

WHY CHALLENGING THE INCOSE CONSISTENCY METRICS MIGHT BENEFIT YOUR REQUIREMENTS?



THE
REUSE
COMPANY

WEBINAR RULES

PLEASE, TRY TO REMAIN MUTED ALONG THE WEBINAR

THERE IS A CHAT BOX FOR YOU TO ASK QUESTIONS OR SEND COMMENTS

ADDRESS THOSE QUESTION TO THE USER "The REUSE Company"

**IN CASE OF ANY TECHNICAL ISSUE, PLEASE USE THIS CHAT BOX OR MAIL US AT:
"support@reusecompany.com"**

THIS WEBINAR WILL BE RECORDED

THE LINK WITH THE CONSEQUENT RECORDING WILL BE SENT IN A FEW DAYS

WEBINAR RULES

PLEASE, TRY TO REMAIN MUTED ALONG THE WEBINAR

THERE IS A CHAT BOX FOR YOU TO ASK QUESTIONS OR SEND COMMENTS

ADDRESS THOSE QUESTION TO THE USER "The REUSE Company"

IN CASE OF ANY TECHNICAL ISSUE, PLEASE USE THIS CHAT BOX OR MAIL US AT:
"support@reusecompany.com"

THIS WEBINAR WILL BE RECORDED

THE LINK WITH THE CONSEQUENT RECORDING WILL BE SENT IN A FEW DAYS

WEBINAR RULES

PLEASE, TRY TO REMAIN MUTED ALONG THE WEBINAR

THERE IS A CHAT BOX FOR YOU TO ASK QUESTIONS OR SEND COMMENTS

ADDRESS THOSE QUESTION TO THE USER "The REUSE Company"

**IN CASE OF ANY TECHNICAL ISSUE, PLEASE USE THIS CHAT BOX OR MAIL US AT:
"support@reusecompany.com"**

THIS WEBINAR WILL BE RECORDED

THE LINK WITH THE CONSEQUENT RECORDING WILL BE SENT IN A FEW DAYS

WEBINAR RULES

PLEASE, TRY TO REMAIN MUTED ALONG THE WEBINAR

THERE IS A CHAT BOX FOR YOU TO ASK QUESTIONS OR SEND COMMENTS

ADDRESS THOSE QUESTION TO THE USER "The REUSE Company"

IN CASE OF ANY TECHNICAL ISSUE, PLEASE USE THIS CHAT BOX OR MAIL US AT:
"support@reusecompany.com"

THIS WEBINAR WILL BE RECORDED

THE LINK WITH THE CONSEQUENT RECORDING WILL BE SENT IN A FEW DAYS

WEBINAR RULES

PLEASE, TRY TO REMAIN MUTED ALONG THE WEBINAR

THERE IS A CHAT BOX FOR YOU TO ASK QUESTIONS OR SEND COMMENTS

ADDRESS THOSE QUESTION TO THE USER "The REUSE Company"

**IN CASE OF ANY TECHNICAL ISSUE, PLEASE USE THIS CHAT BOX OR MAIL US AT:
"support@reusecompany.com"**

THIS WEBINAR WILL BE RECORDED

THE LINK WITH THE CONSEQUENT RECORDING WILL BE SENT IN A FEW DAYS

WEBINAR RULES

PLEASE, TRY TO REMAIN MUTED ALONG THE WEBINAR

THERE IS A CHAT BOX FOR YOU TO ASK QUESTIONS OR SEND COMMENTS

ADDRESS THOSE QUESTION TO THE USER "The REUSE Company"

IN CASE OF ANY TECHNICAL ISSUE, PLEASE USE THIS CHAT BOX OR MAIL US AT:
"support@reusecompany.com"

THIS WEBINAR WILL BE RECORDED

THE LINK WITH THE CONSEQUENT RECORDING WILL BE SENT IN A FEW DAYS

INDEX

INTRODUCTION

QUALITY PROPERTIES: CCC

WHY SHOULD YOU CARE ABOUT CONSISTENCY?

USE CASES: SYSTEMS ENGINEERING SUITE

INTRODUCTION

WHO ARE WE?

TRC IN A NUTSHELL

WHO ARE WE?



Cecilia Karlsson-Llorens



cecilia.karlsson@reusecompany.com



[@ReuseCompany](https://twitter.com/ReuseCompany)



THE
REUSE
COMPANY

WHO ARE WE?



Katerina Godunova



katerina.godunova@reusecompany.com



www.linkedin.com/in/kgodunova



THE
REUSE
COMPANY

TRC IN A NUTSHELL

INTRODUCTION



THE
REUSE
COMPANY

T **R** **C**

TRACEABILITY



REUSE



CALIDAD = QUALITY



INDEX

INTRODUCTION

QUALITY PROPERTIES: CCC

WHY SHOULD YOU CARE ABOUT CONSISTENCY?

USE CASES: SYSTEMS ENGINEERING SUITE

QUALITY PROPERTIES: CCC

WHAT DO YOUR REQUIREMENTS DEPEND ON?

DEFYING INCOSE CONSISTENCY APPROACH

WHAT DO YOUR REQUIREMENTS DEPEND ON?

QUALITY PROPERTIES: CCC

CORRECTNESS 

COMPLETENESS 

CONSISTENCY 

WHAT DO YOUR REQUIREMENTS DEPEND ON?

QUALITY PROPERTIES: CCC

CORRECTNESS

ENSURING NEEDS FULFILLED AS EXPECTED



COMPLETENESS

COMPRISE ALL COMPONENTS/STAGES/
NEEDS/... REQUIRED



CONSISTENCY

AVOID CONFLICT OR REDUNDANCY



DEFYING INCOSE CONSISTENCY APPROACH

QUALITY PROPERTIES: CCC

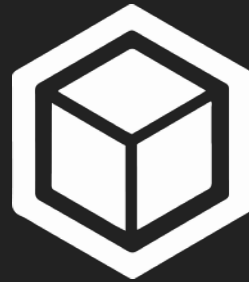
3 INCOSE CHALLENGES

01 02 03

DEFYING INCOSE CONSISTENCY APPROACH

QUALITY PROPERTIES: CCC

3 INCOSE CHALLENGES



CONSISTENCY AGAINST MODELS

01

DEFYING INCOSE CONSISTENCY APPROACH

QUALITY PROPERTIES: CCC

3 INCOSE CHALLENGES

Another key tool is the use of diagrams and other models that show the relationships between needs and between the resulting requirements. Using a software tool, e.g. diagramming and modeling, to manage dependencies can help in identifying conflicts and manage dependencies.

DEFYING INCOSE CONSISTENCY APPROACH

QUALITY PROPERTIES: CCC

3 INCOSE CHALLENGES

Another key tool is the use of diagrams and other models that show the relationships between needs and between the resulting requirements. Using a software tool, e.g. diagramming and modeling, to manage dependencies can help in identifying conflicts and manage dependencies.

Consistency in needs and requirements wording is greatly assisted by the use of a centralized domain ontology that is shared among all stakeholders.

