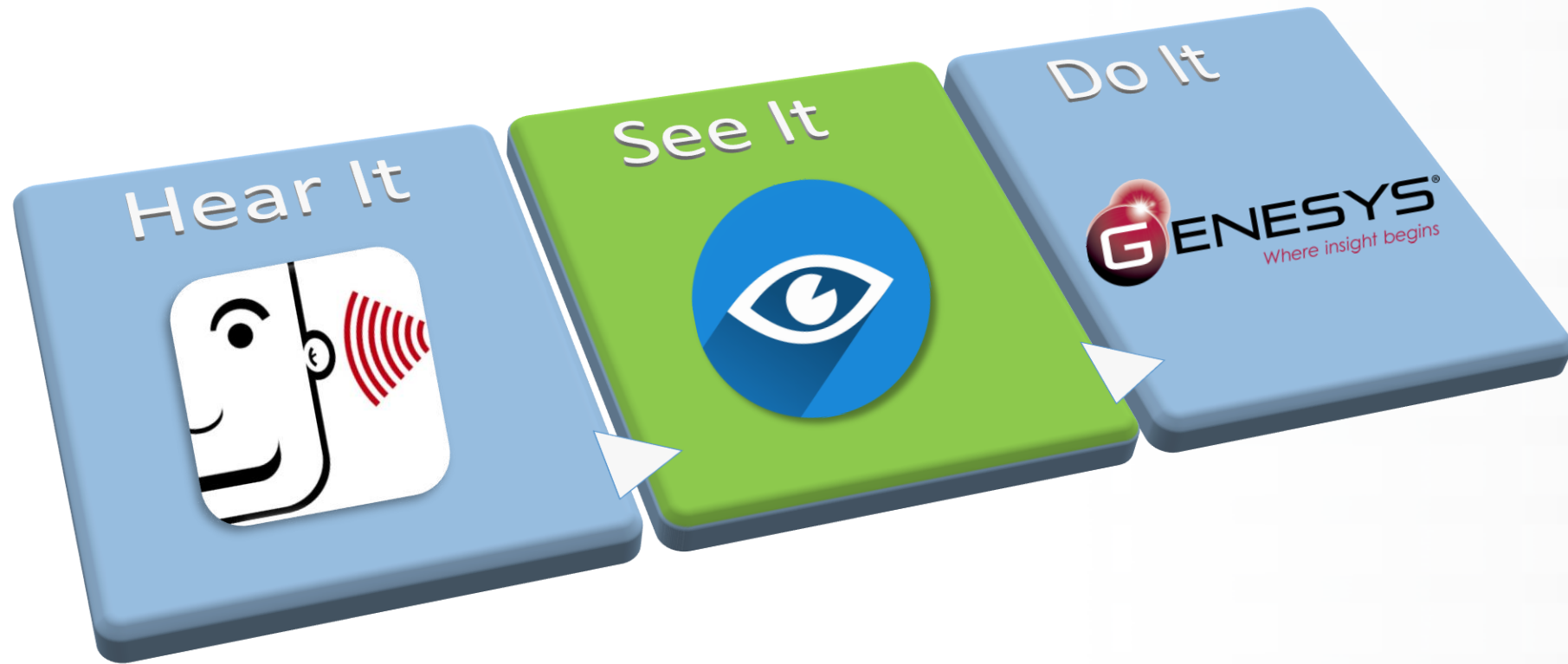


# The GENESYS Experience: A Three-Part Series



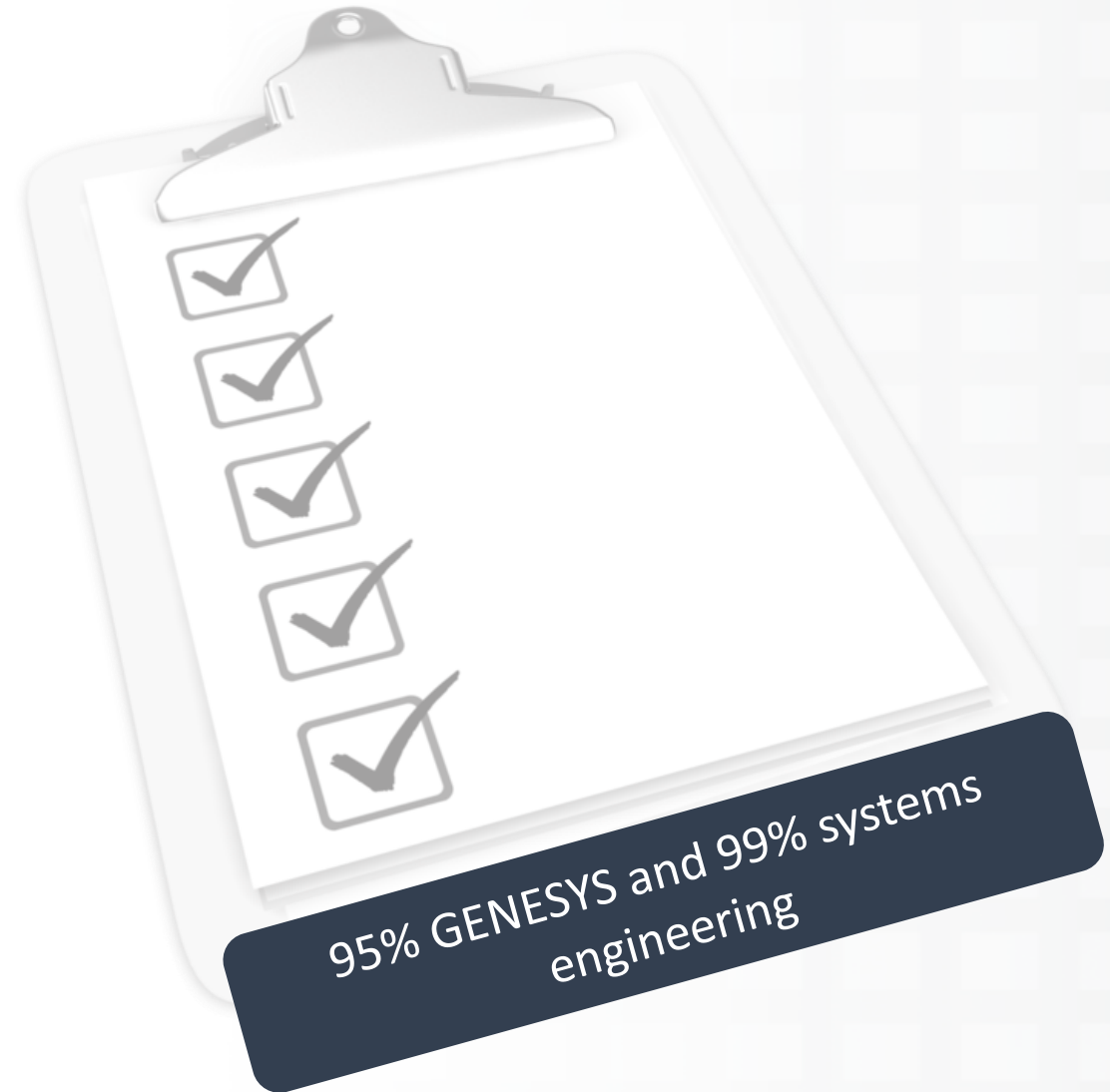
# “See It”

An introductory demonstration of GENESYS



# A Roadmap for our Session

- GENESYS Foundations
- Basic Navigation
- Getting Started
- Engineering the System
- Parametrization
- Verification





# GENESYS

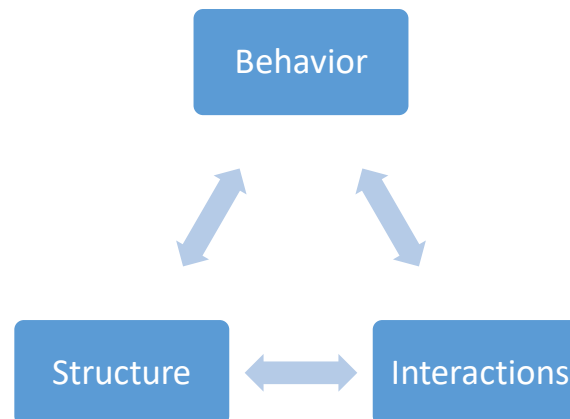
## Systems Thinking

Foundations

# System Thinking



- A **system** is an arrangement of parts or elements that together exhibit **behavior** or meaning that the individual constituents do not.
- The **behavior** is a result of (emerges from) the **interactions** of the individual components.
  - Interactions can be within your system or with things external to the system.
- The system **structure** will define the **interactions** and therefore will influence the behavior.





# GENESYS Systems Process

Foundations

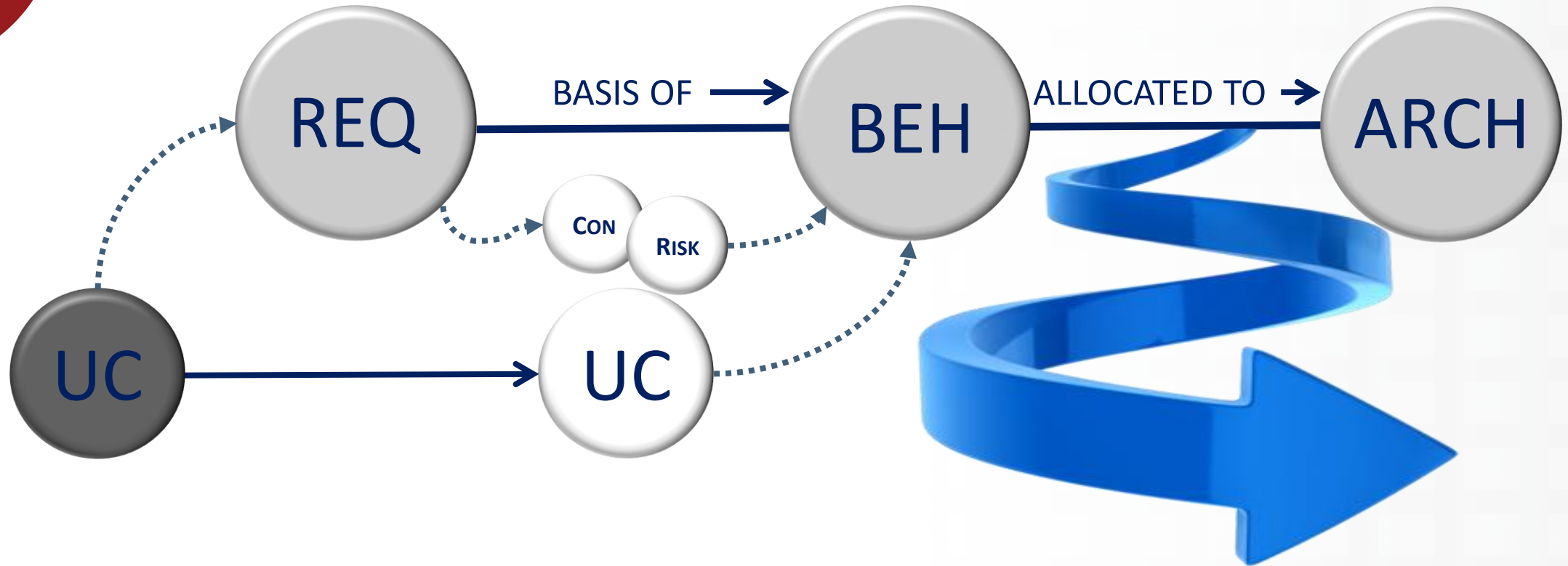
# Enterprise Perspective

Operational Architecture

System Definition  
(black box perspective)

Behavioral Architecture  
(glass box perspective)

