish a digital information security marking standard

- Work with relevant stakeholders in DoD and beyond
- Support information security in digital engineering (more than just MagicDraw models)

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Version 1.0.1 Now Available!

- Currently available to government organizations
  - Provided under Distribution Statement D government purpose rights
  - Can be distributed by DoD organizations to other organizations as long as they are using the plugin only for DoD work
  - APL is working on method of plugin distribution and licensing for non-DoD uses
- Plugin package includes:
  - Plugin JAR file
  - Example markings database XML file
  - Information Security Validation Profile
  - Information Security Marking Schema Profile
  - Information Security Marking Schema Example Model
  - User manual
- Install via MagicDraw Resource/Plugin Manager
- Contact me for access to the plugin

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Questions?

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