DEFYING INCOSE CONSISTENCY APPROACH

QUALITY PROPERTIES: CCC

3 INCOSE CHALLENGES

Rules that help establish this characteristic:

R4 - /Accuracy/UseDefinedTerms

R29 - /Uniqueness/Classify

R30 - /Uniqueness/ExpressOnce

R36 - /UniformLanguage/UseConsistentTerms

R37 - /UniformLanguage/DefineAcronyms

R38 - /UniformLanguage/AvoidAbbreviations

R39 - /UniformLanguage/StyleGuide

R40 - /Modularity/RelatedRequirements

R41 - /Modularity/Structured

DEFYING INCOSE CONSISTENCY APPROACH

QUALITY PROPERTIES: CCC

3 INCOSE CHALLENGES

The screenshot displays a software development environment with three main components:

- Project Explorer (Left):** Shows a project structure for "Temperature War - Model [v5.0]". The "System Requirements" folder is expanded, showing a table of requirements.
- Requirements Table (Bottom Left):** A table listing system requirements for the Temperature Warrior. The first requirement is highlighted in blue.
- System Architecture Diagram (Right):** A hierarchical diagram of the Temperature Warrior system. It includes sub-systems like Temperature Registration System, Management System, Temperature Actuation System, Control System, and Power System. Each sub-system contains specific functional blocks.

Workproduct name
<input checked="" type="checkbox"/> While the Temperature Warrior is in Combat Mode , the Temperature Warrior shall measure the physical environment temperature.
<input type="checkbox"/> While the Temperature Warrior is in the competition, the code shall remain untouched.
<input type="checkbox"/> While the Temperature Warrior is in operation, the Temperature Warrior shall refrain from polluting the physical environment.
<input type="checkbox"/> While the Temperature Warrior is in development, the operators of the Temperature Warrior shall utilize insulating footwear with plastic materials.
<input type="checkbox"/> While the Temperature Warrior is in development, the development team of the Temperature Warrior shall elaborate a cost document.
<input type="checkbox"/> While the Temperature Warrior is in development, the development team of the Temperature Warrior shall document the complete development.
<input type="checkbox"/> While the Temperature Warrior is in development, the building installations of the Temperature Warrior shall include electrical protection equipment.
<input type="checkbox"/> While the Temperature Warrior is in competition, the software of the Temperature Warrior shall be in release mode.
<input type="checkbox"/> While the Temperature Warrior is in Combat Mode , the temperature registered shall be superior to 12 °C.
<input type="checkbox"/> While the Temperature Warrior is in Combat Mode , the temperature registered shall be inferior to 40 °C.
<input type="checkbox"/> While the Temperature Warrior is in Combat Mode , the operational activity of the Temperature Warrior shall be autonomous.
<input type="checkbox"/> While the Temperature Warrior is in Combat Mode , the control laptop shall request the Temperature Warrior for the temperature measured by the
<input type="checkbox"/> While the Temperature Warrior is in Combat Mode , the Temperature Warrior shall utilize a temperature regulation software algorithm.
<input type="checkbox"/> While the Temperature Warrior is in Combat Mode , the Temperature Warrior shall register the time in which the temperature of the Sensor is with
<input type="checkbox"/> While the Temperature Warrior is in Combat Mode , the Temperature Warrior shall maintain the physical environment temperature within the confi

DEFYING INCOSE CONSISTENCY APPROACH

QUALITY PROPERTIES: CCC

3 INCOSE CHALLENGES

02

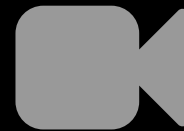
TAILORING & EXTENSION



DEFYING INCOSE CONSISTENCY APPROACH

QUALITY PROPERTIES: CCC

3 INCOSE CHALLENGES



DEFYING INCOSE CONSISTENCY APPROACH

QUALITY PROPERTIES: CCC

3 INCOSE CHALLENGES



RULES AUTOMATIZATION

03

DEFYING INCOSE CONSISTENCY APPROACH

QUALITY PROPERTIES: CCC

3 INCOSE CHALLENGES

The screenshot displays the RQA (Requirements Quality Assurance) software interface. The main window shows a table of requirements with columns for ID, Workproduct name, Correctness, and Consistency. A context menu is open over the table, offering options to assess CCC for the whole specification or selected requirements. The interface also includes a ribbon with various tools like 'Quality view', 'Metrics', and 'Suggestions'.

ID	Workproduct name	Correctness	Consistency
SysR61	While the Temperature Warrior is in Configuration Mode, the maximum temperature input parameter of the Temperature Warrior shall...	★★★★	★☆☆
SysR62	While the Temperature Warrior is in Configuration Mode, the minimum temperature input parameter of the Temperature Warrior shall...	★★★	★☆☆
SysR63	The protective walls of the Temperature Warrior shall have a minimum 90 °C angle.	★★★★	★☆☆
SysR64	The protective walls of the Temperature Warrior shall be at a radius of at least 10 cm from the sensor.	★★★★	★★★★
SysR65	The height of the protective walls of the Temperature Warrior shall be inferior to 5 cm.	★★★★	★★★★
SysR66	The width of the protective walls of the Temperature Warrior shall be inferior to 5 cm.	★★★★	★★★★
SysR67	The protective walls of the Temperature Warrior shall refrain from containing insulating materials.	★★★★	★☆☆
SysR68	The height of the Temperature Warrior shall be inferior to 50 cm.	★★★★	★★★★
SysR69	The width of the Temperature Warrior shall be inferior to 50 cm.	★★★★	★★★★
SysR70	The depth of the Temperature Warrior shall be inferior to 50 cm.	★★★★	★★★★
SysR71	The Temperature Warrior shall use a motherboard Netduino 2 Plus.	★★★★	★☆☆
SysR72	The Temperature Warrior shall utilize, at least, one sensor TMP36GT9 for the physic	★★★	★☆☆

Total requirements: 135

Assess quality options:

- Assess CCC for the whole specification
- Assess correctness for the whole specification
- Assess completeness for the whole specification
- Assess consistency for the whole specification
- Assess correctness for selected requirements

INDEX

INTRODUCTION

QUALITY PROPERTIES: CCC

WHY SHOULD YOU CARE ABOUT CONSISTENCY?

USE CASES: SYSTEMS ENGINEERING SUITE

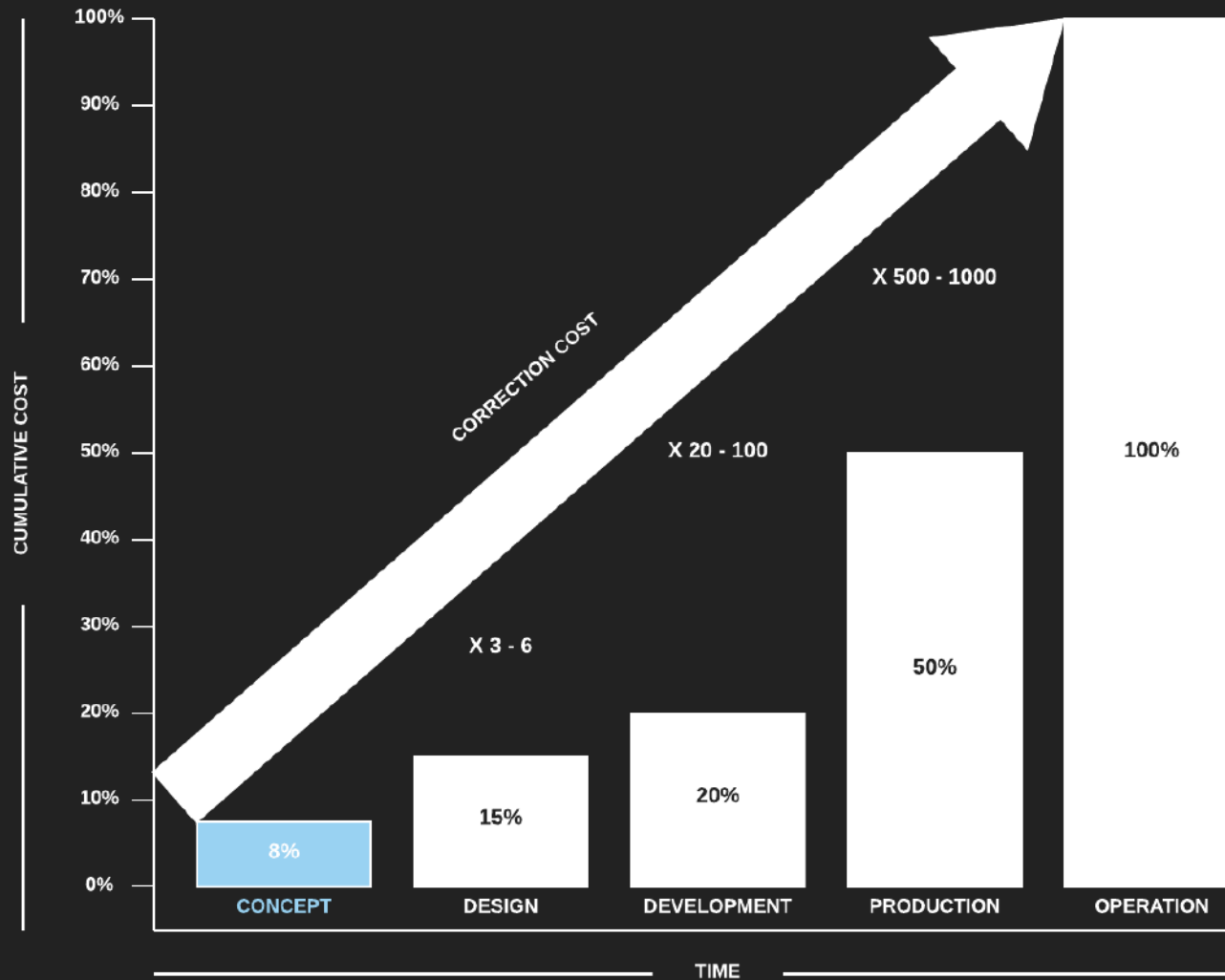
WHY SHOULD YOU CARE ABOUT CONSISTENCY?