Physical Architecture



PROBLEM SPACE

SOLUTION SPACE

# Poll Question

---



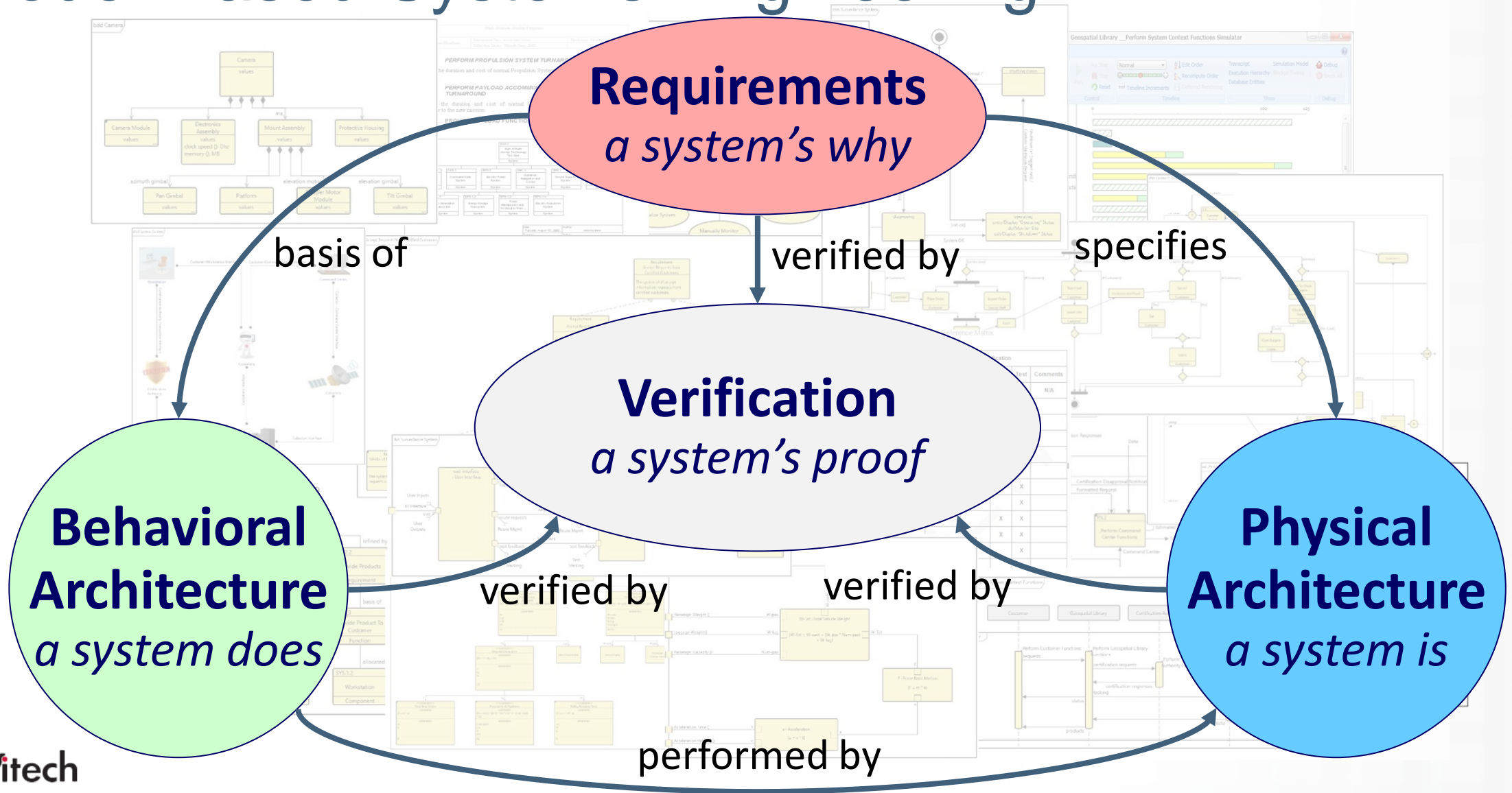




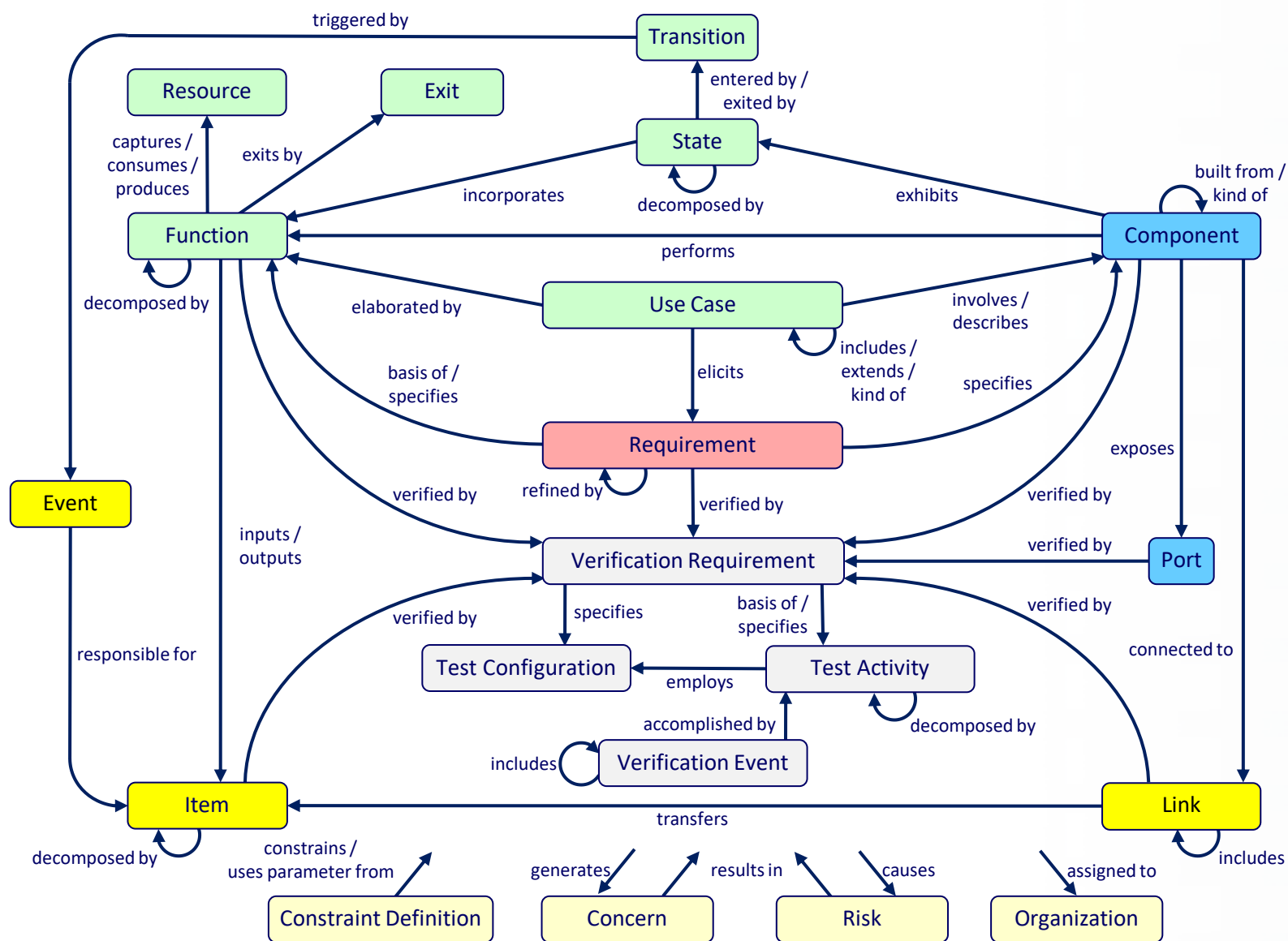
# GENESYS Information Model

Foundations

# Focusing on the Foundational Concepts: Model-Based Systems Engineering



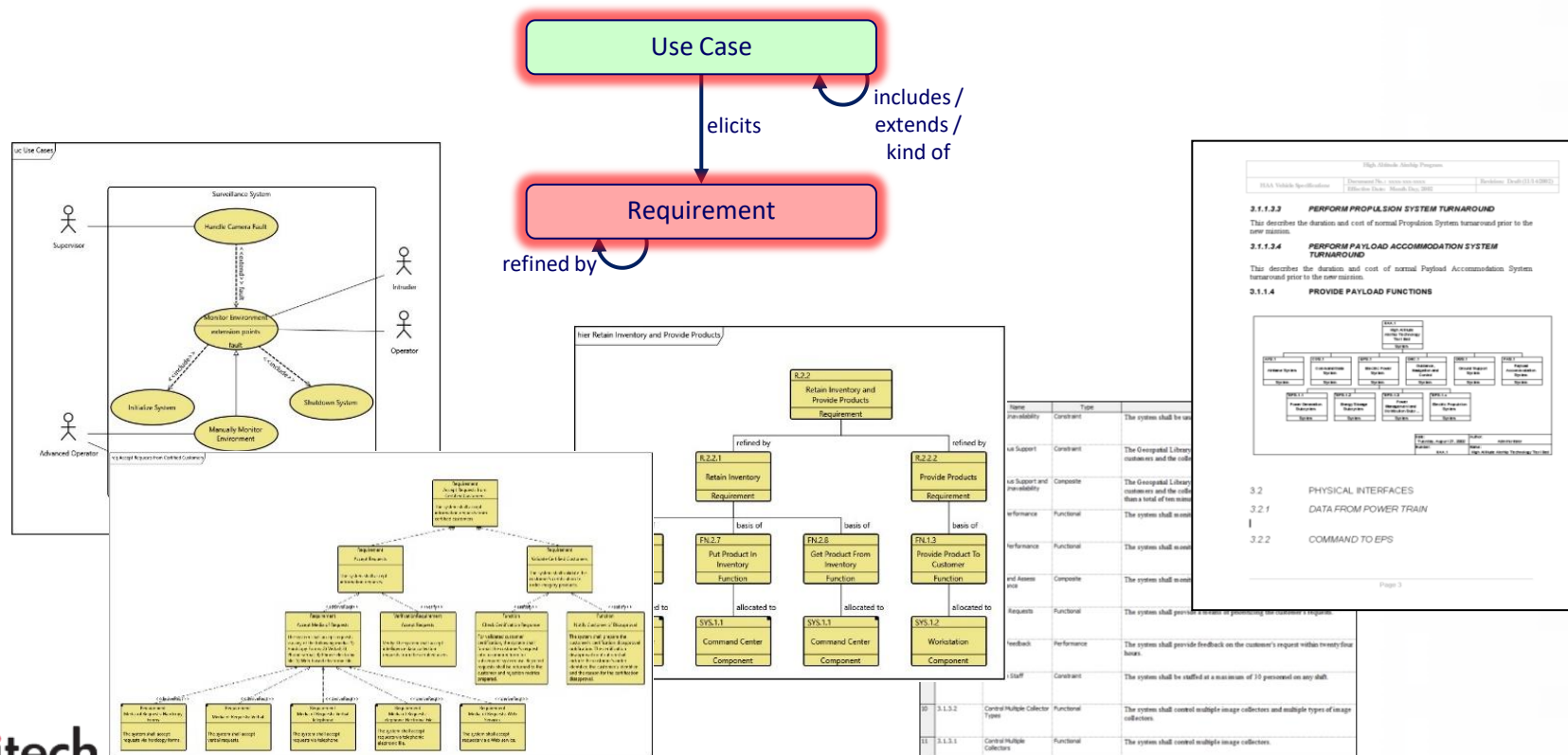
# Simplified Engineering Metamodel



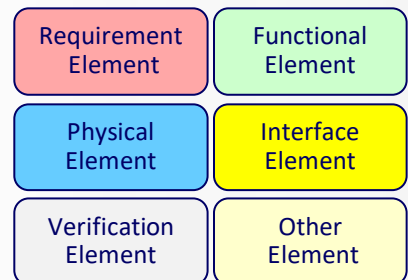
## Color Code

Requirement Element	Functional Element
Physical Element	Interface Element
Verification Element	Other Element

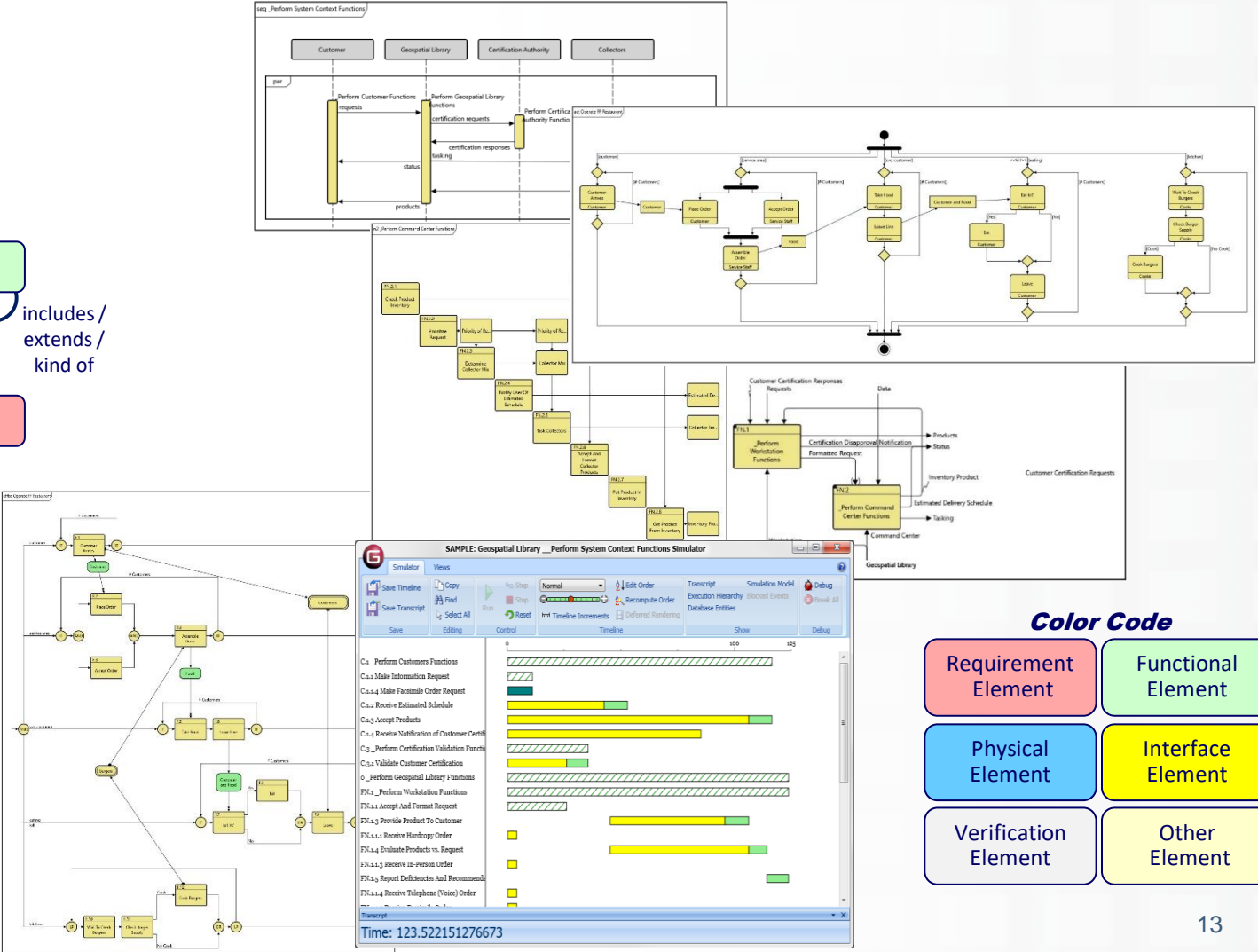
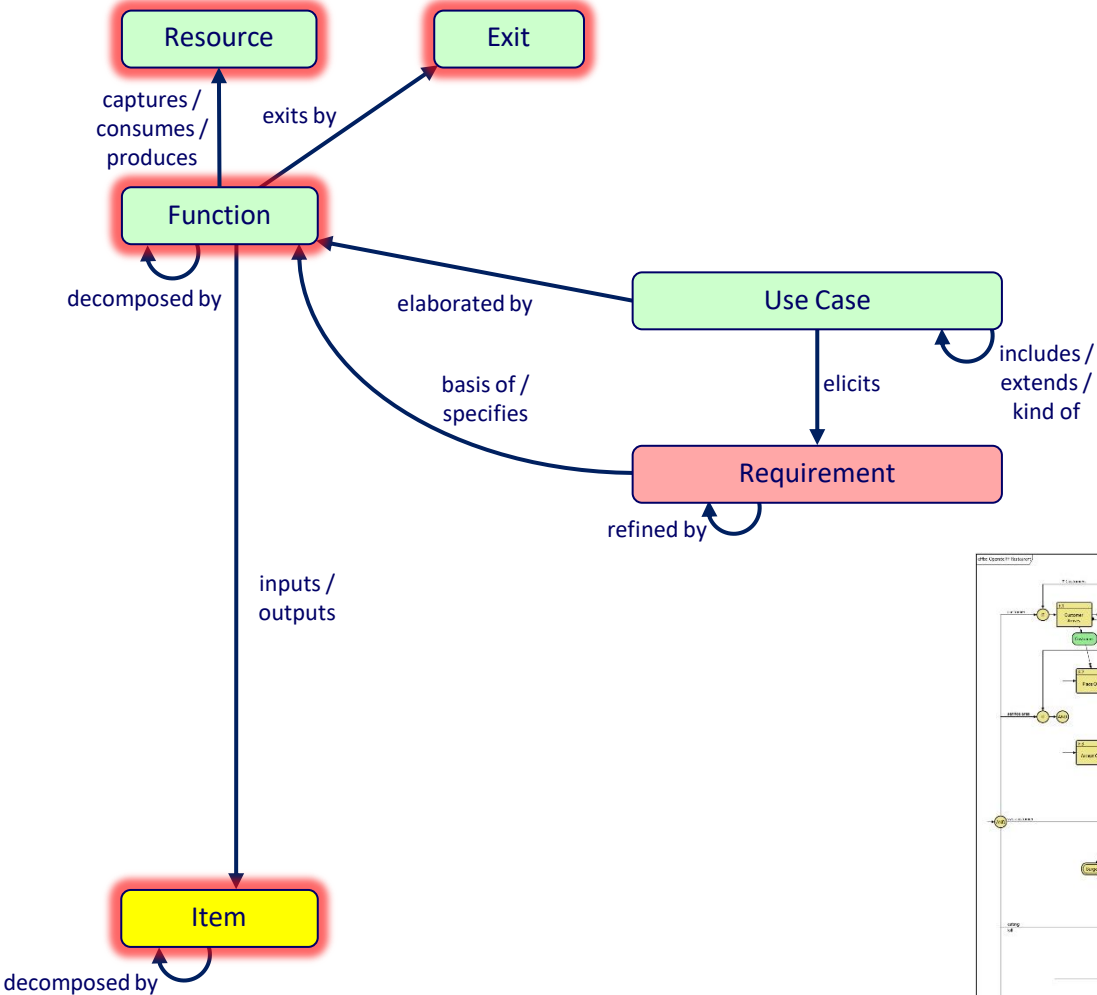
# Focusing on the Foundational Concepts: Capturing the Right Problem



## Color Code



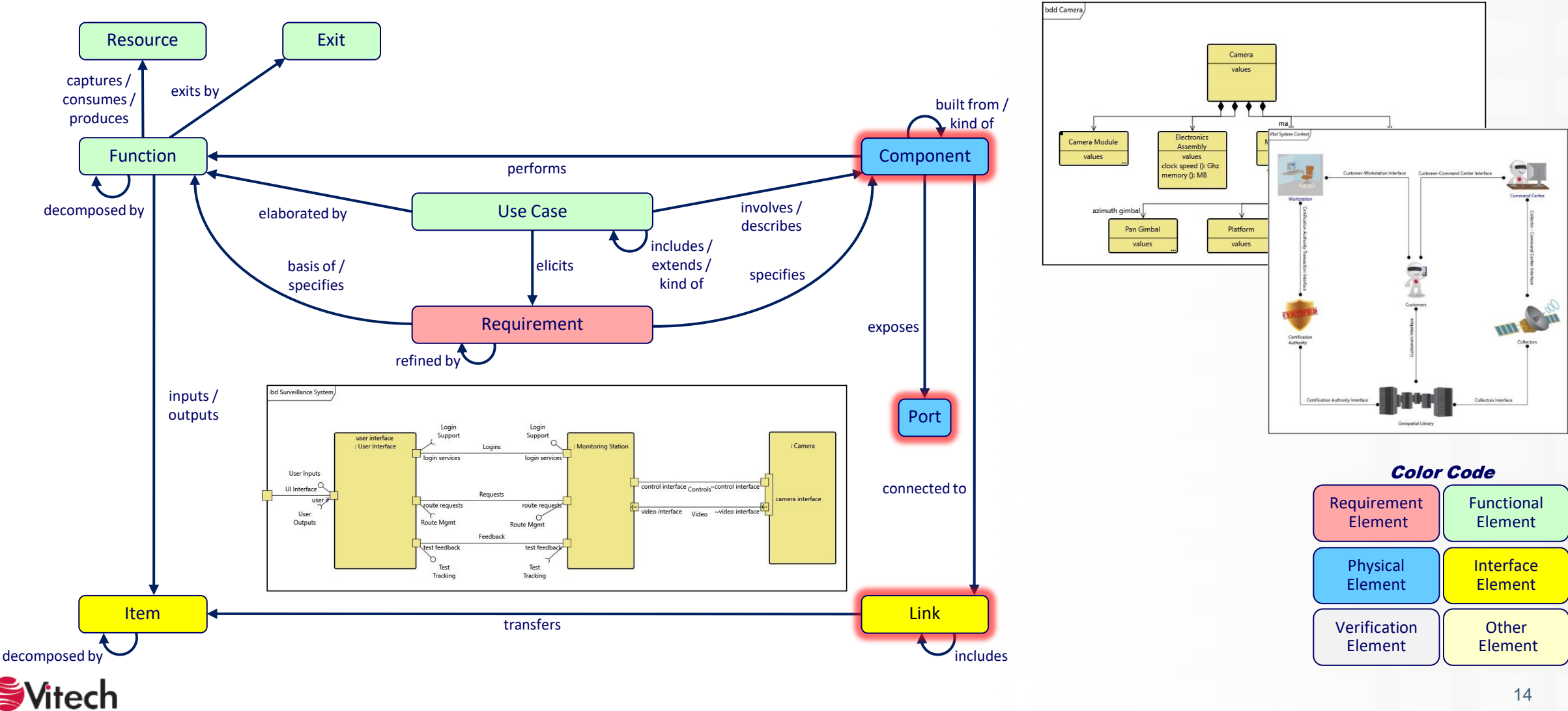
# Focusing on the Foundational Concepts: Defining Functions and Exchanges



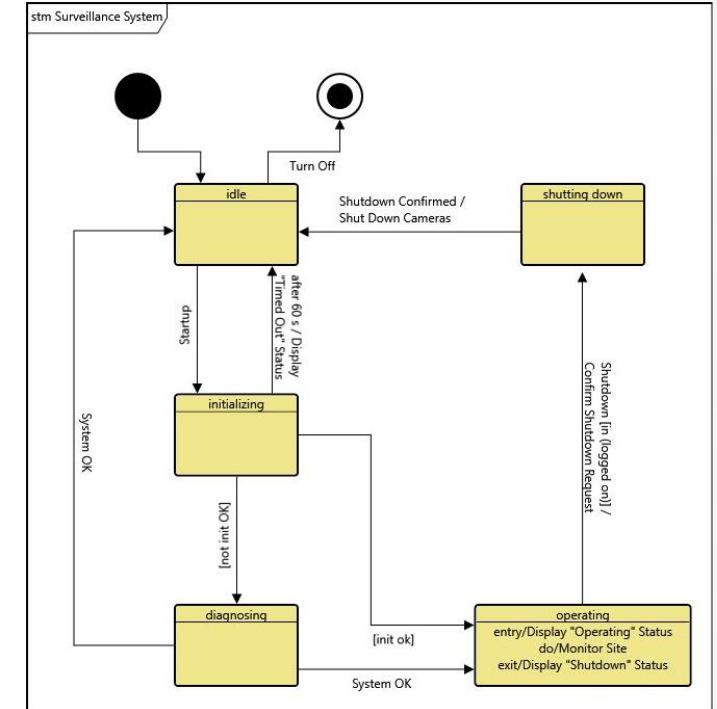
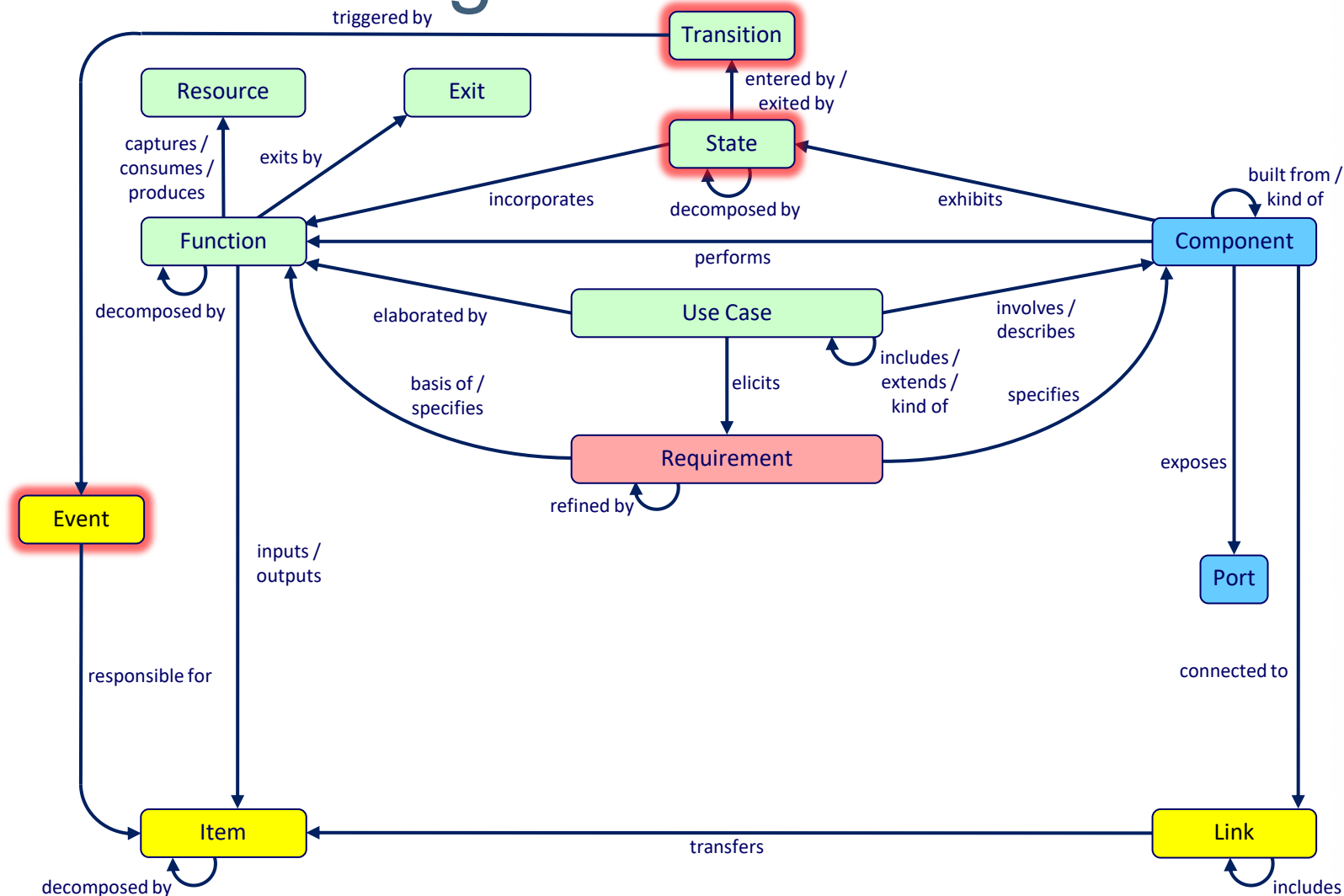
**Color Code**