COST IMPACT

REAL-LIFE IMPACT

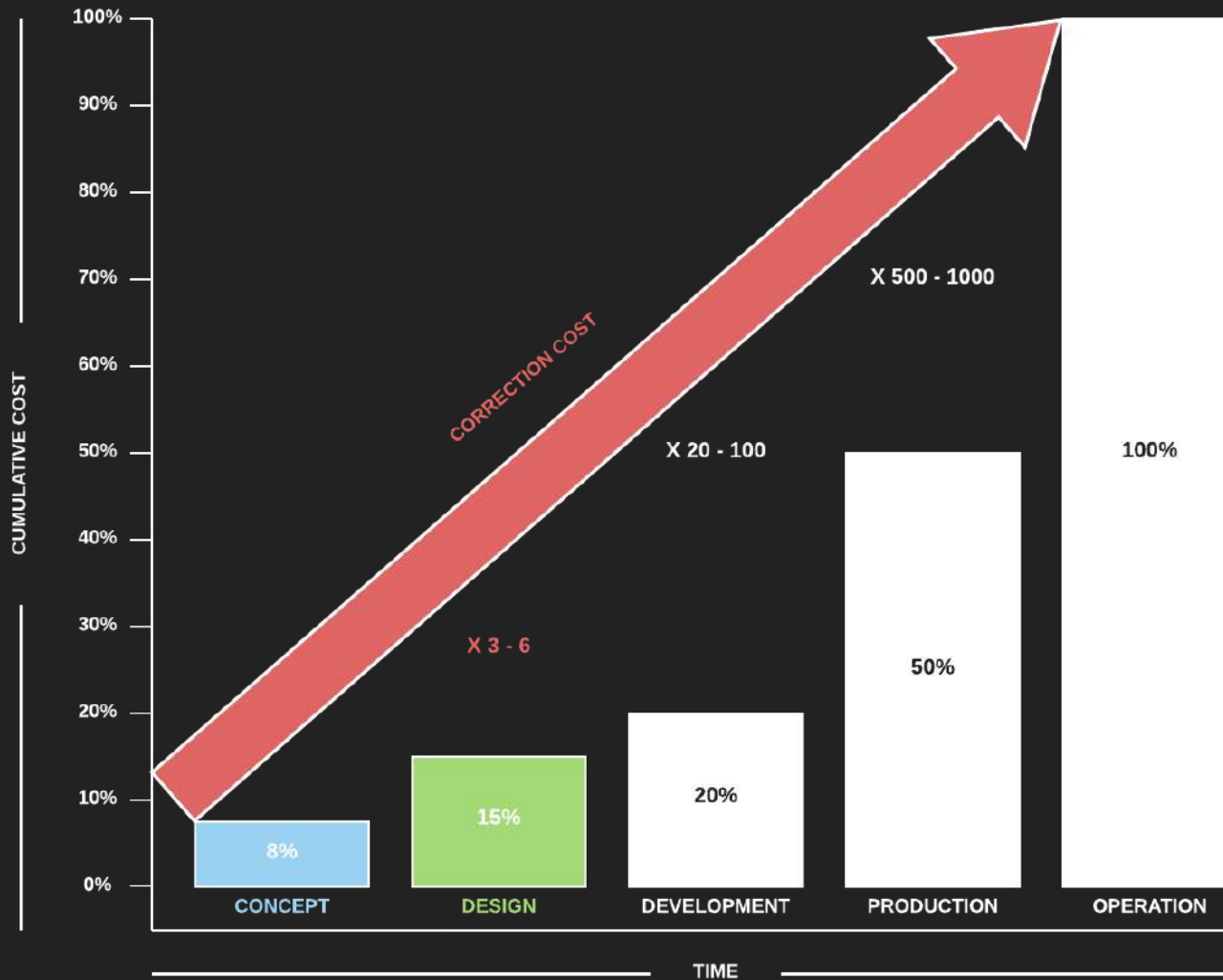
COST IMPACT

WHY SHOULD YOU CARE ABOUT CONSISTENCY?



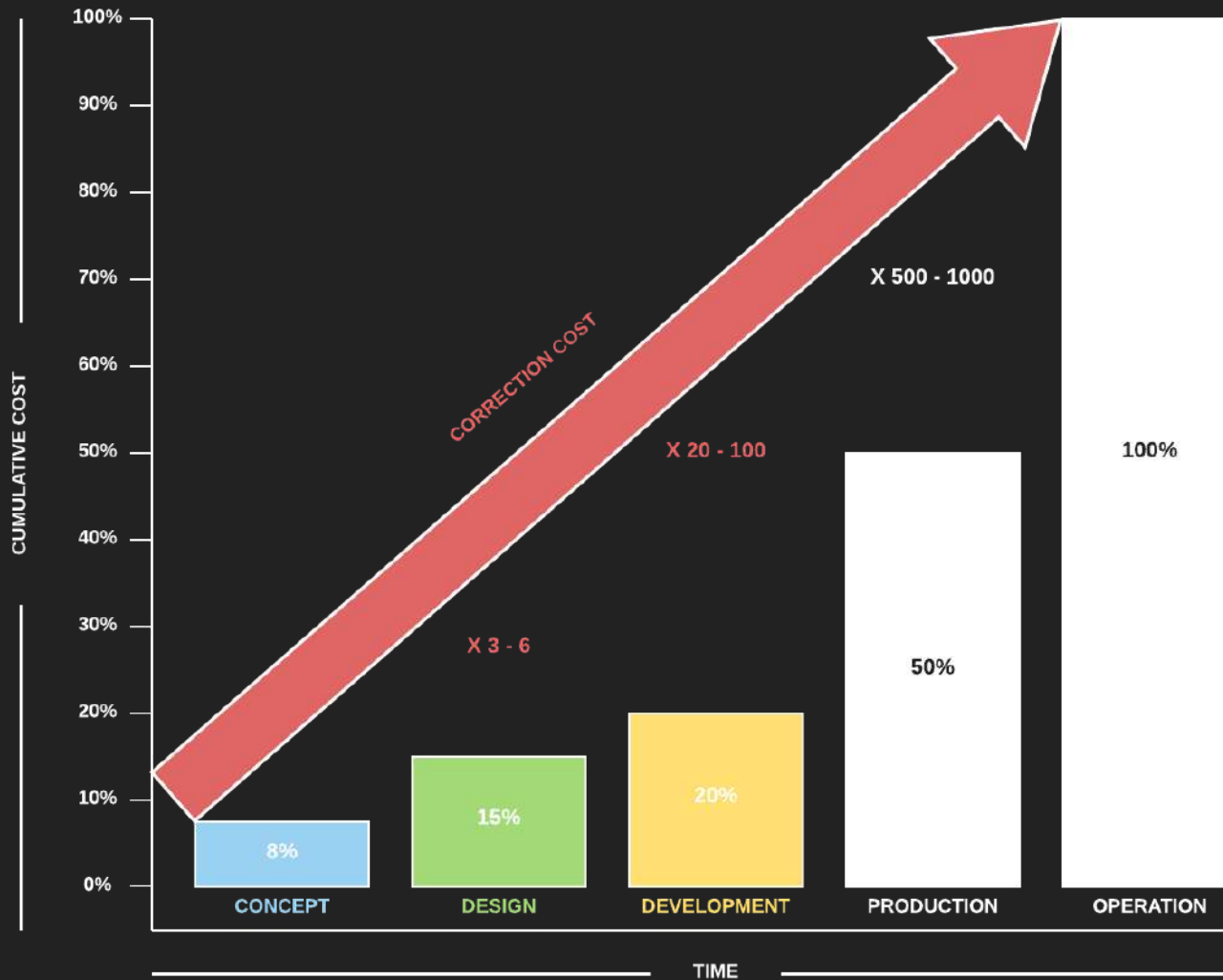
COST IMPACT

WHY SHOULD YOU CARE ABOUT CONSISTENCY?



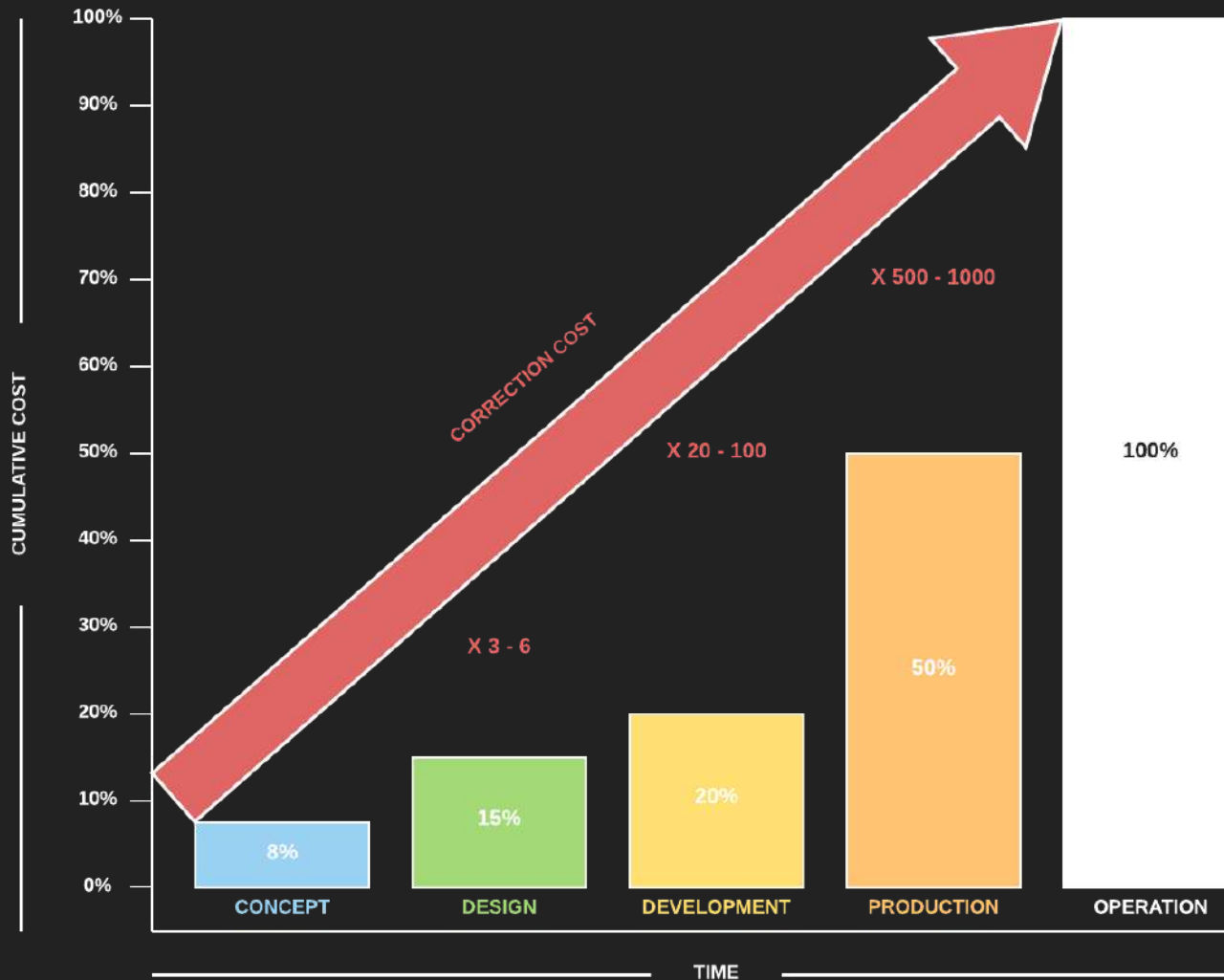
COST IMPACT

WHY SHOULD YOU CARE ABOUT CONSISTENCY?