Requirement Element	Functional Element
Physical Element	Interface Element
Verification Element	Other Element

# Focusing on the Foundational Concepts: Specifying the Design Envelope



# Focusing on the Foundational Concepts: Considering All States

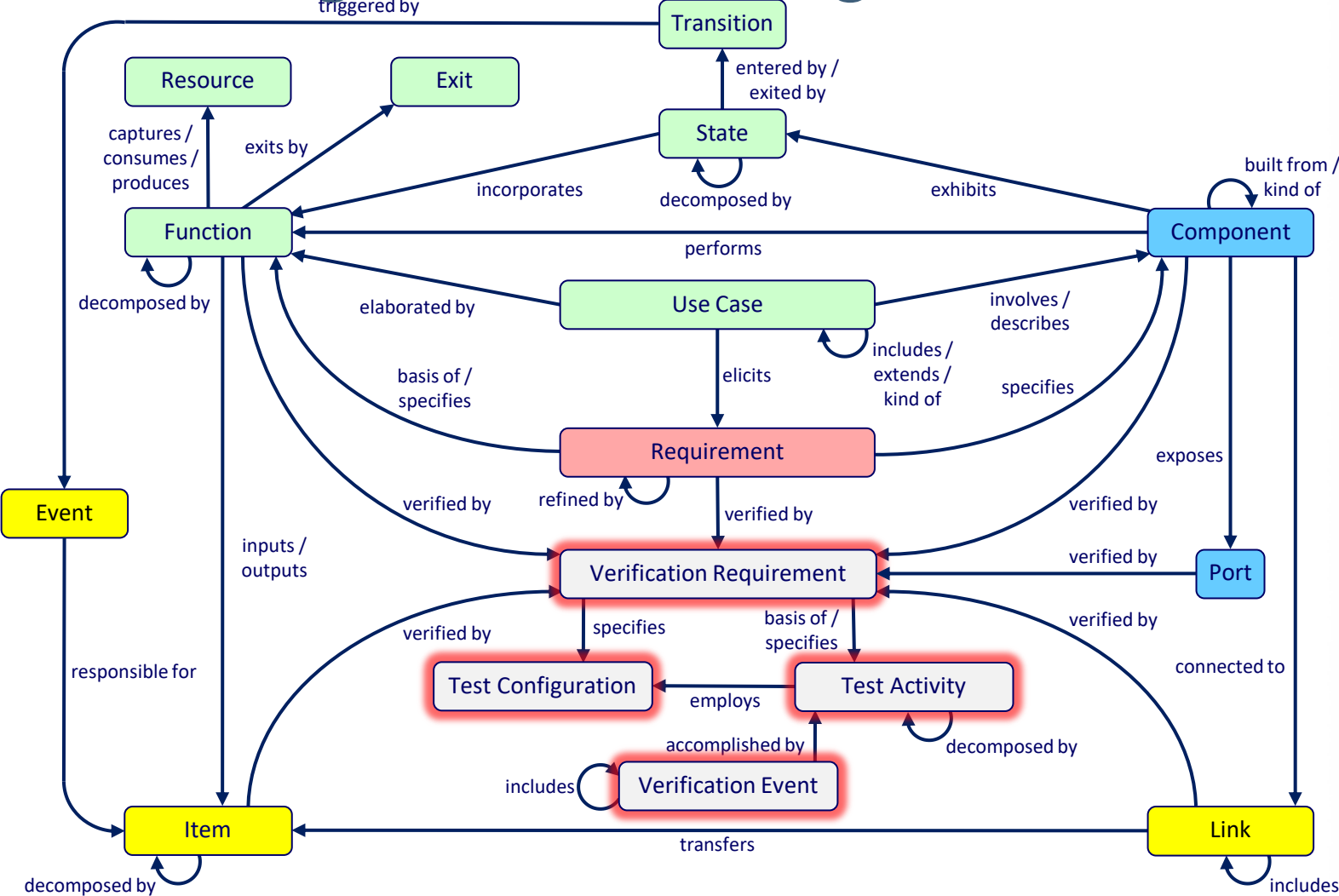


## Color Code

Requirement Element	Functional Element
Physical Element	Interface Element
Verification Element	Other Element



# Focusing on the Foundational Concepts: Planning and Tracking Verification



Appendix B Verification Cross-Reference Matrix

SDS Req# Number	SDS Req# Title	Verification				
		Inspection	Analysis	Demo	Test	Comments
3.1	SDS DATA DISTRIBUTION AND DEPOSITORY ELEMENT					N/A
3.1.1	Ingest SD3E Data					Not Retain Inventory and Provide Products
3.1.1.1	Product Subscription to IDPS			X		
3.1.1.2	Ad-hoc Request to IDPS			X		
3.1.1.3	RDR Ingest from IDPS					
3.1.1.4	Data Delivery Report Ingest					
3.1.1.5	NPDSS Data Product and Request Status Ingest					
3.1.1.6	xDR Ordering Request from IDPS				X	
3.1.1.7	Product Subscription to the ADS					
3.1.1.8						
3.1.1.9						
3.1.1.10						

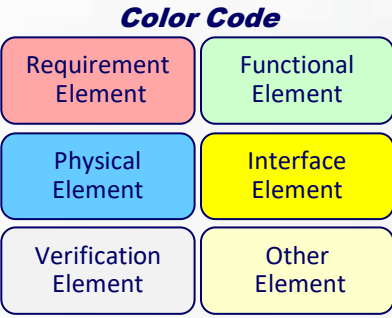
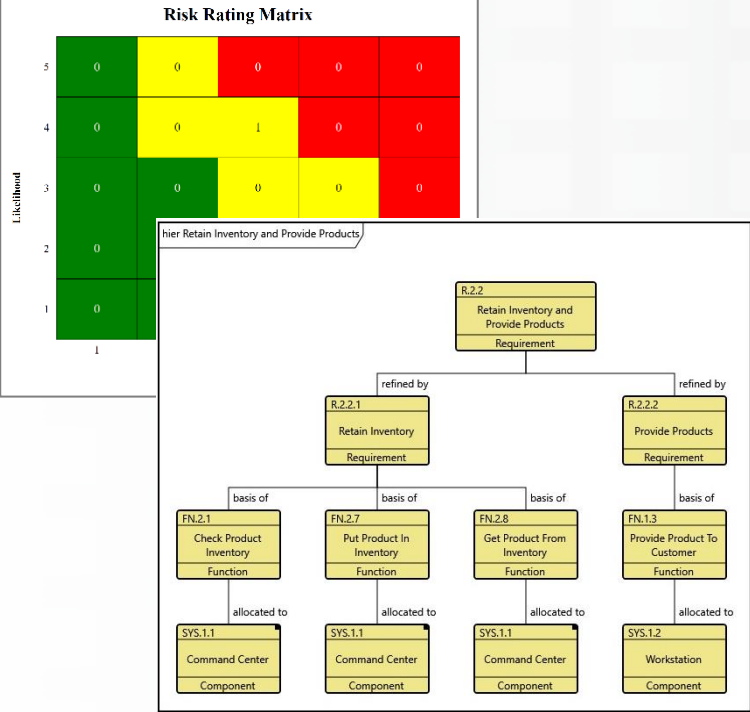
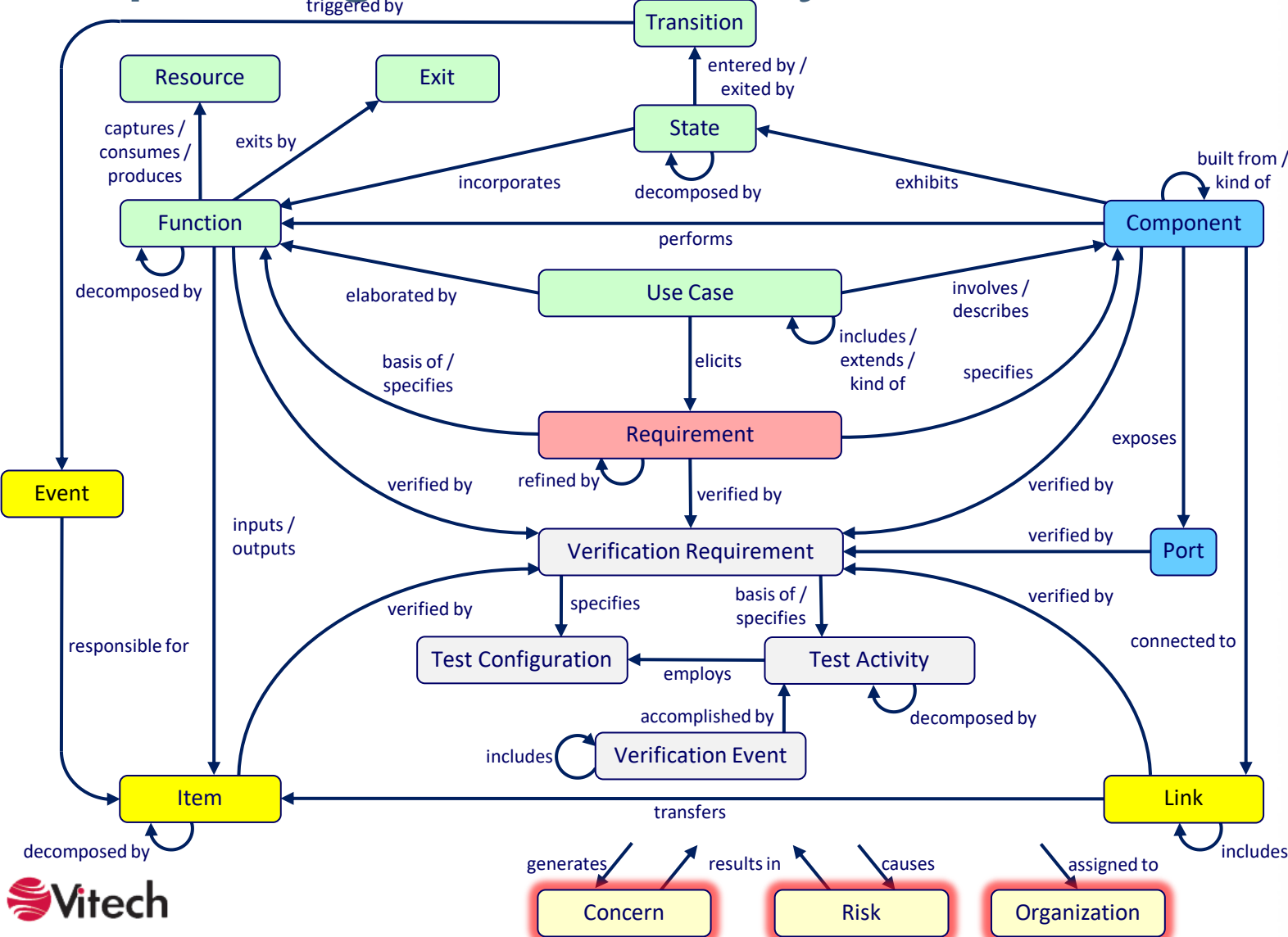
Below the table is a hierarchical diagram showing the decomposition of requirements into functions and components, with labels like 'refined by', 'basis of', 'includes', and 'allocated to'.

**Color Code**

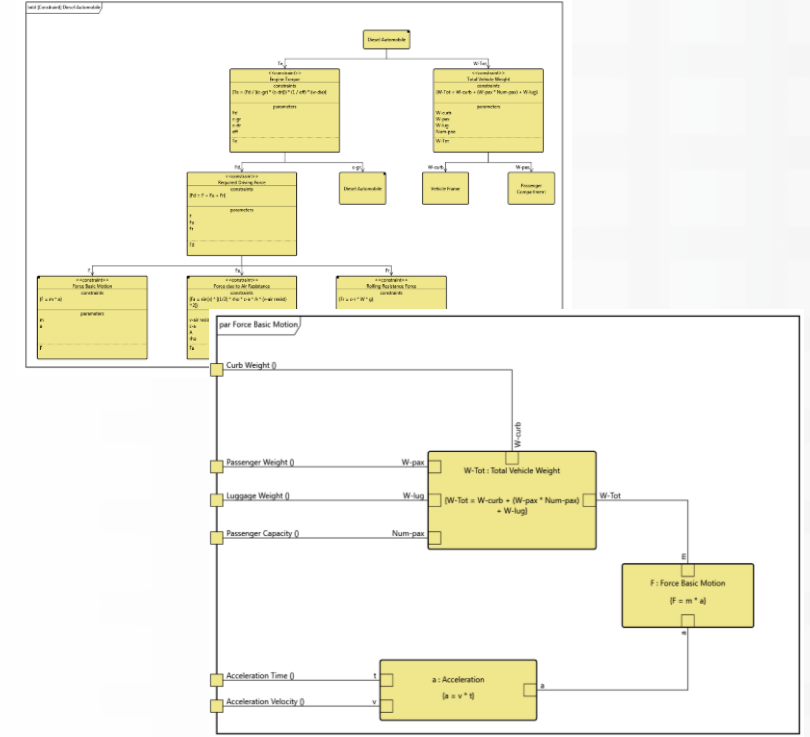
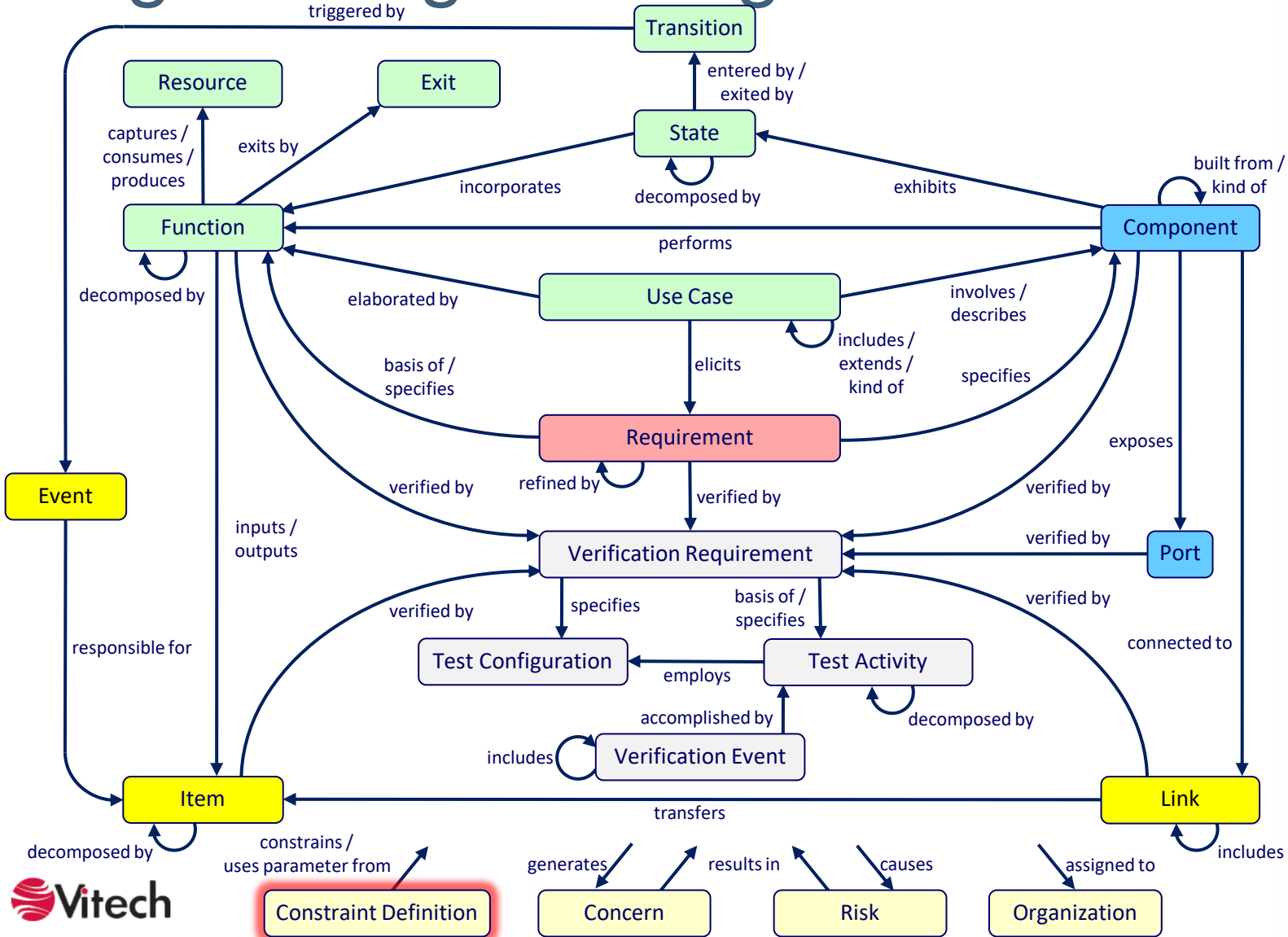
Requirement Element	Functional Element
Physical Element	Interface Element
Verification Element	Other Element



# Focusing on the Foundational Concepts: Capturing the Journey



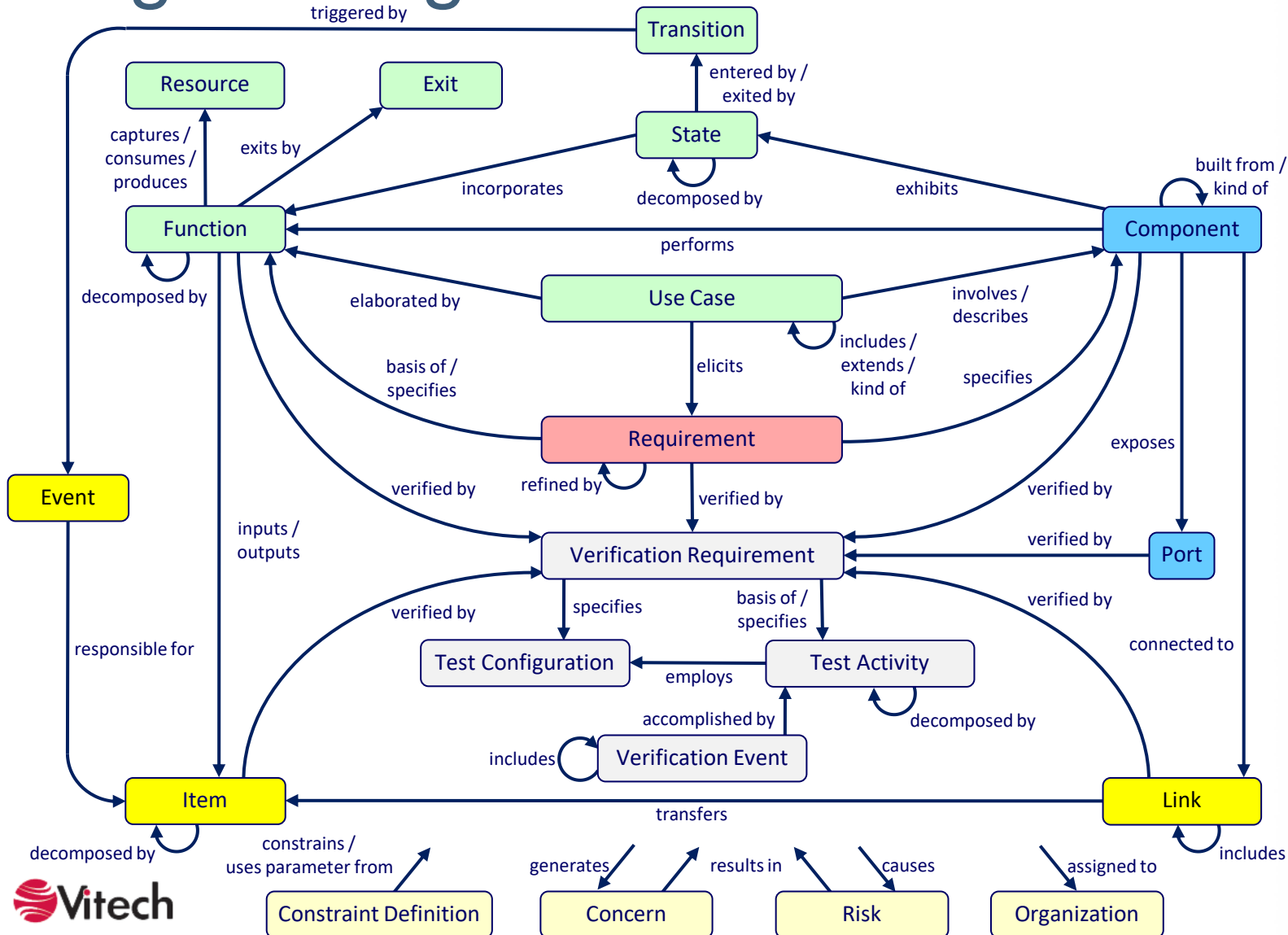
# Focusing on the Foundational Concepts: Engineering with Rigor



### **Color Code**

Requirement Element	Functional Element
Physical Element	Interface Element
Verification Element	Other Element

# Leveraging the Foundation for Engineering and Business Value



...more than diagrams

...more than a data dictionary

...more than capture

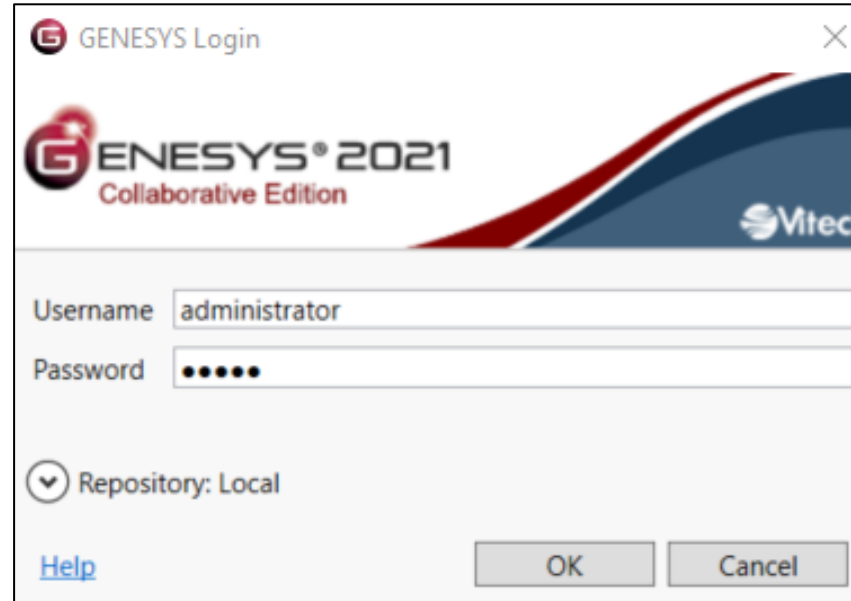
...more than specification

...more than the system of interest



# Basic Navigation

# Login



A screenshot of the GENESYS Login dialog box. The window title is "GENESYS Login". The header area features the GENESYS logo, "GENESYS® 2021 Collaborative Edition", and the Vitech logo. The main area contains a "Username" field with the text "administrator" and a "Password" field with six dots. Below these fields is a "Repository" dropdown menu currently set to "Local". At the bottom left is a blue "Help" link, and at the bottom right are "OK" and "Cancel" buttons.

GENESYS Login

GENESYS® 2021  
Collaborative Edition

Vitech

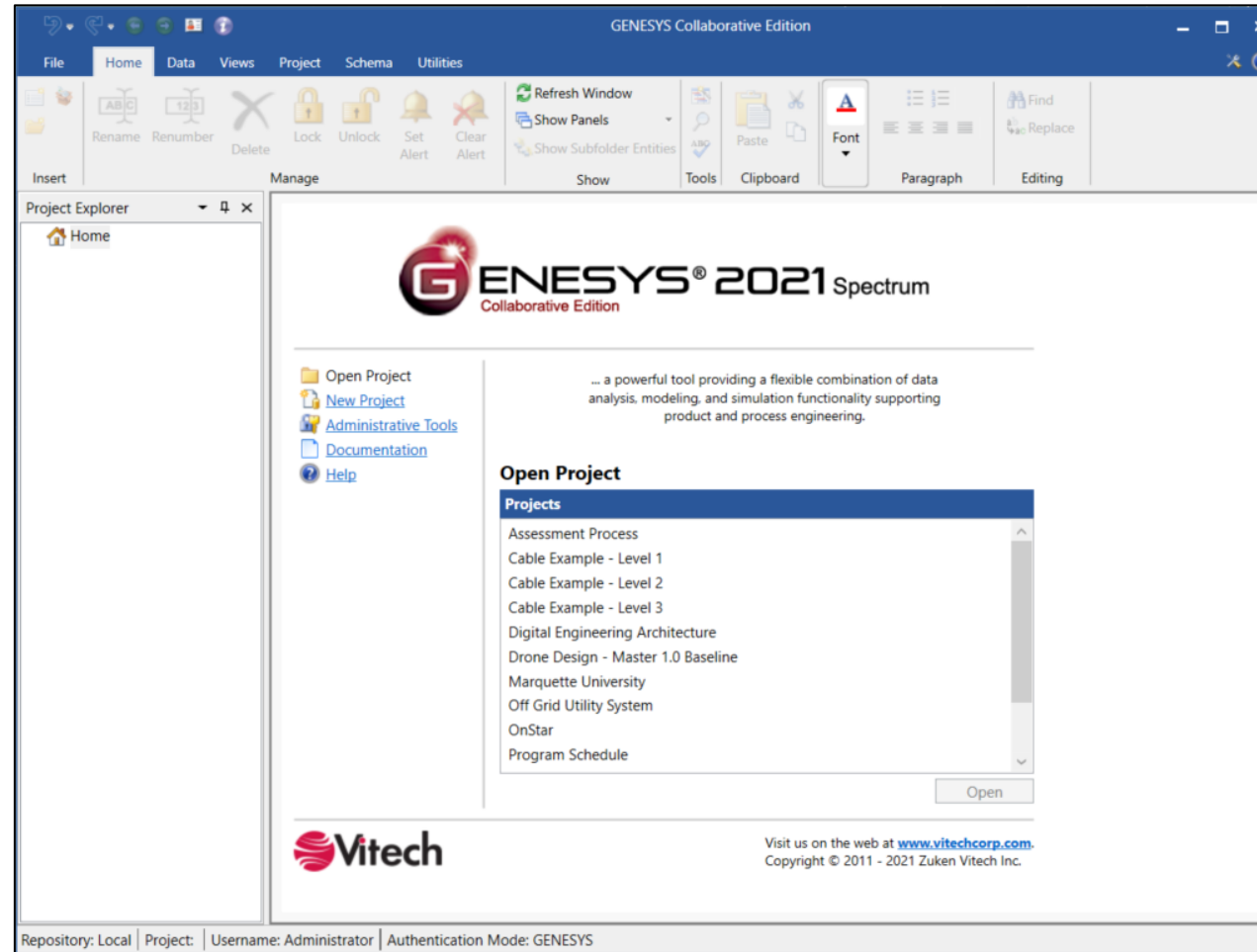
Username: administrator

Password: ••••••

Repository: Local

[Help](#) OK Cancel

# Home Screen



# Navigation Controls

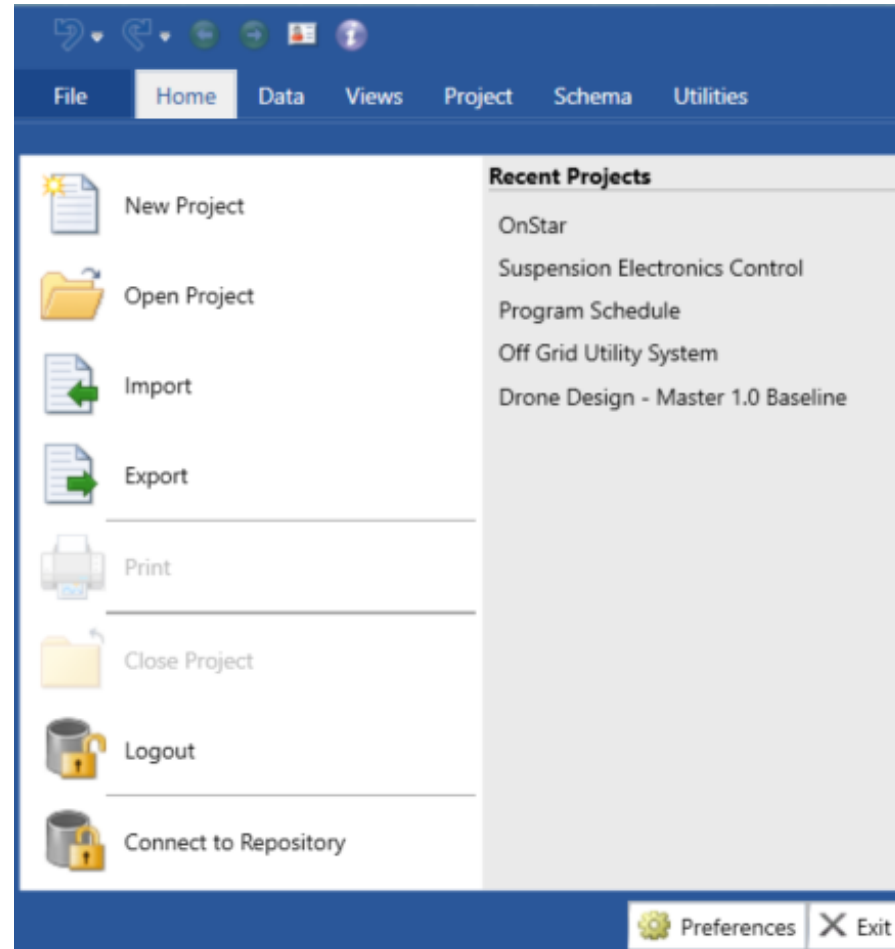


# Tabs and Ribbons





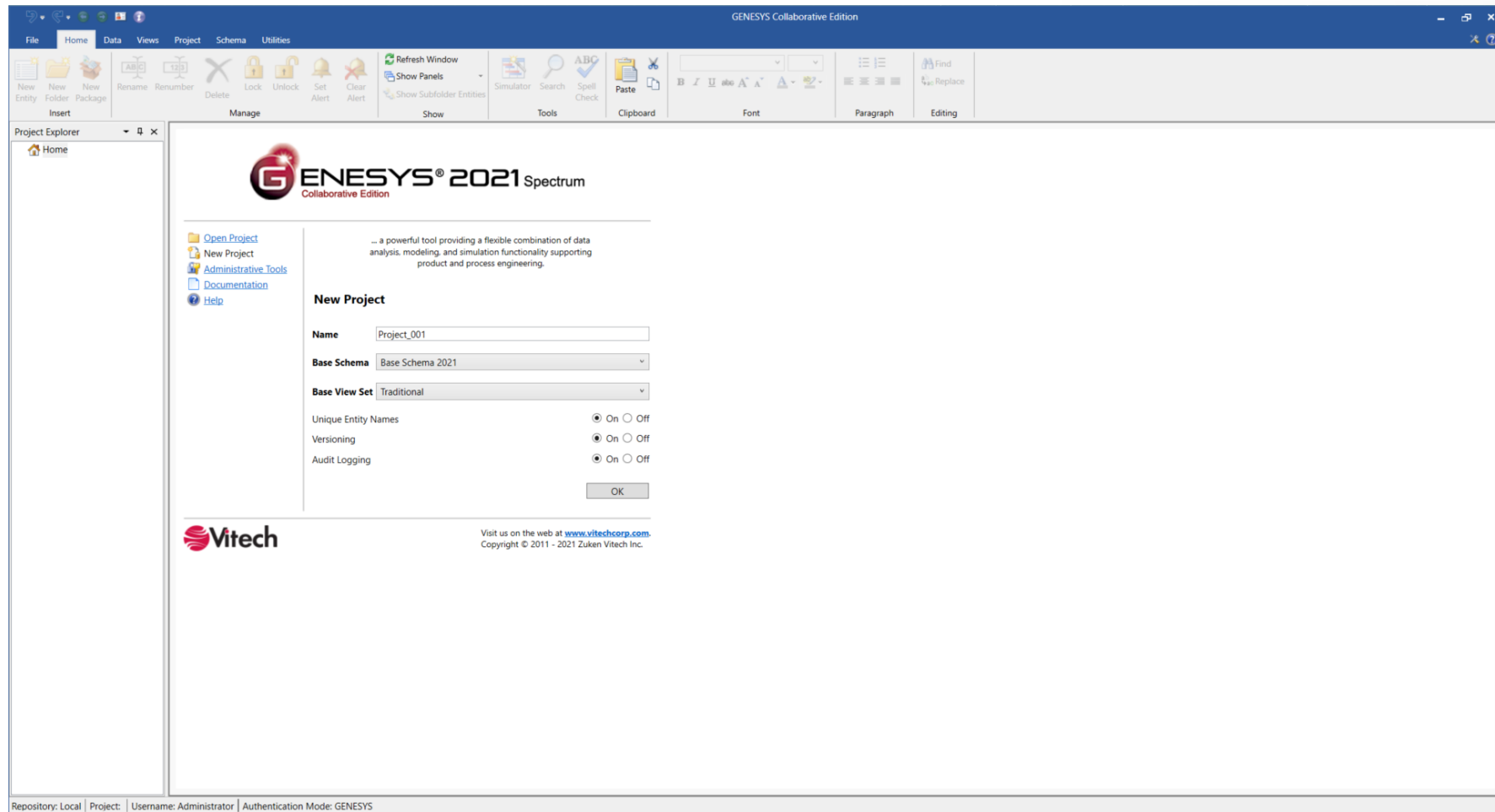
# File Menu





# Getting Started

# Create New Project



# Project Explorer

The image displays five sequential screenshots of the 'Project Explorer' window, illustrating the expansion of a project hierarchy. Each window has a title bar with 'Project Explorer' and standard window controls. The hierarchy starts with 'Home' and 'Model Assistant'. The 'Off Grid Electrical Utility System' is expanded in all views. The expansion progresses from 'Scripts' and 'Reports' in the first view, through 'Commands', 'Diagnostics', 'Schema Migration', 'SubComponents', 'TeamView', and 'Utilities' in the second, to 'Database', 'Notifications', 'Schema' (with 'Classes', 'Facilities', 'Relations'), 'Utilities' (with 'Filters', 'Node Templates', 'Rule Sets', 'Sort Blocks'), 'Scripts', and 'Reports' in the third. The fourth view shows 'Packages' (with 'Essentials', 'Related Projects', 'Search Results') and 'Notifications'. The final view shows a detailed list of items under 'Essentials': 'Component (7/7)', 'ConstraintDefinition', 'Document', 'Function (17/19)', 'Item (8/8)', 'Link (4/4)', 'Requirement (3/3)', 'Risk', 'State (7/7)', 'UseCase (7/7)', and 'VerificationRequirement (1/1)', followed by 'Related Projects', 'Search Results', 'Notifications', 'Schema', 'Utilities', 'Scripts', and 'Reports'.