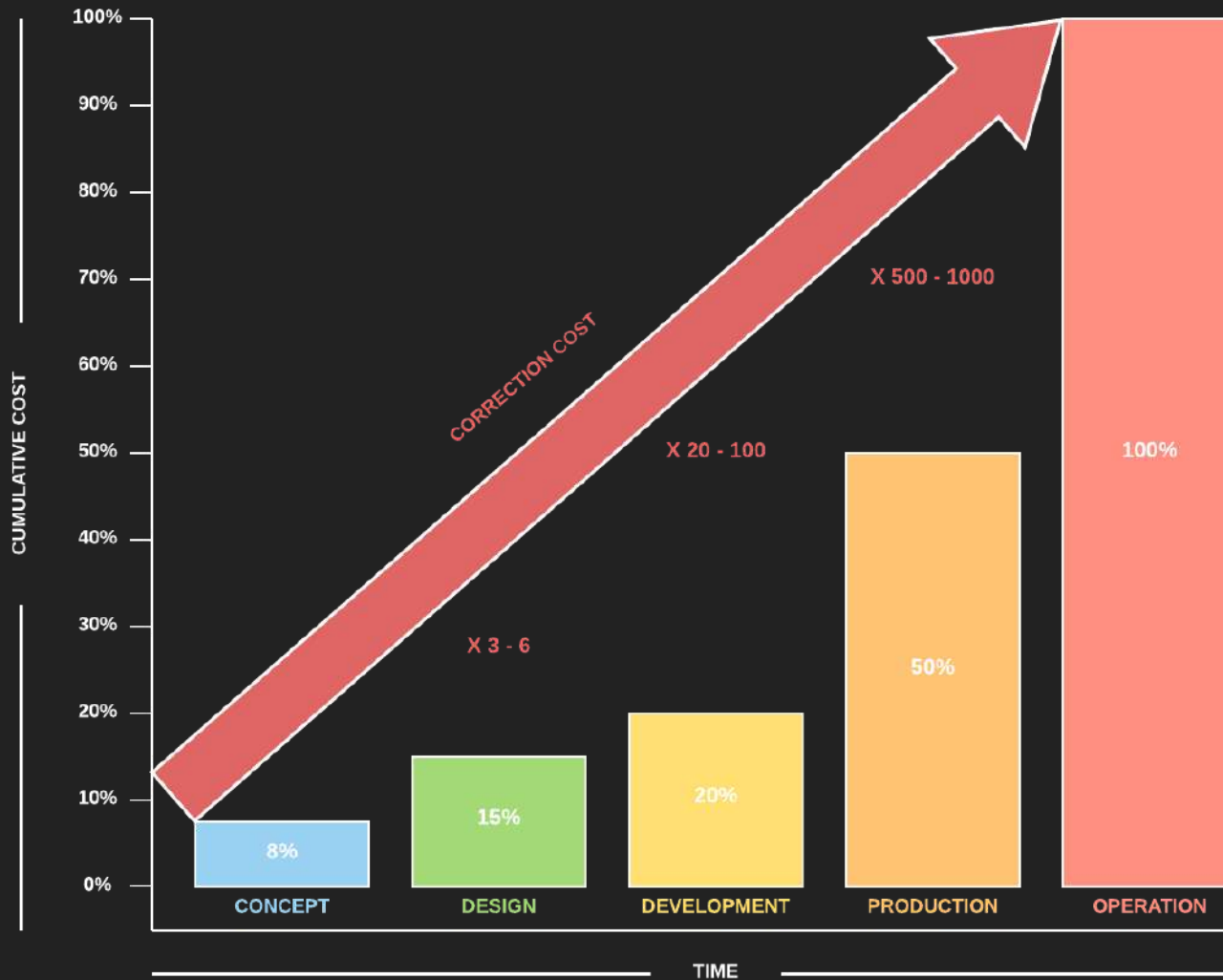
COST IMPACT

WHY SHOULD YOU CARE ABOUT CONSISTENCY?



COST IMPACT

WHY SHOULD YOU CARE ABOUT CONSISTENCY?



REAL-LIFE IMPACT

WHY SHOULD YOU CARE ABOUT CONSISTENCY?

NASA'S MARS CLIMATE ORBITER

WHAT HAPPENED?

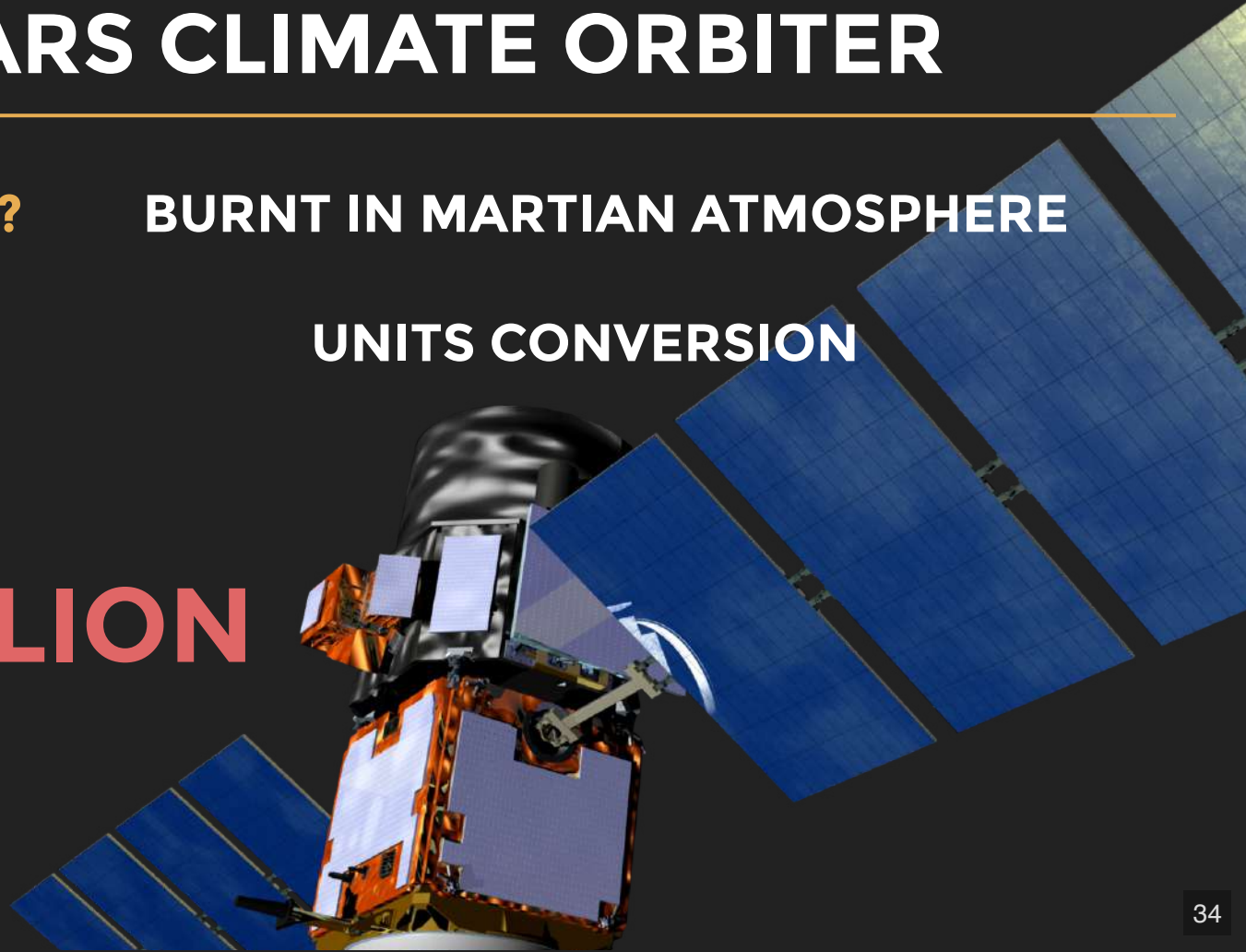
BURNT IN MARTIAN ATMOSPHERE

WHY?

UNITS CONVERSION

IMPACT?

\$125 MILLION



INDEX

INTRODUCTION

QUALITY PROPERTIES: CCC

WHY SHOULD YOU CARE ABOUT CONSISTENCY?

USE CASES: SYSTEMS ENGINEERING SUITE

USE CASES: SYSTEMS ENGINEERING SUITE

MEASUREMENT UNITS ACCORDANCE

EXPECTED VALUES WITHIN RANGE

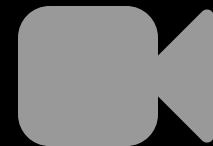
OVERLAPPING & DUPLICATION

SYSTEM DECOMPOSITION PROPERTIES

WRONG STATES & TRANSITIONS

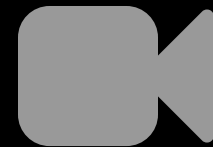
MEASUREMENT UNITS ACCORDANCE

USE CASES: SYSTEMS ENGINEERING SUITE



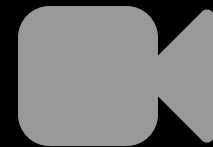
EXPECTED VALUES WITHIN RANGE

USE CASES: SYSTEMS ENGINEERING SUITE



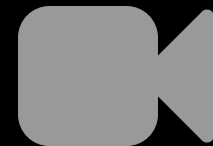
OVERLAPPING & DUPLICATION

USE CASES: SYSTEMS ENGINEERING SUITE



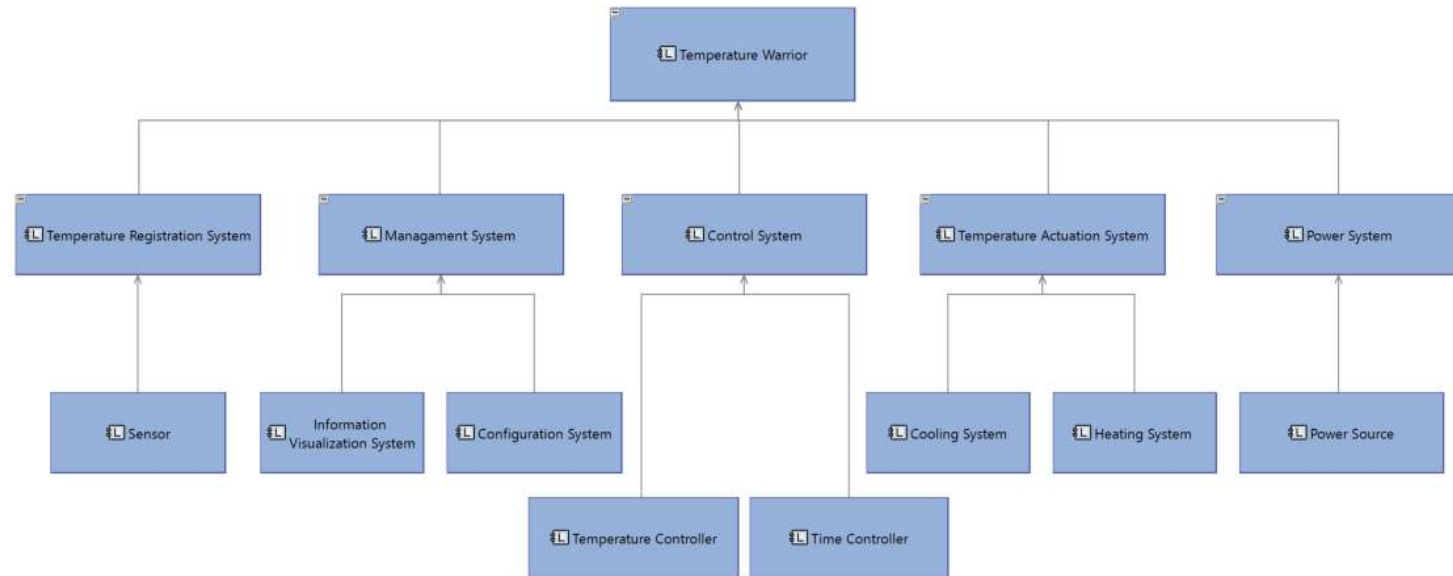
SYSTEM DECOMPOSITION PROPERTIES

USE CASES: SYSTEMS ENGINEERING SUITE



WRONG STATES & TRANSITIONS

USE CASES: SYSTEMS ENGINEERING SUITE



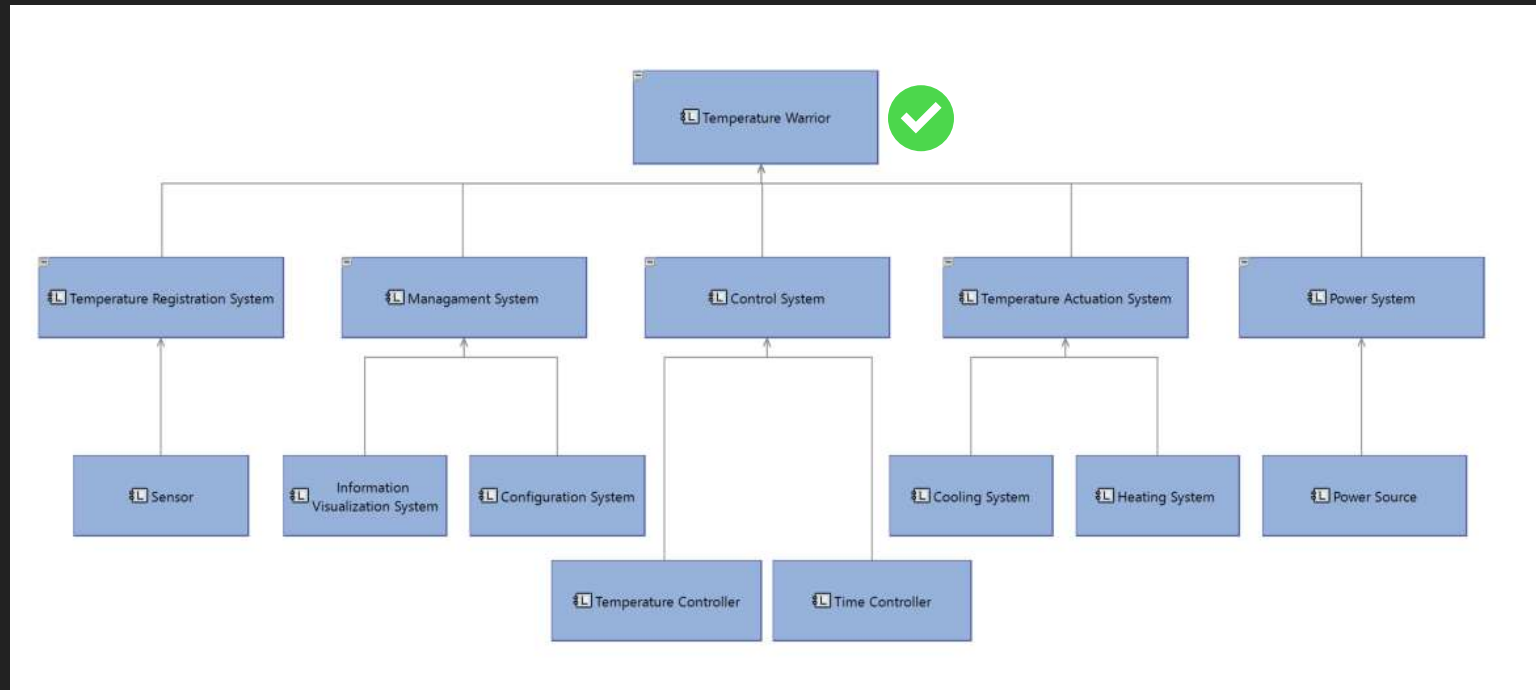
The TEMPERATURE WARRIOR shall have a CONTROL SYSTEM