Project Explorer

- Home
  - Model Assistant
    - Off Grid Electrical Utility System
      - Scripts
        - Reports

Project Explorer

- Home
  - Model Assistant
    - Off Grid Electrical Utility System
      - Scripts
        - Commands (2/2)
        - Custom Scripts (1/1)
        - Diagnostics (0/17)
        - Schema Migration (1/1)
        - SubComponents (3/3)
        - TeamView (1/1)
        - Utilities (5/5)
      - Reports
        - Attribute History (1/1)
        - Common Subreports (6/6)
        - Custom Reports (2/2)
        - Diagnostics (2/2)
        - DoDAF 2.0 (52/124)
        - IRS (1/8)
        - My SDD (3/35)
        - Project Compare (1/3)
        - Reporting Toolkit (7/7)
        - Risk Report (1/5)
        - Schema Definition (1/3)
        - Schema Migration (1/1)
        - SDD (3/106)
        - SSDD (1/10)
        - SSS (1/24)
        - TABLEMaker (4/4)

Project Explorer

- Home
  - Model Assistant
    - Off Grid Electrical Utility System
      - Database
        - Notifications
      - Schema
        - Classes
        - Facilities
        - Relations
      - Utilities
        - Filters
        - Node Templates
        - Rule Sets
        - Sort Blocks
      - Scripts
      - Reports

Project Explorer

- Home
  - Model Assistant
    - Off Grid Electrical Utility System
      - Database
        - Packages
          - Essentials
            - Related Projects
            - Search Results
          - Notifications
        - Schema
        - Utilities
      - Scripts
      - Reports

Project Explorer

- Home
  - Model Assistant
    - Off Grid Electrical Utility System
      - Database
        - Packages
          - Essentials
            - Component (7/7)
            - ConstraintDefinition
            - Document
            - Function (17/19)
            - Item (8/8)
            - Link (4/4)
            - Requirement (3/3)
            - Risk
            - State (7/7)
            - UseCase (7/7)
            - VerificationRequirement (1/1)
            - Related Projects
            - Search Results
            - Notifications
          - Schema
          - Utilities
        - Scripts
        - Reports

# Browser/Data Pane

The screenshot displays the GENESYS Collaborative Edition software interface. The top menu bar includes File, Home, Data, Views, Project, Schema, and Utilities. Below the menu is a toolbar with various icons for file management, simulation, search, and editing. The main workspace is divided into three panes:

- Project Explorer:** Shows a hierarchical tree of project elements. The 'Database' folder is expanded, showing 'Packages' and 'Essentials'. Under 'Essentials', there are several items: Component (1/1), ConstraintDefinition, Document, Function (1/1), Item, Link, Requirement, Risk, State (1/1), UseCase, and VerificationRequirement. Below these are 'Related Projects', 'Search Results', 'Notifications', 'Schema', 'Classes', 'Facilities', 'Relations', 'Utilities', 'Filters', 'Node Templates', 'Rule Sets', 'Sort Blocks', 'Scripts', and 'Reports'.
- Browser:** A pane for viewing system context. It contains a 'System Context' section with a 'Create' button. Below this are fields for Name, Number, Description, Abbreviation, Doc. PUID, Title, Type, Contract Line Item Number, and Purpose.
- asPropertySheet:** A pane for viewing properties. It has tabs for Attributes, Properties, Parameters, Diagnostics, and Views. The 'Properties' tab is active, showing a table with columns 'Relationships' and 'Targets & Attributes'. The table is currently empty. Below the table is a 'Sort' dropdown menu set to 'Numeric by class'.

At the bottom of the interface, a status bar displays the following information: Repository: Local | Project: Hunter's Cabin Electrical Utility | Username: Administrator | Authentication Mode: GENESYS.

# Project Information

Off Grid Electrical Utility System Project	
Name	Off Grid Electrical Utility System
Description	The Off Grid Electrical Utility System project is a project to systems engineer an electrical utility system that will support basic electrical needs for a cabin in the woods where no electrical utilities are currently available.
Guidance	<p>The purpose of this model is to develop a solution for the system.</p> <p>It will demonstrate the systems engineering concepts of:</p> <p>Problem Space</p> <ul style="list-style-type: none"><li>- Requirements Capture</li><li>- Verification Requirement Capture and Traceability</li><li>- System Context Structural Definition (Components and Interface(Links))</li><li>- System Context Behavior Definition (Functions and Exchanges(Items))</li><li>- Use Case Development, Requirements Elicitation and Parameterization</li><li>- Solution Space Consideration</li></ul> <p>Solution Space</p> <ul style="list-style-type: none"><li>- Behavior Definition (Functions and Exchanges(Items))</li><li>- Structure Definition (Components and Interface(Links))</li><li>- Analytical Verification (Simulation)</li></ul>
Organization Name	Vitech
Organization Address	
Customer Name	Cash's Cabin
Customer Address	
Base Path	C:\Users\scash\OneDrive - vitechcorp.com\Documents\Models\Off Grid Electrical Utility
External Graphics Path	C:\Users\scash\OneDrive - vitechcorp.com\Documents\Models\Off Grid Electrical Utility\Images
Completeness Checker	CompletenessCheckerLevel3
Design Integrity Checker	DesignIntegrityCheckerLevel1
Versioning Enabled	<input checked="" type="radio"/> On <input type="radio"/> Off
Audit Logging	<input checked="" type="radio"/> On <input type="radio"/> Off
Baseline Schema	Base Schema 2021
Unique Entity Names	True
Base View Set	Traditional
Version	
Created	Administrator 10/1/2021 7:36:56 AM
Modified	Administrator 10/4/2021 7:44:45 AM
ID	4ec25c50-fd29-4407-a7ec-dce143d575cd



# Engineering the System

# Requirement Capture

Deliver Electrical Energy asPropertySheet	
Name	Deliver Electrical Energy
Number	R.1
Description	<p>The electrical utility shall deliver electrical energy to support the cabin's electrical needs.</p>
Doc. PUID	
Title	
Type	Functional
Key Performance Parameter	<input type="radio"/> True <input checked="" type="radio"/> False
Performance Parameter Type	nil
Origin	Originating
Rationale	

Attributes Properties Parameters Diagnostics Views



# Requirement Diagnostics

The screenshot displays the GENESYS Collaborative Edition software interface. The top menu bar includes File, Home, Data, Views, Project, Schema, and Utilities. Below the menu is a ribbon with various tool groups: New Entity, New Folder, New Package, Insert, Manage, Show Panels, Refresh Window, Show Subfolder Entities, Simulator, Search, Spell Check, Paste, Clipboard, Font, Paragraph, and Editing.

The left sidebar shows the Project Explorer with a tree view of the project structure. The main workspace is divided into several panes:

- Project Explorer:** Shows the project hierarchy, including Hunter's Cabin Electrical Utility, Database, Packages, Essentials, Component (1/1), ConstraintDefinition, Document, Function (1/1), Item, Link, Requirement (1/1), Risk, State (1/1), UseCase, VerificationRequirement, Related Projects, Search Results, Notifications, Schema, Classes, Facilities, Relations, Utilities, Filters, Node Templates, Rule Sets, Sort Blocks, Scripts, and Reports.
- Browser:** Displays the selected entity, R.1 Deliver Electrical Energy.
- Completeness Checker:** Shows the Completeness Checker results for R.1 Deliver Electrical Energy. It includes a table with columns for the checker name and the level of the error. The table shows three errors: Level 1 (This entity has no relationships to any other entity in the project), Level 3 (The entity is at the leaf level and is not of type 'Incentive Award Fee Criterion', but no 'verified by' relationship has been established), and Level 3 (The entity is at the leaf level, but no 'specifies' or 'basis of' relationship has been established).
- Design Integrity Checker:** Shows the Design Integrity Checker results for R.1 Deliver Electrical Energy. It includes a table with columns for the checker name and the level of the error. The table shows one error: All checks passed.
- Relationships:** A list of relationships for the selected entity, including augmented by, basis of, categorized by, causes, documented by, elicited by, establishes, generates, grouped by, has comments, impacted by, and packaged by.
- Targets & Attributes:** A table showing the targets and attributes for the selected entity.

The bottom status bar displays the repository (Local), project (Hunter's Cabin Electrical Utility), username (Administrator), and authentication mode (GENESYS).

# Verification Requirement Capture

Analytical Electrical Utility Delivery Verification asPropertySheet	
Name	Analytical Electrical Utility Delivery Verification
Number	VR.1
Description	<p>The electrical utility concept shall be verified, by analysis, to deliver the energy necessary to meet the demand of the cabin.</p> <p>Objective: Verify that the electrical utility can deliver the required energy. Method: Analysis Level/Phase: Concept Level Environmental Conditions: TBD Special Conditions: No Criteria: Energy supply is greater than or equal to the energy demand.</p>
Doc. PUID	
Title	
Status	Not Yet Planned
Type	Verification
Method	Analysis
Level	System

Attributes Properties Parameters Diagnostics Views

# Verification Requirement Diagnostics

The screenshot displays the GENESYS Collaborative Edition software interface. The top menu bar includes File, Home, Data, Views, Project, Schema, and Utilities. Below the menu is a toolbar with various icons for file management, simulation, search, and editing. The main workspace is divided into several panels:

- Project Explorer:** Shows a hierarchical tree of project elements. Under 'Hunter's Cabin Electrical Utility', there is a 'Database' folder containing 'Essentials' (with sub-items like Component, ConstraintDefinition, Document, Function, Item, Link, Requirement, Risk, State, UseCase, and VerificationRequirement) and 'Related Projects'.
- Browser:** Displays the selected entity, 'VR.1 Analytical Electrical Utility Delivery'.
- Analytical Electrical Utility Delivery Verification asPropertySheet:** This panel shows the results of verification checks.
  - Completeness Checker:** Shows 'CompletenessErrors updated: 10/1/2021 12:02 PM'. The 'CompletenessCheckerLevel3' section lists three levels of errors: Level 1 (no relationships), Level 2 (no 'verifies' relationship), and Level 3 (entity at leaf level but no 'specifies' or 'basis of' relationship).
  - Design Integrity Checker:** Shows 'DesignIntegrityCheckerLevel1' with the message 'All checks passed.' and 'Design Integrity Errors updated: 10/1/2021 12:02 PM'.
- Relationships:** A list of relationship types, including 'augmented by', 'based on', 'basis of', 'categorized by', 'causes', 'documented by', 'generates', 'grouped by', 'has comments', 'impacted by', 'packaged by', and 'reoriented by'.
- Targets & Attributes:** A section for defining targets and attributes, currently showing 'Sort: Numeric by class'.

The bottom status bar indicates the repository is 'Local', the project is 'Hunter's Cabin Electrical Utility', the user is 'Administrator', and the authentication mode is 'GENESYS'.

# Diagnostics Resolutions

## Revised Verification Requirement Diagnostics

Analytical Electrical Utility Delivery Verification asPropertySheet

Completeness Checker

Completeness Errors updated: 10/1/2021 12:10 PM

CompletenessCheckerLevel3

Level 3: The entity is at the leaf level, but no 'specifies' or 'basis of' relationship has been established.

Design Integrity Checker

Design Integrity Errors updated: 10/1/2021 12:10 PM

DesignIntegrityCheckerLevel1

All checks passed.

Attributes | Properties | Parameters | Diagnostics | Views

## Revised Requirement Diagnostics

Deliver Electrical Energy asPropertySheet

Completeness Checker

Completeness Errors updated: 10/1/2021 12:08 PM

CompletenessCheckerLevel3

Level 3: The entity is at the leaf level, but no 'specifies' or 'basis of' relationship has been established.

Design Integrity Checker

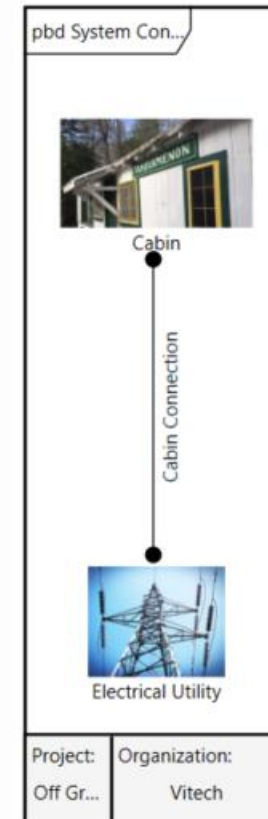
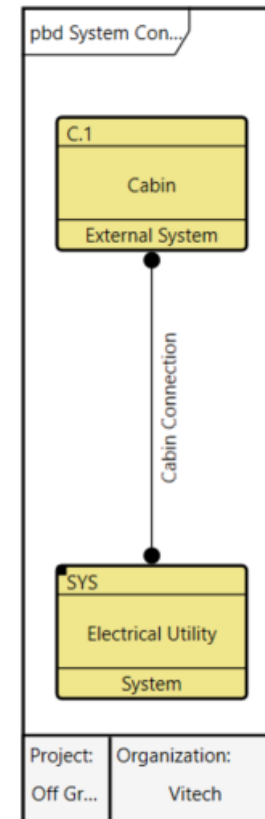
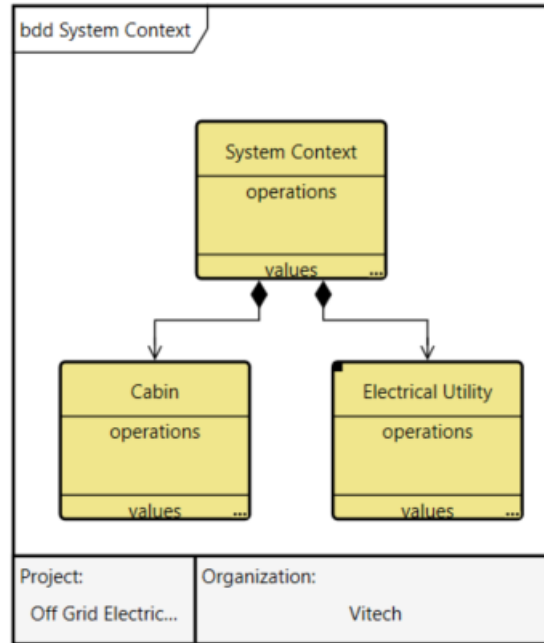
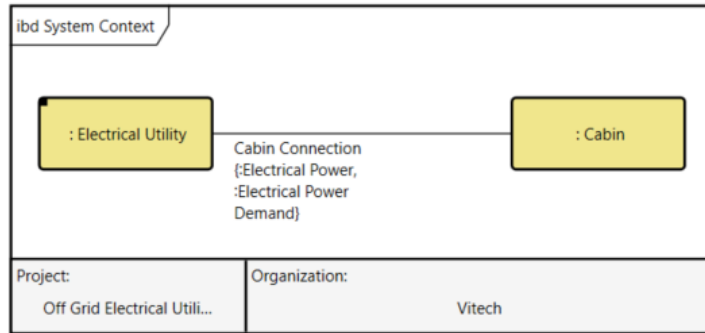
Design Integrity Errors updated: 10/1/2021 12:08 PM

DesignIntegrityCheckerLevel1

All checks passed.

Attributes | Properties | Parameters | Diagnostics | Views

# System Context



# Root Functions and Root States

The screenshot displays the GENESYS Collaborative Edition software interface. The main window is titled 'System Context as PropertySheet'. The left sidebar shows a project tree with 'Hunter's Cabin Electrical Utility' selected. The main area is divided into two panes: 'Description' and 'Targets & Attributes'.

**Description Pane:**

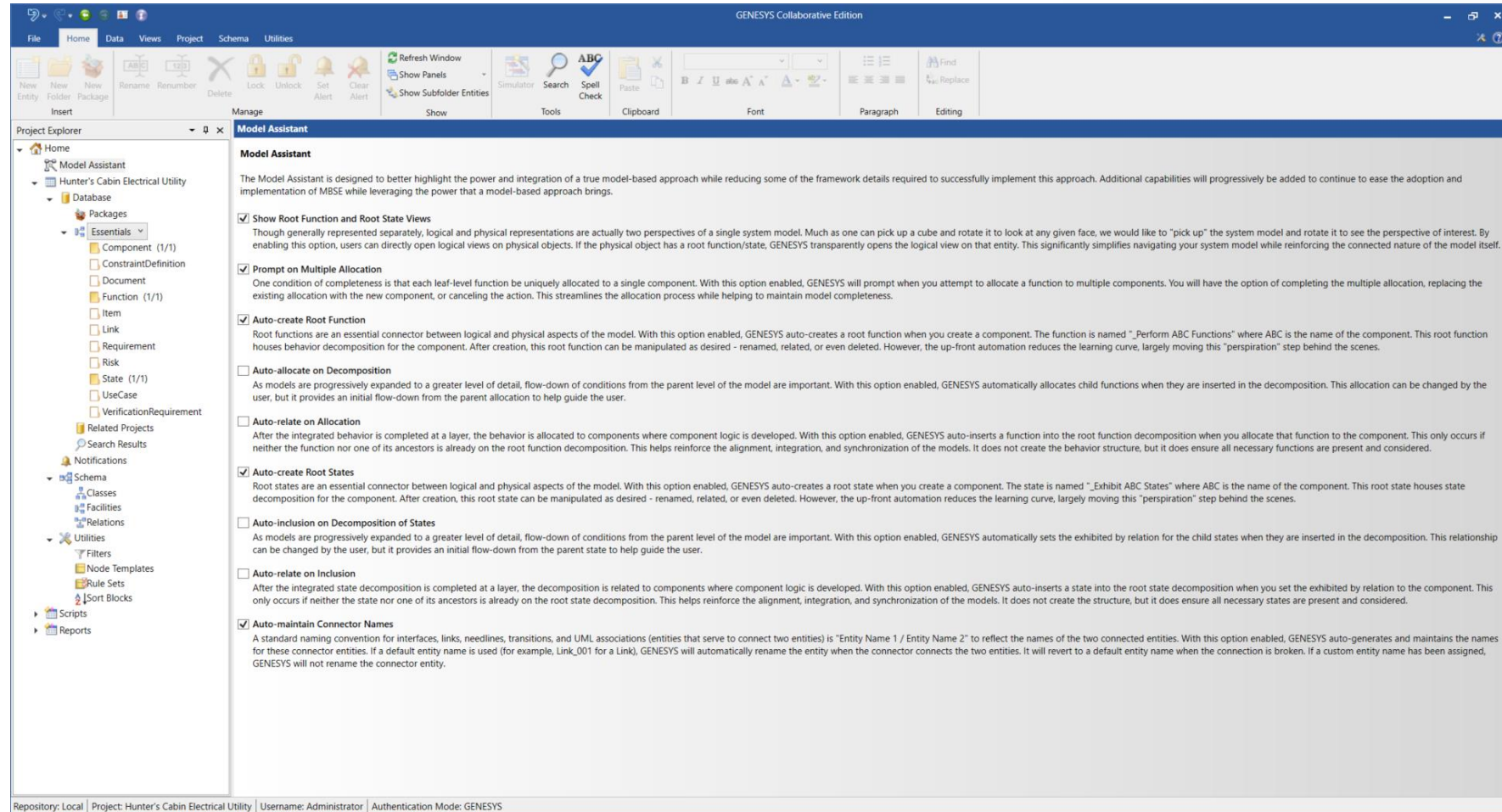
- Description:** The system context identifies the physical context (the environment and external systems your system interacts with) enabling you to specify the system boundary.
- Abbreviation:**
- Doc. PUID:**
- Title:**
- Type:** Context
- Contract Line Item Number:**
- Purpose:**

**Targets & Attributes Pane:**

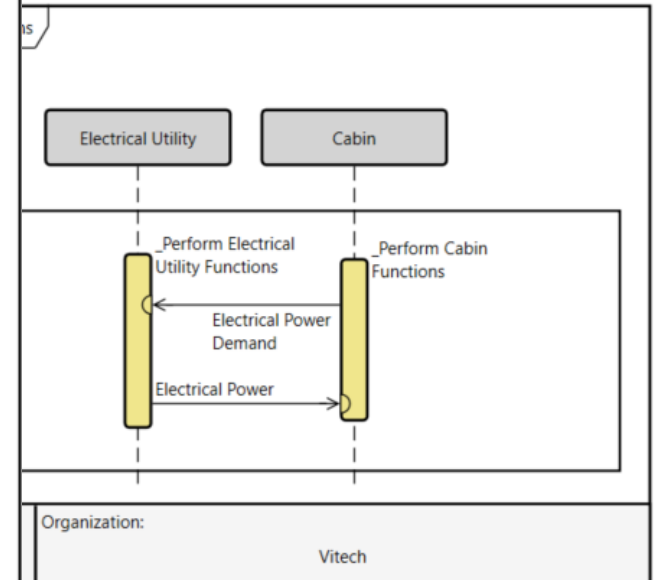
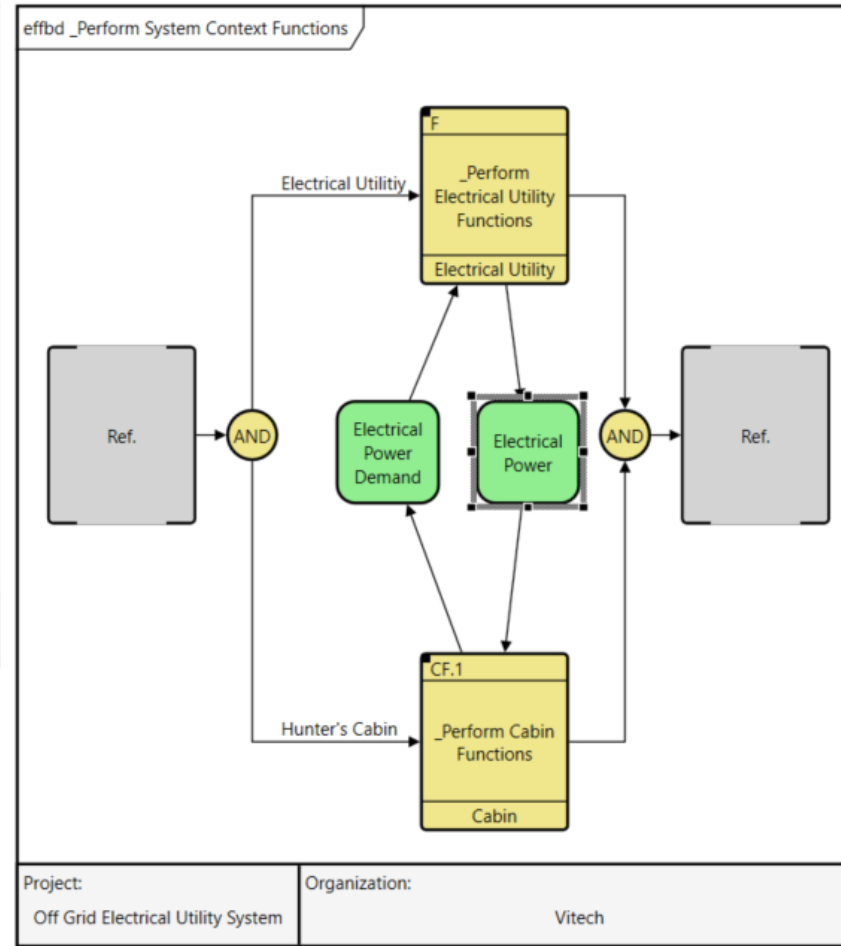
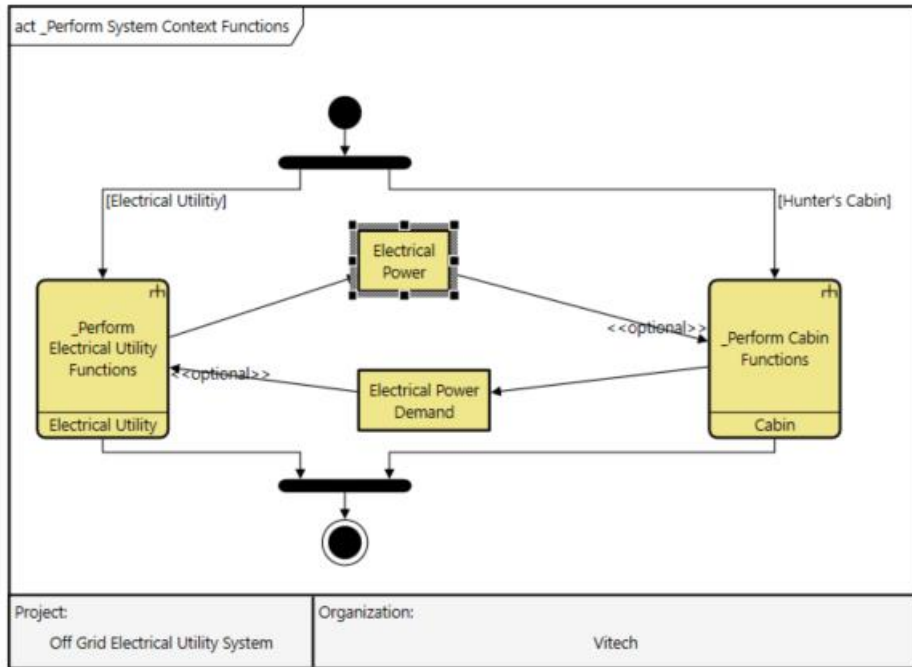
- Relationships:**
  - (all relationships)
  - assigned to
  - augmented by
  - built from
  - built in
  - categorized by
  - causes
  - connected to
  - constrained by
  - contained by
  - contains
  - described by
  - documented by
- Targets & Attributes:**
  - built from Component C.1 Hunter's Cabin
  - built from Component SYS Electrical Utility
  - exhibits State \_Exhibit System Context States
  - performs Function CF\_Perform System Context Functions
    - Behavior Type: Integrated (Root)

The bottom of the interface shows a toolbar with various icons for navigation and editing, and a status bar at the very bottom.

# Model Assistant

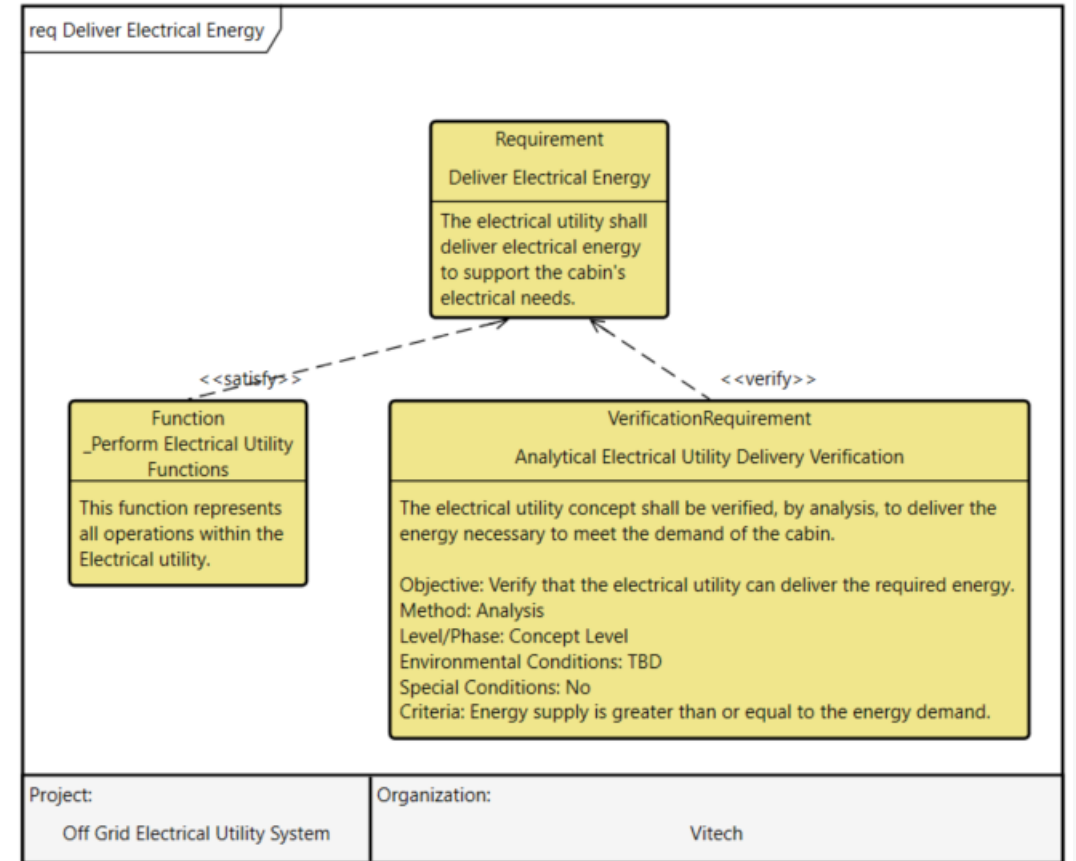
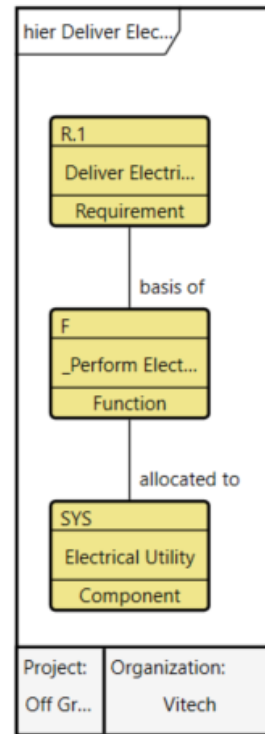
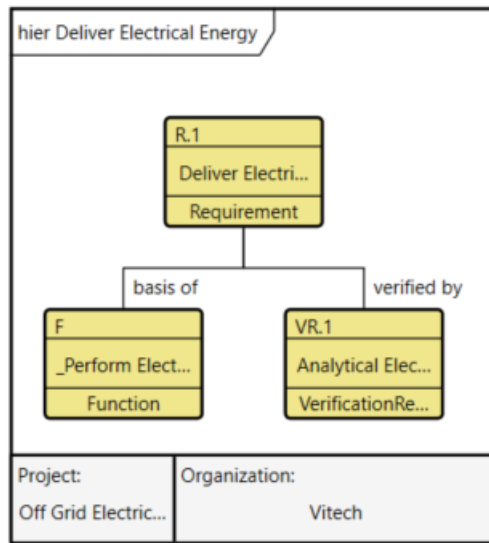