The TEMPERATURE WARRIOR shall have a POWER SYSTEM

The TEMPERATURE WARRIOR shall have a DEFENSE SYSTEM

WRONG STATES & TRANSITIONS

USE CASES: SYSTEMS ENGINEERING SUITE



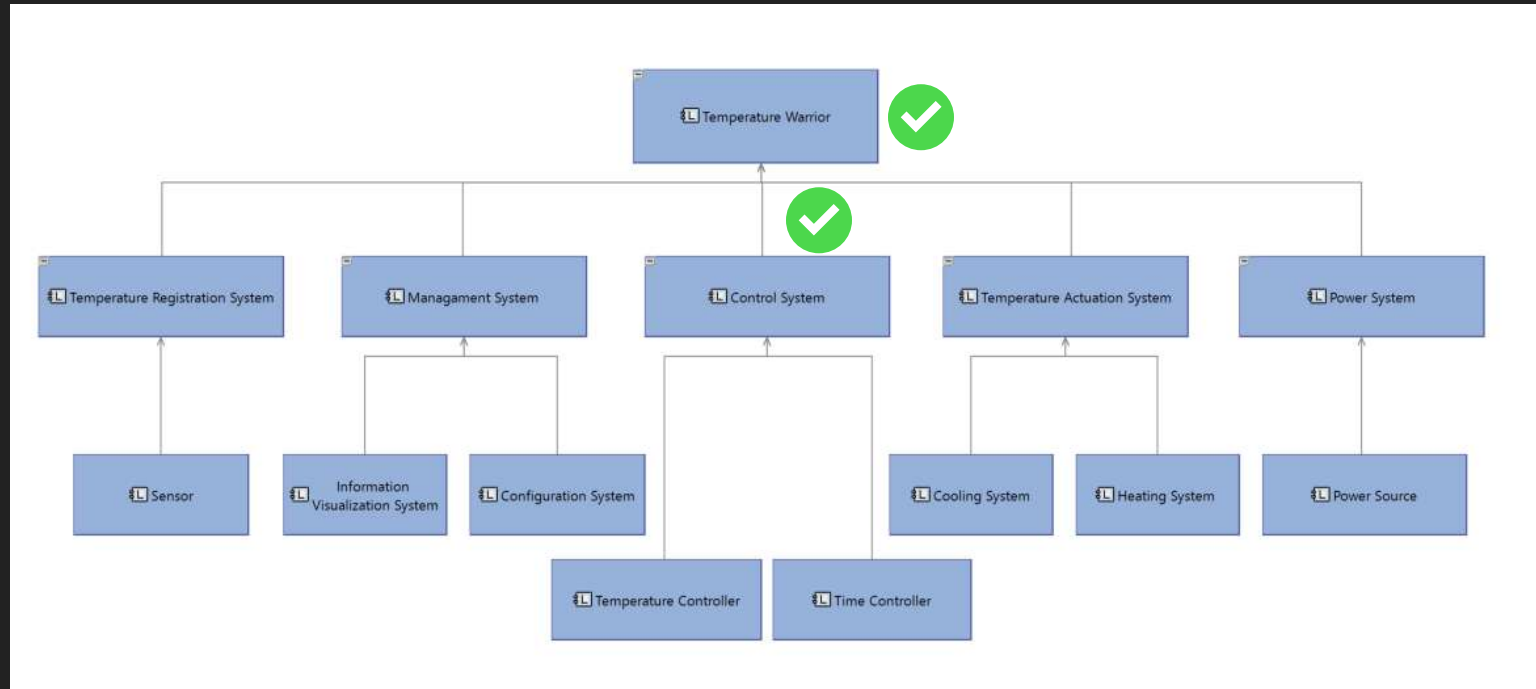
The TEMPERATURE WARRIOR shall have a CONTROL SYSTEM

The TEMPERATURE WARRIOR shall have a POWER SYSTEM

The TEMPERATURE WARRIOR shall have a DEFENSE SYSTEM

WRONG STATES & TRANSITIONS

USE CASES: SYSTEMS ENGINEERING SUITE



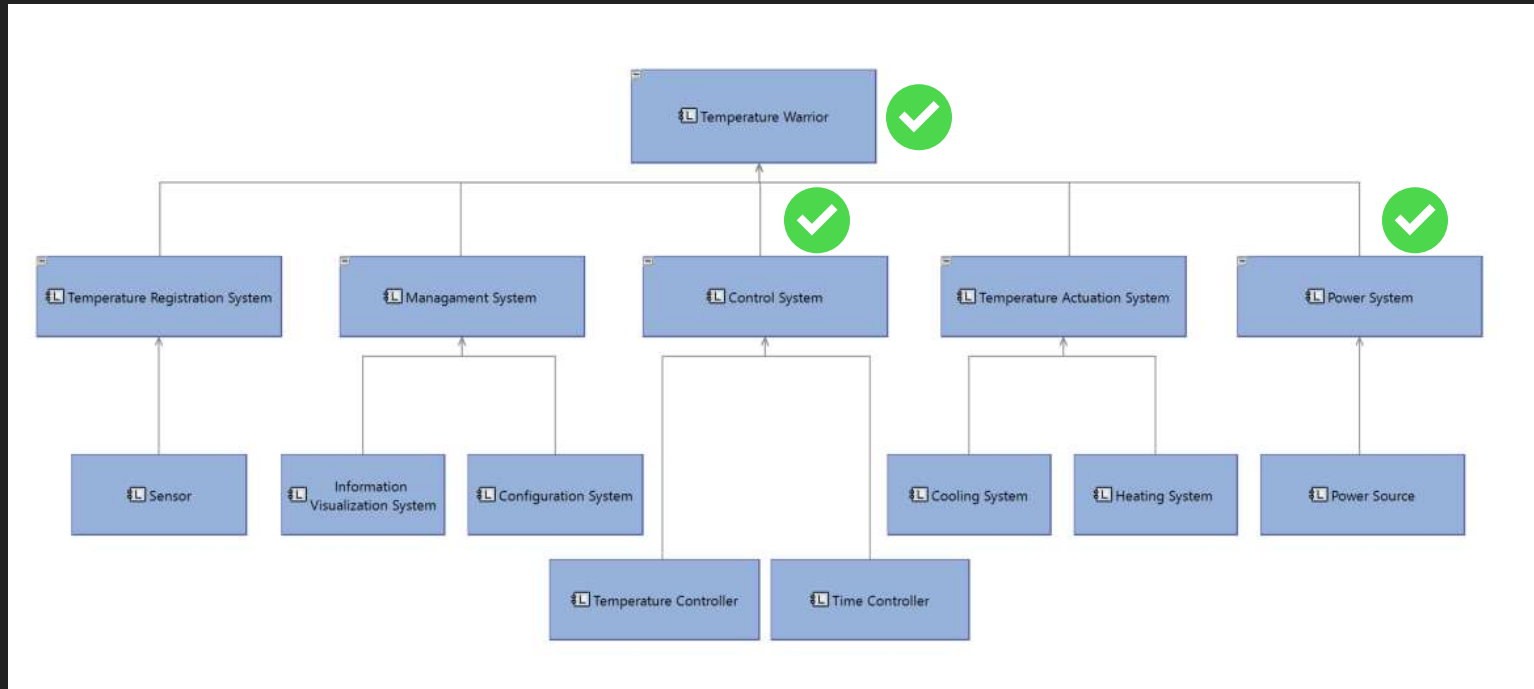
The TEMPERATURE WARRIOR shall have a CONTROL SYSTEM