# System Context (Problem Space – Behavioral)

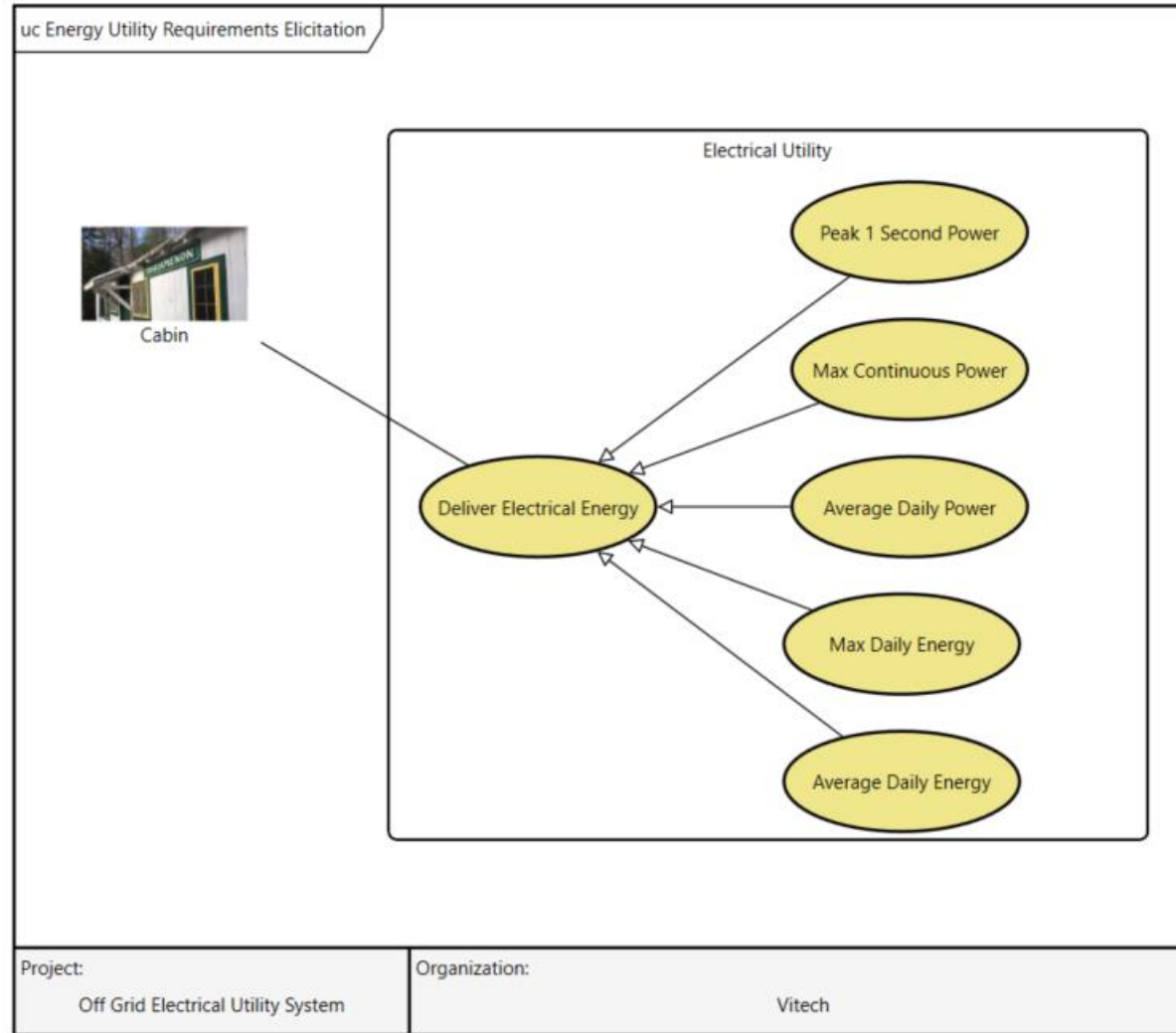




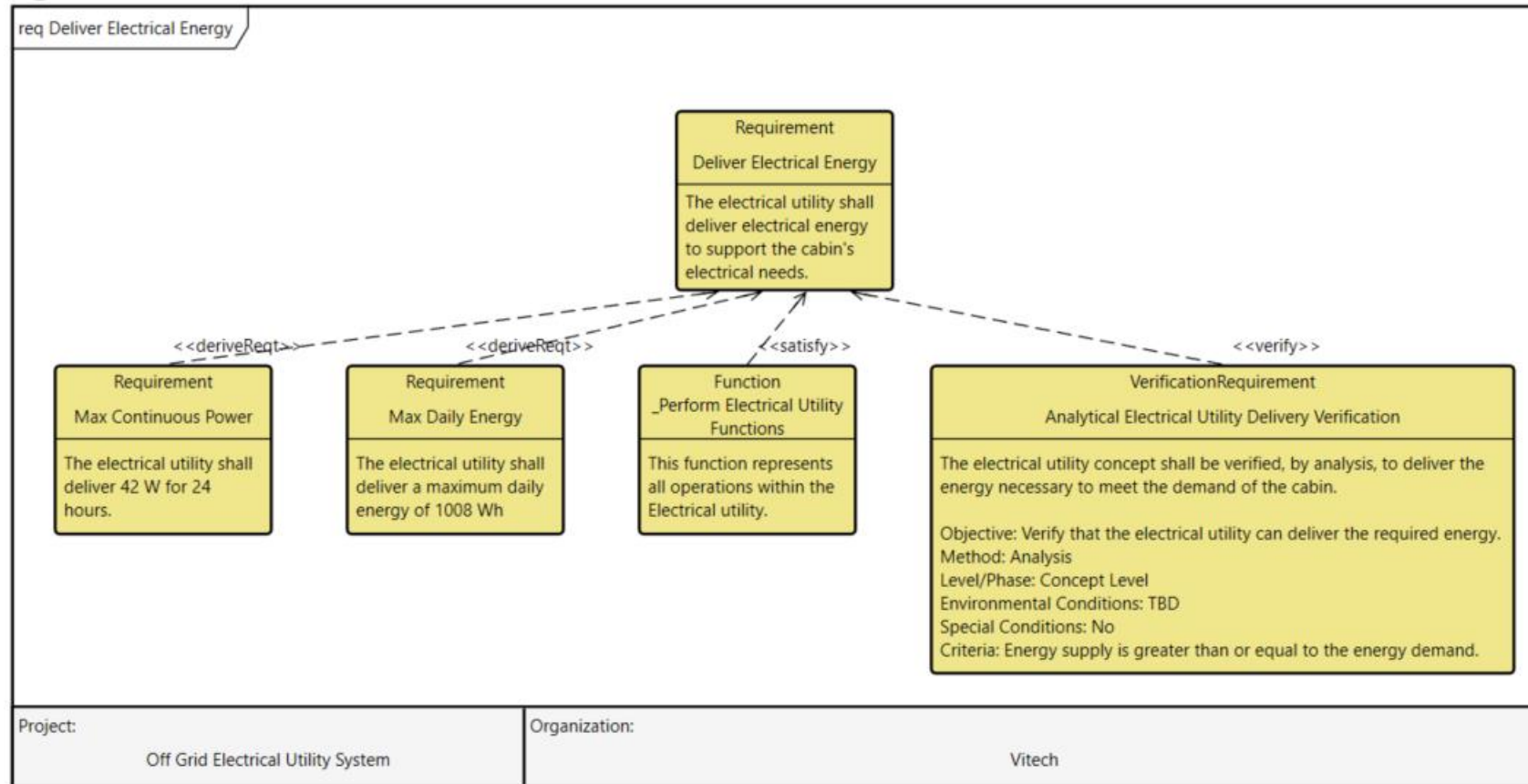
# Requirement Traceability



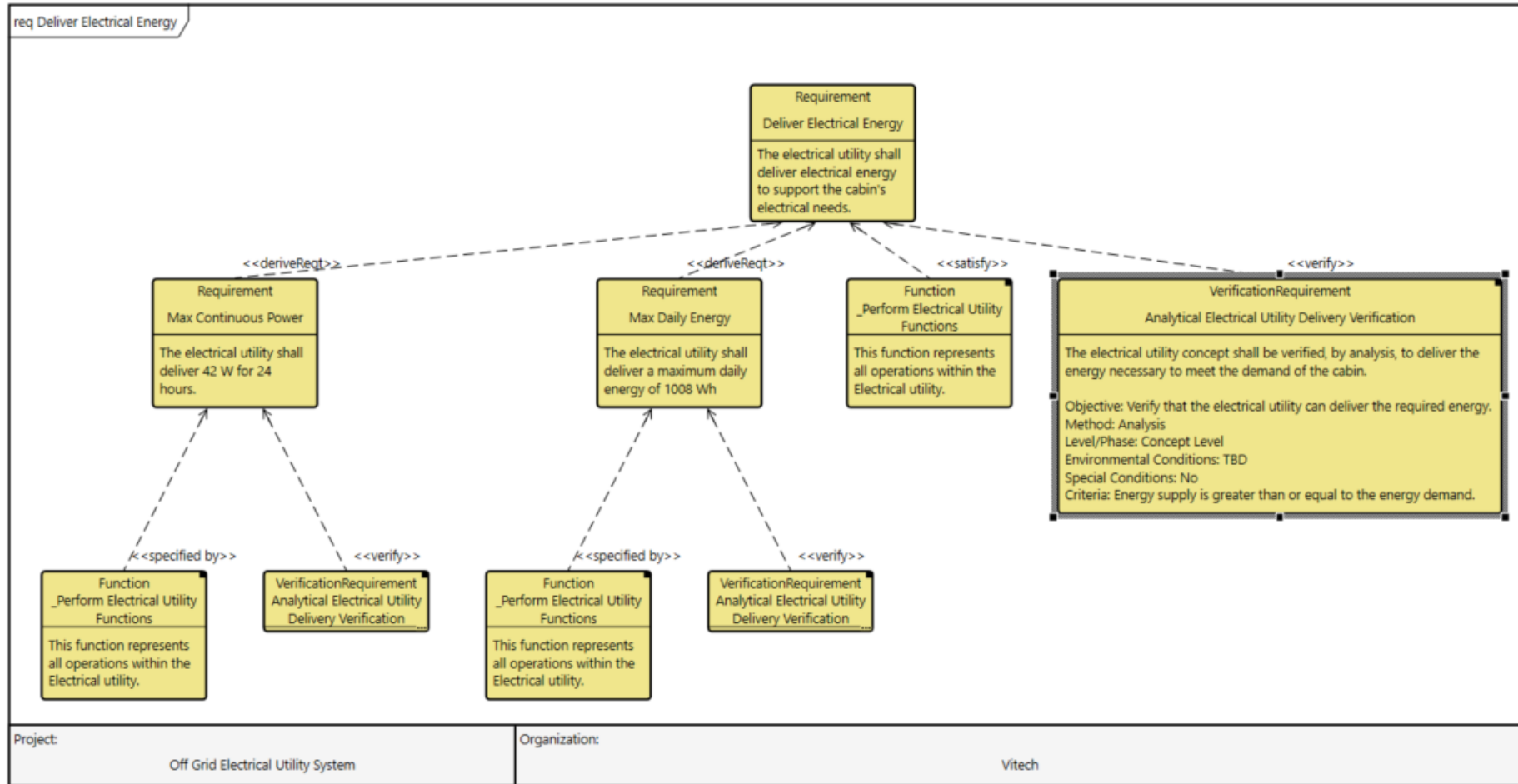
# Use Case (Requirements Elicitation)



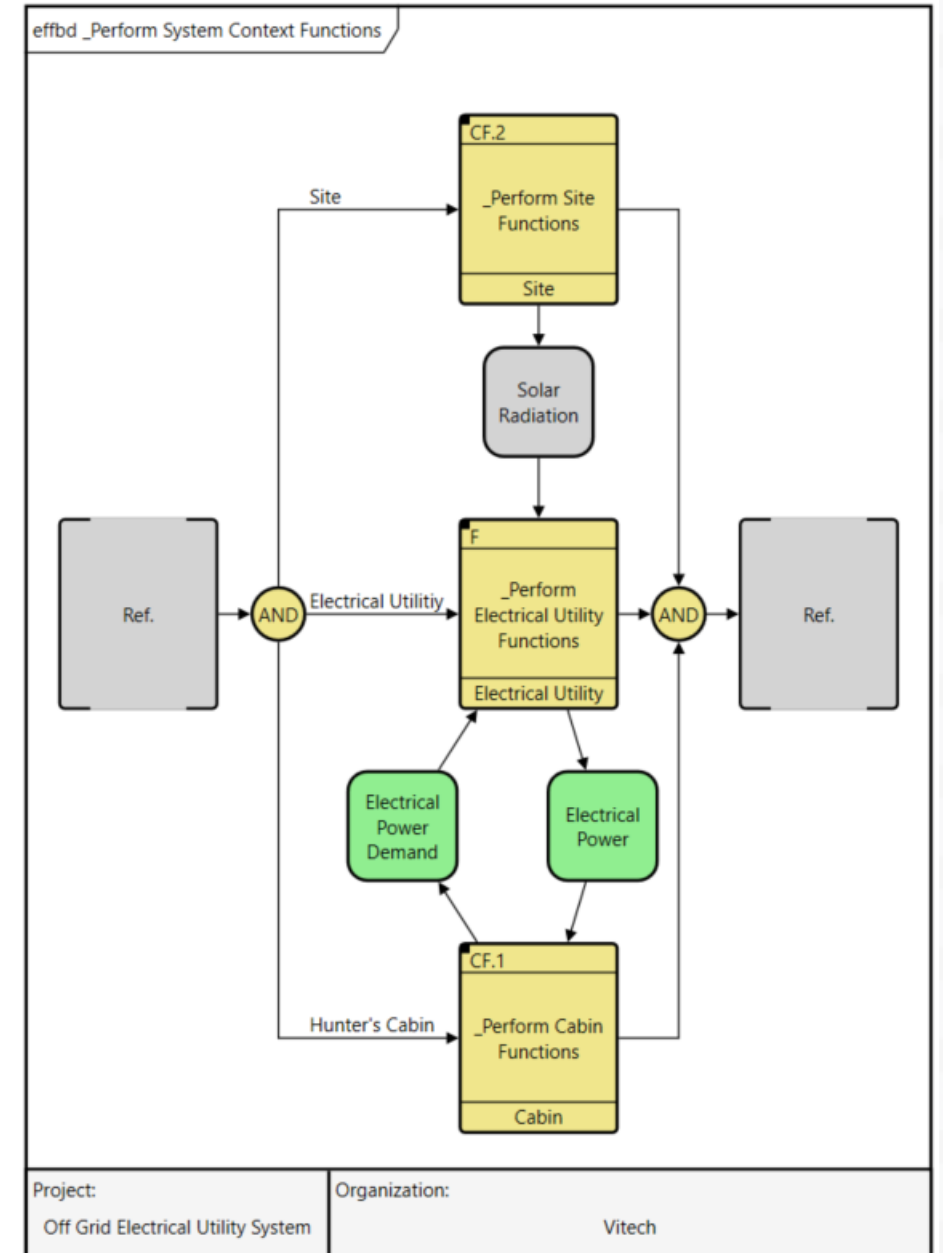
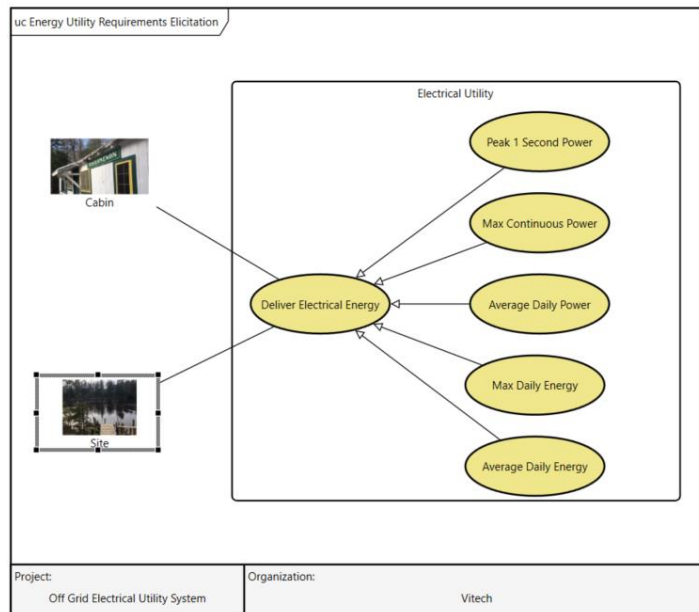
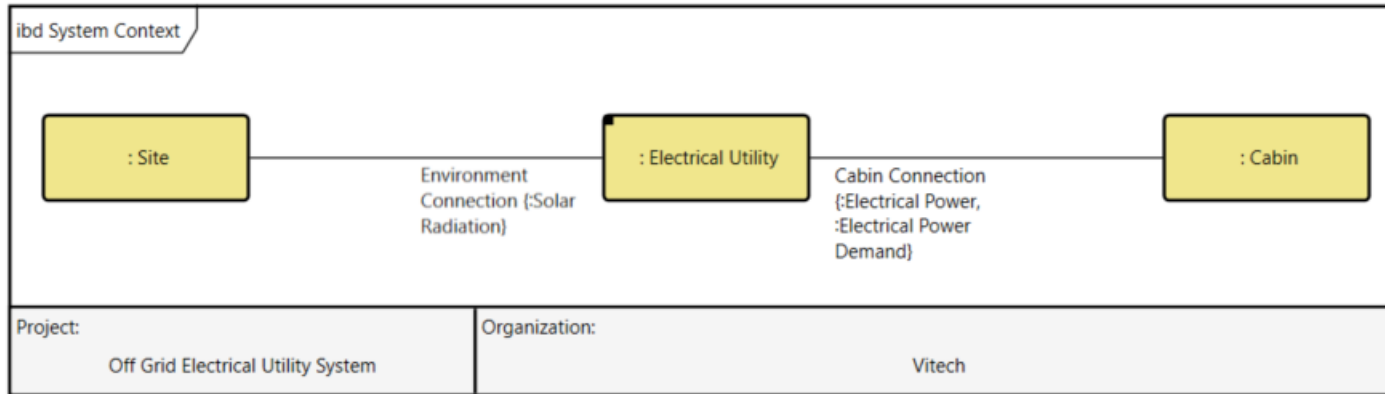
# Elicited Requirements



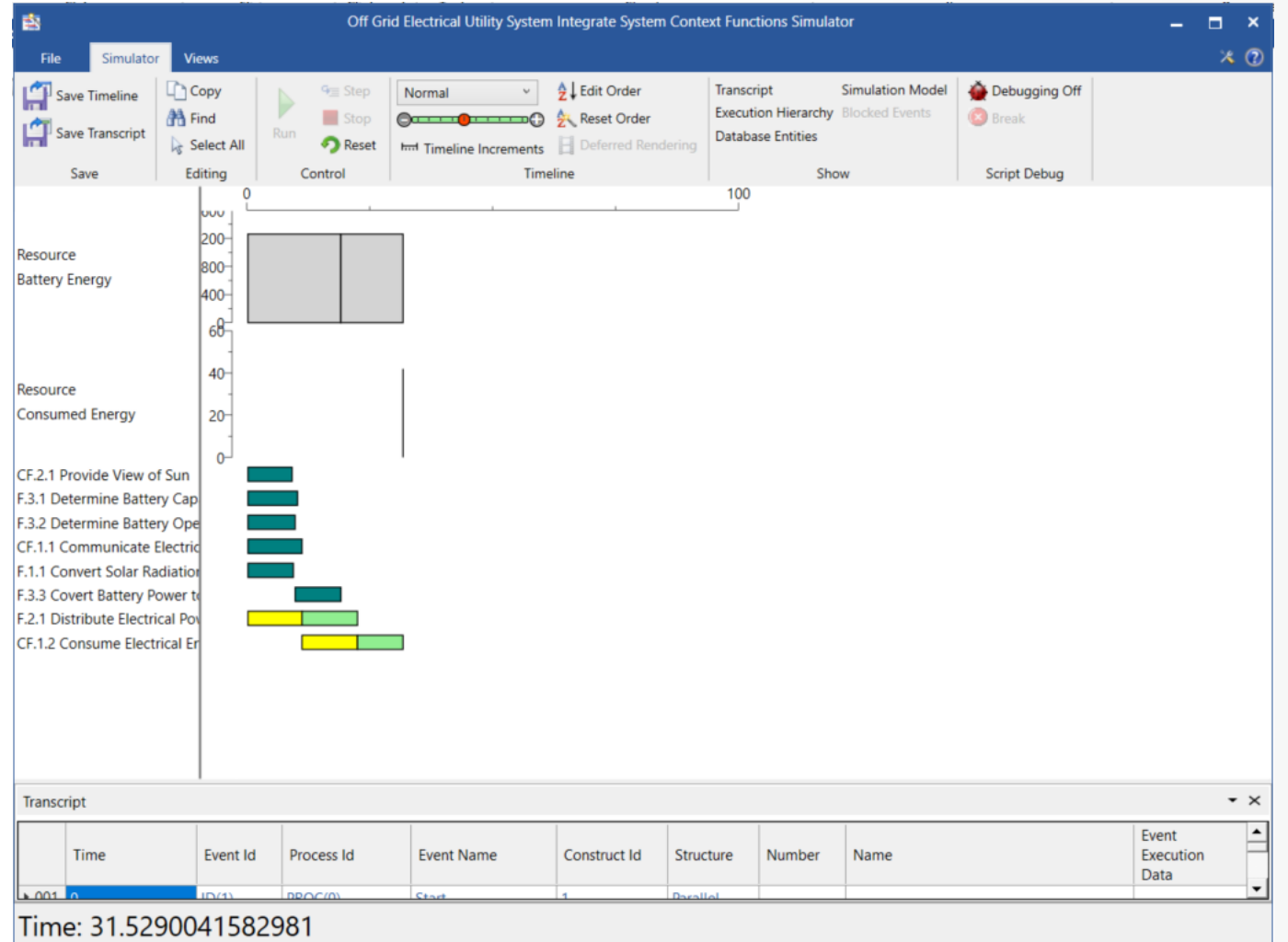
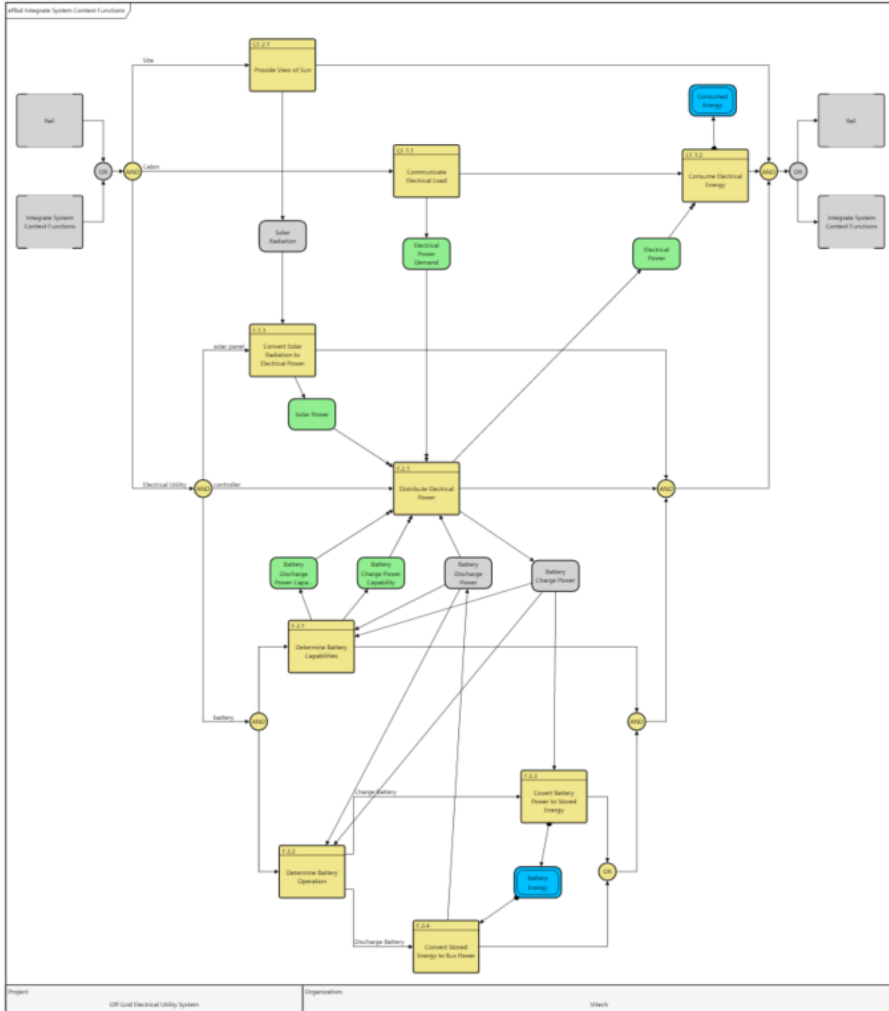
# Requirement Traceability



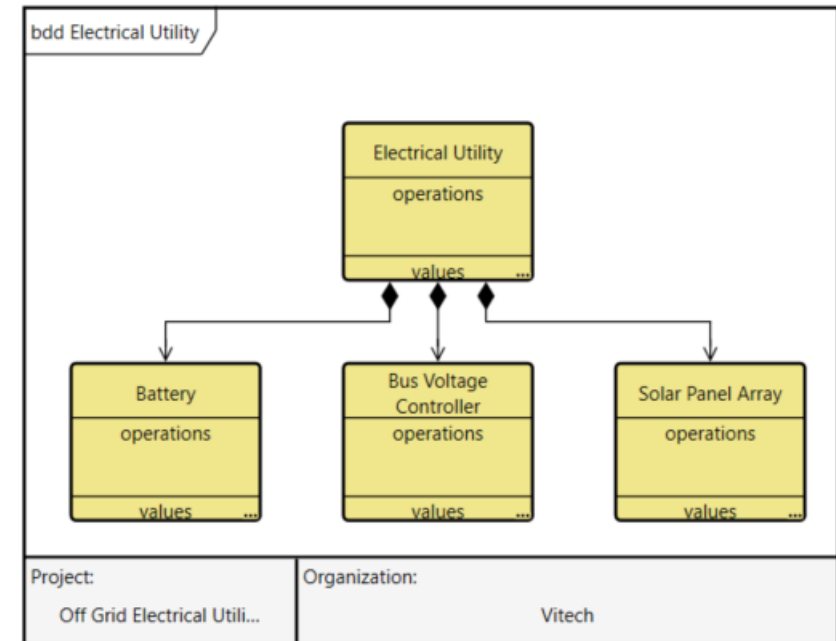
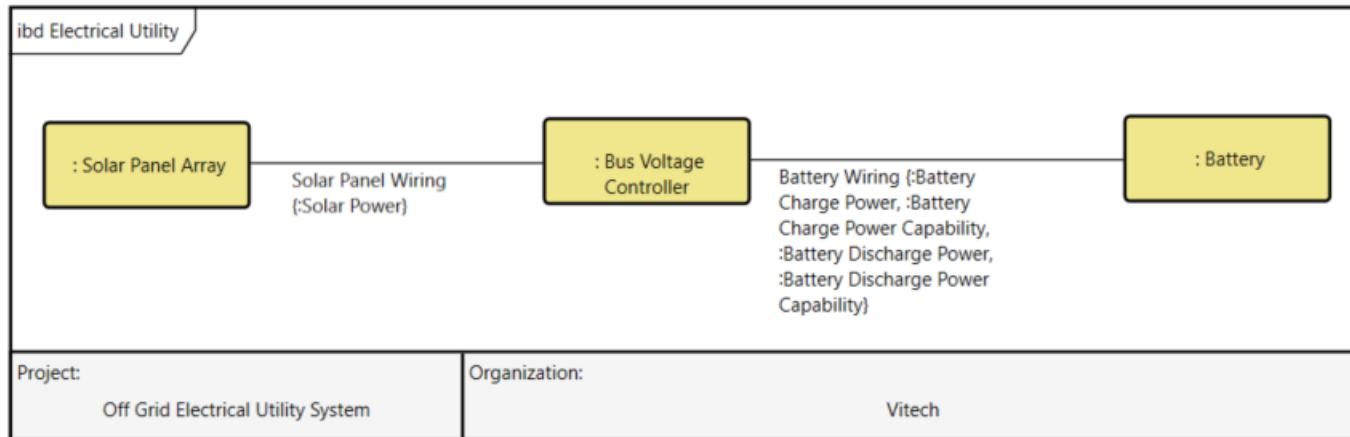
# System Context(Solution Space)



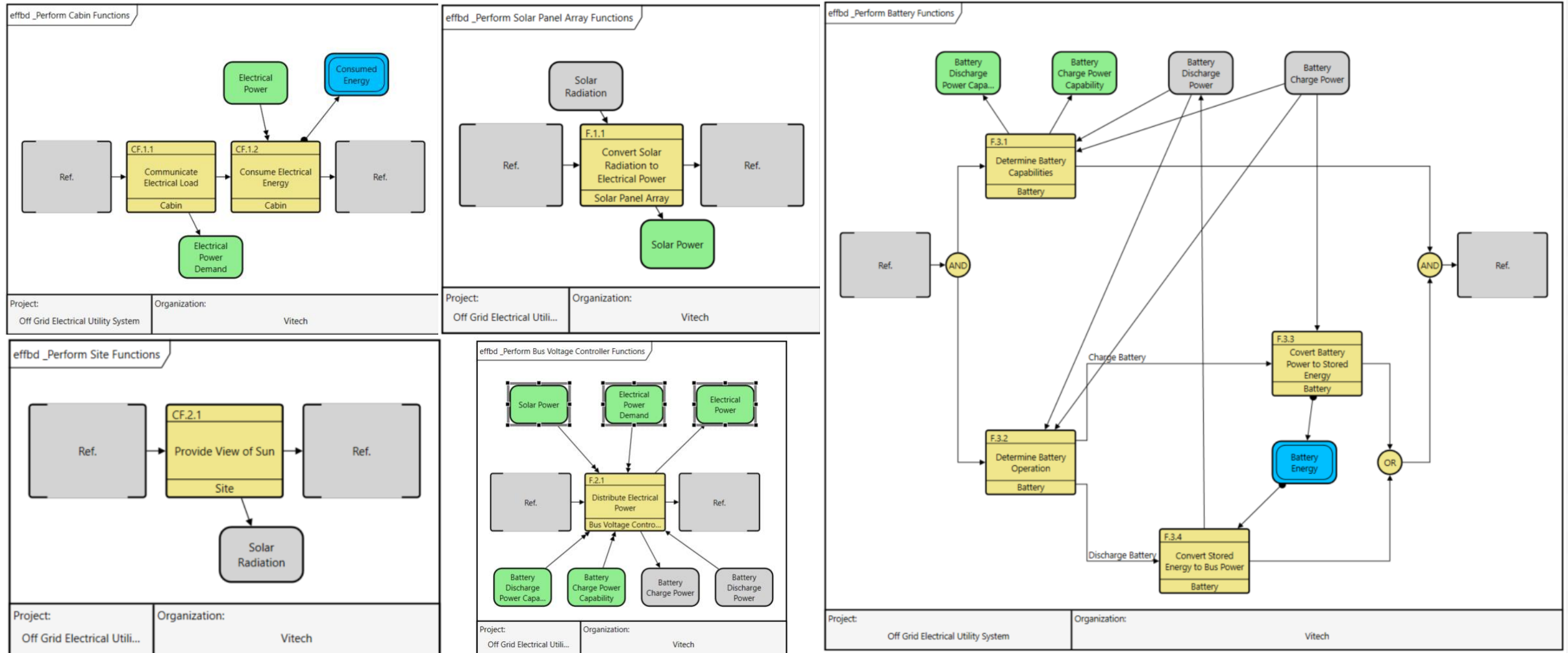
# Solution Space – Integrated Behavior



# Solution Space – System Components



# Solution Space – Partition – Decompose – Allocate





# Poll Question

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# Parameterization

# Parameterization – Requirements – Components – Verification Requirement (Binding)

The image displays four screenshots of the 'asPropertySheet' interface, showing the configuration of different requirements. Each panel includes tabs for 'Add / Remove', 'Permissions', 'Attributes', 'Properties', 'Parameters', 'Diagnostics', and 'Views'.

### Max Continuous Power asPropertySheet

Objective	Minimum	Maximum	Units	Design	Observed	Precision
Power (PWR)		42.00000000	W			
Source Binding:	CMP Electrical Utility					
Dependent Bindings:	VR Analytical Electrical Utility Delivery Verification					

### Electrical Utility asPropertySheet

Objective	Minimum	Maximum	Units	Design	Observed	Precision
Energy (E)		1008.00000000	Wh			
Source Binding:	REQ Max Daily Energy					
Dependent Bindings:	VR Analytical Electrical Ut					
Power (PWR)		42.00000000	W			
Source Binding:	REQ Max Continuous Power					
Dependent Bindings:	VR Analytical Electrical Ut					

### Max Daily Energy asPropertySheet

Objective	Minimum	Maximum	Units	Design	Observed	Precision
Energy (E)		1008.00000000	Wh			
Source Binding:	CMP Electrical Utility					
Dependent Bindings:	VR Analytical Electrical Utility Delivery Verification					

### Analytical Electrical Utility Delivery Verification asPropertySheet

Objective	Minimum	Maximum	Units	Design	Observed	Precision
Energy (E)		1008.00000000	Wh			
Source Binding:	REQ Max Daily Energy					
Dependent Bindings:	CMP Electrical Utility					
Power (PWR)		42.00000000	W			
Source Binding:	REQ Max Continuous Power					
Dependent Bindings:	CMP Electrical Utility					



# Verification

# Verification

Electrical Utility Scenario UI Form

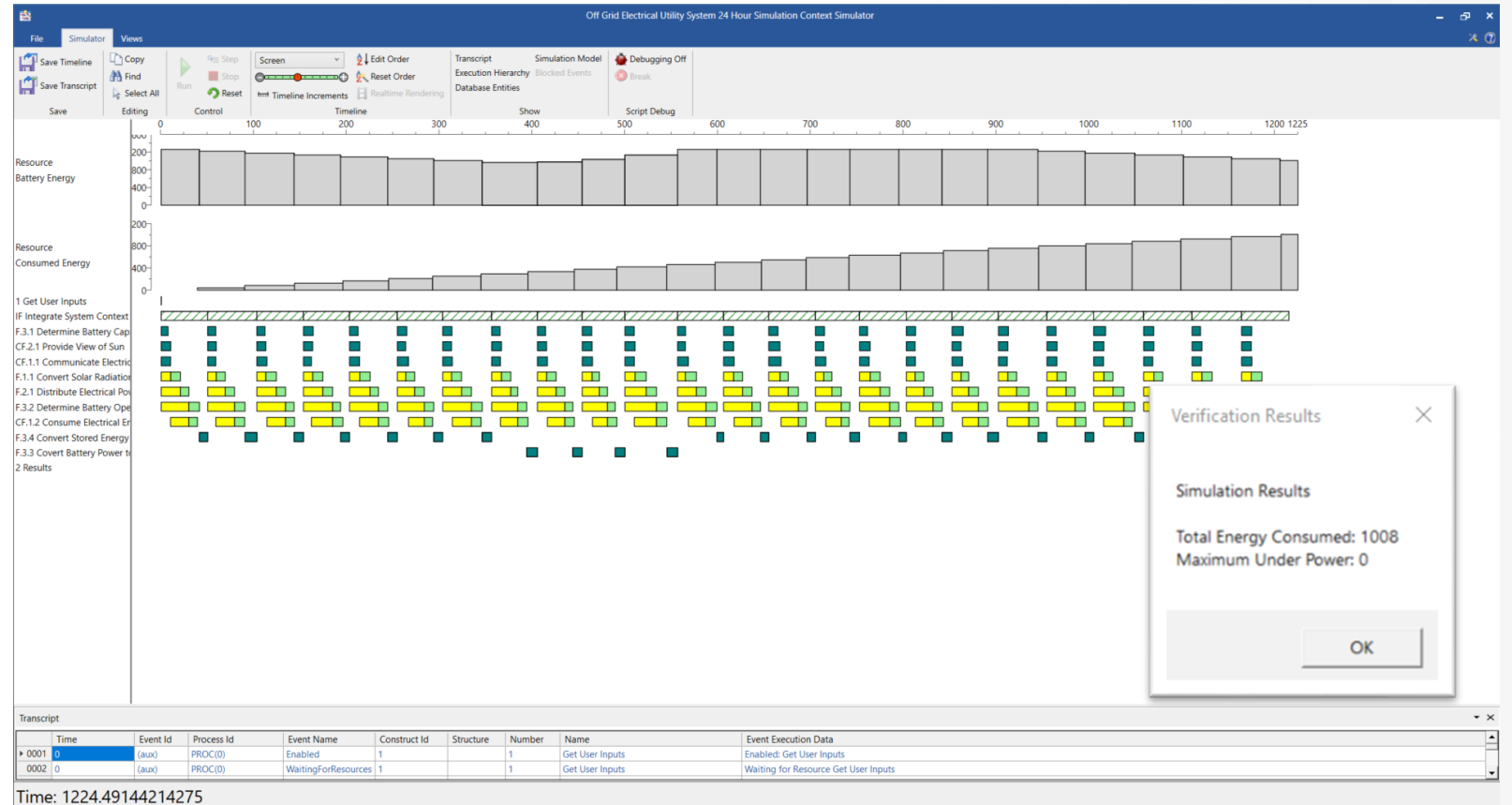
Max Solar Panel Power(W)

Max Battery Charge Power(W)

Max Battery Discharge Power(W)

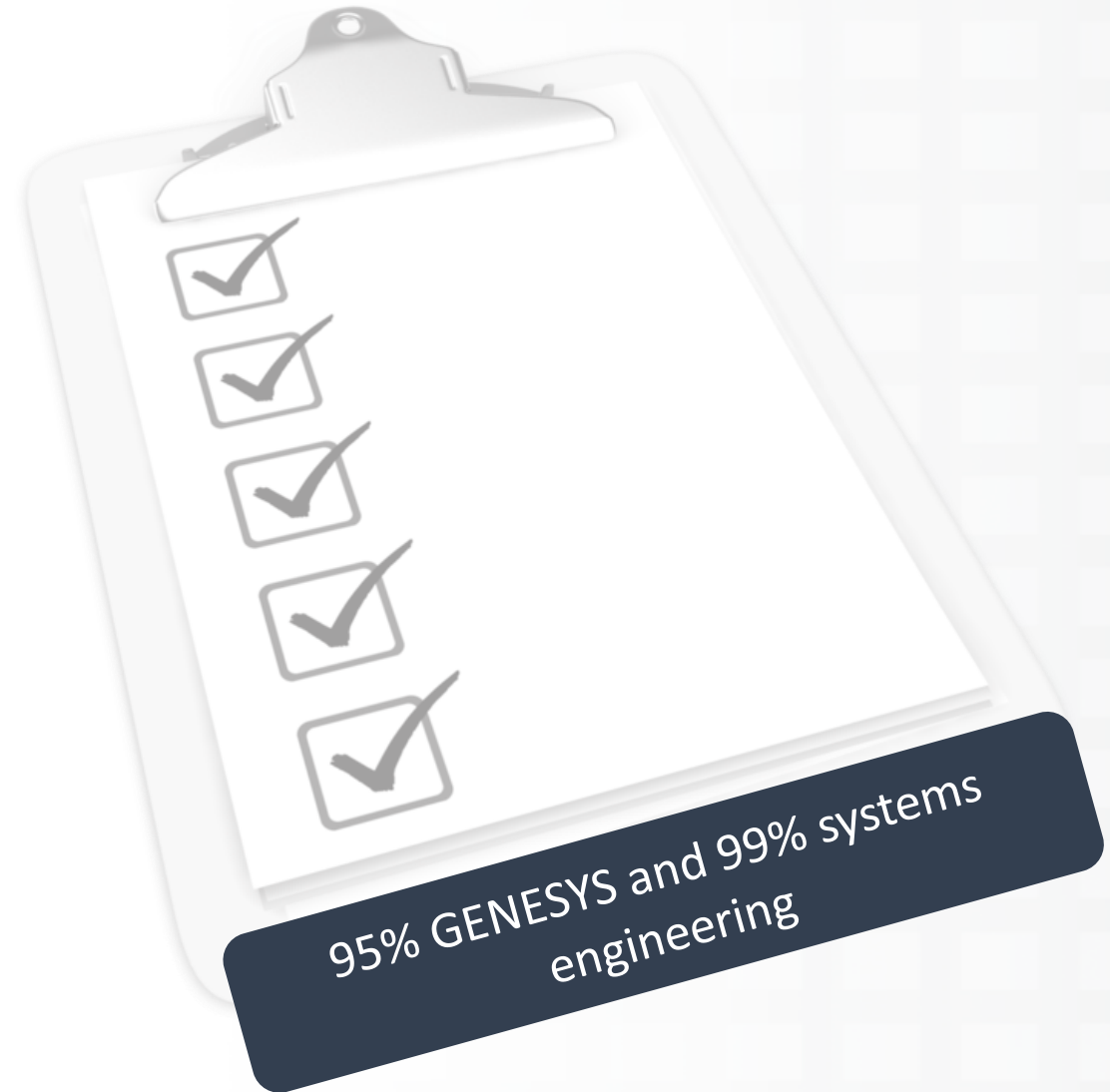
Battery Energy Capacity (Wh)

Cabin Continuous Power Demand



# Our Session

- GENESYS Foundations
- Basic Navigation
- Getting Started
- Engineering the System
- Parametrization
- Verification



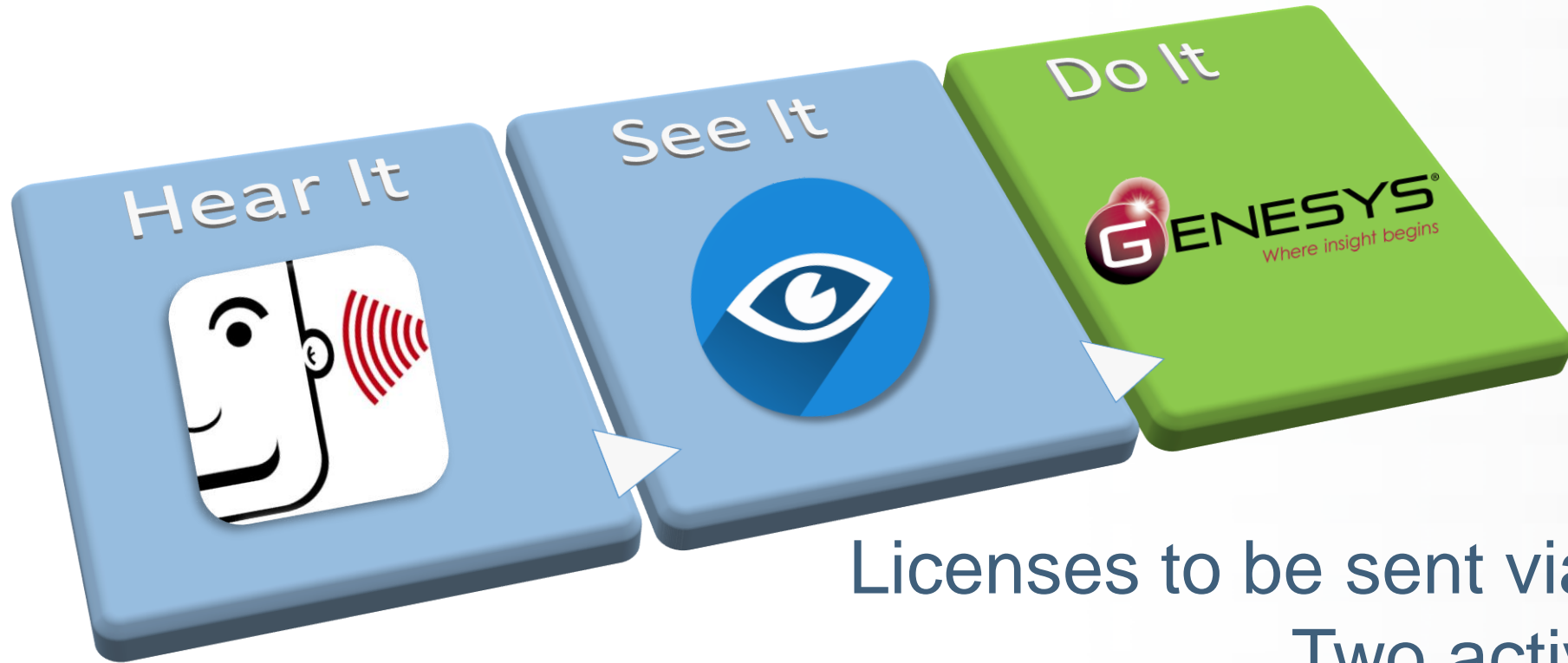
# Questions



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# The GENESYS Experience: A Three-Part Series



Licenses to be sent via email

Two activations

Office Hours

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