The TEMPERATURE WARRIOR shall have a POWER SYSTEM

The TEMPERATURE WARRIOR shall have a DEFENSE SYSTEM

WRONG STATES & TRANSITIONS

USE CASES: SYSTEMS ENGINEERING SUITE



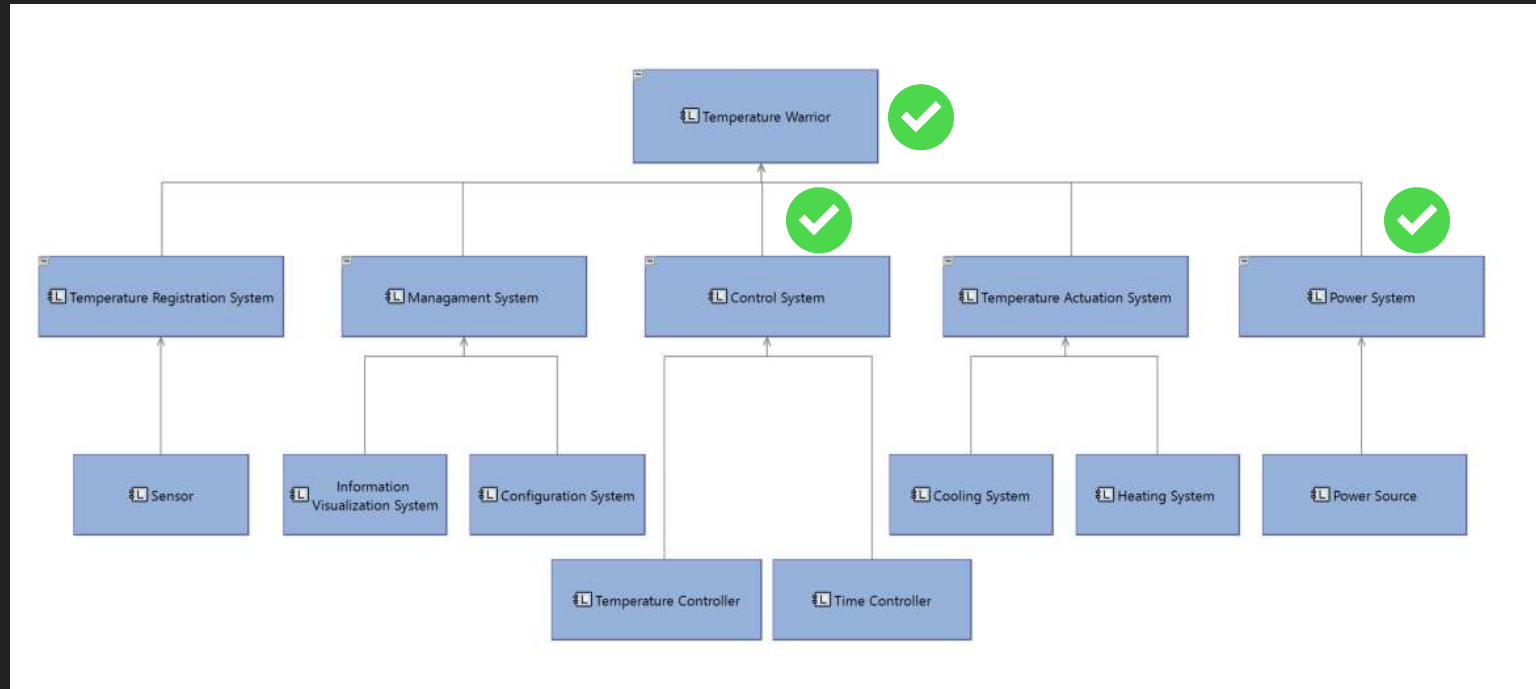
The TEMPERATURE WARRIOR shall have a CONTROL SYSTEM

The TEMPERATURE WARRIOR shall have a POWER SYSTEM

The TEMPERATURE WARRIOR shall have a DEFENSE SYSTEM

WRONG STATES & TRANSITIONS

USE CASES: SYSTEMS ENGINEERING SUITE



The TEMPERATURE WARRIOR shall have a CONTROL SYSTEM

The TEMPERATURE WARRIOR shall have a POWER SYSTEM

The TEMPERATURE WARRIOR shall have a DEFENSE SYSTEM

WRONG STATES & TRANSITIONS

USE CASES: SYSTEMS ENGINEERING SUITE

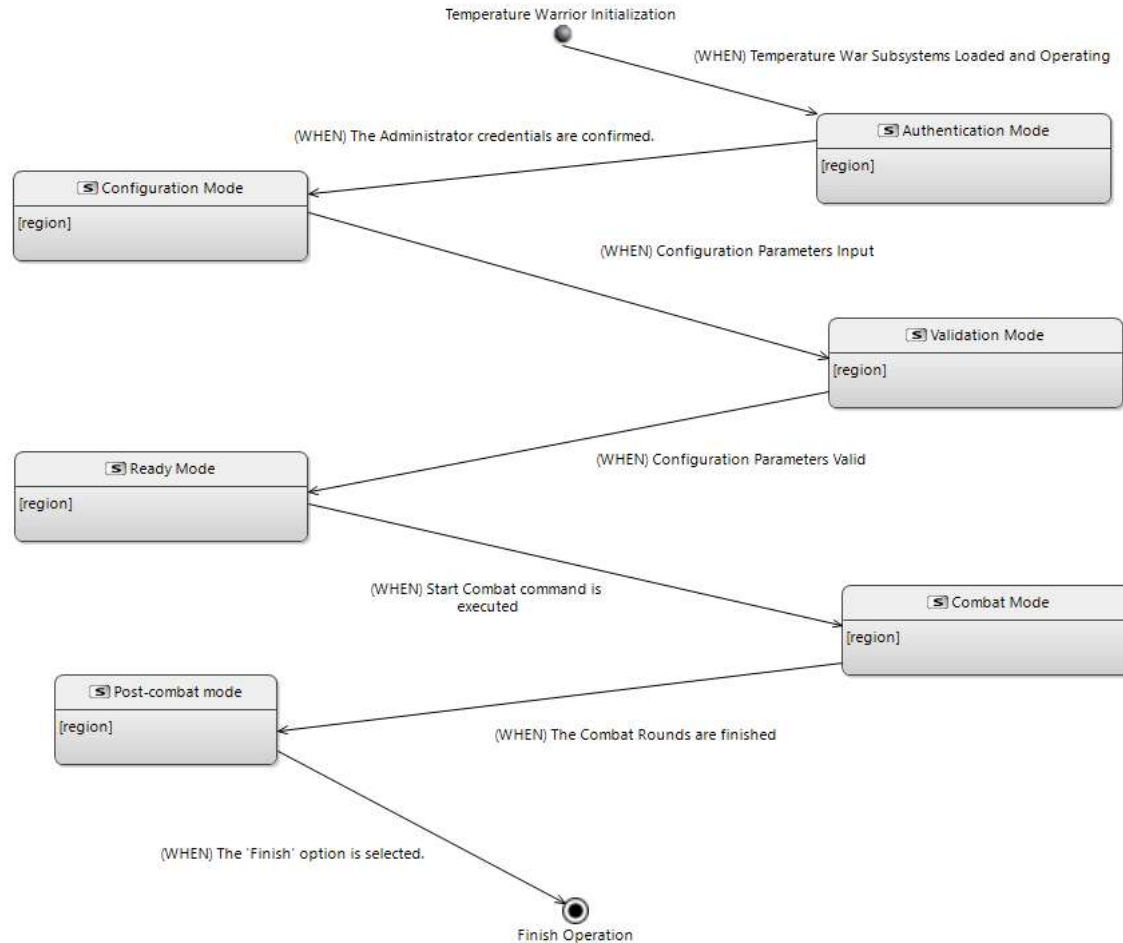
When the Temperature Warrior is in the CONFIGURATION MODE (and the Configuration Parameters are input), the Temperature Warrior shall activate the VALIDATION MODE.

When the Temperature Warrior is in the COMBAT MODE (and the Combat Rounds are finished), the Temperature Warrior shall activate the POST-COMBAT MODE.

When the Temperature Warrior is in the POST-COMBAT MODE (and the Administrator selects the New Combat command), the Control System shall activate the AUTHENTICATION MODE.

WRONG STATES & TRANSITIONS

USE CASES: SYSTEMS ENGINEERING SUITE



WRONG STATES & TRANSITIONS

USE CASES: SYSTEMS ENGINEERING SUITE

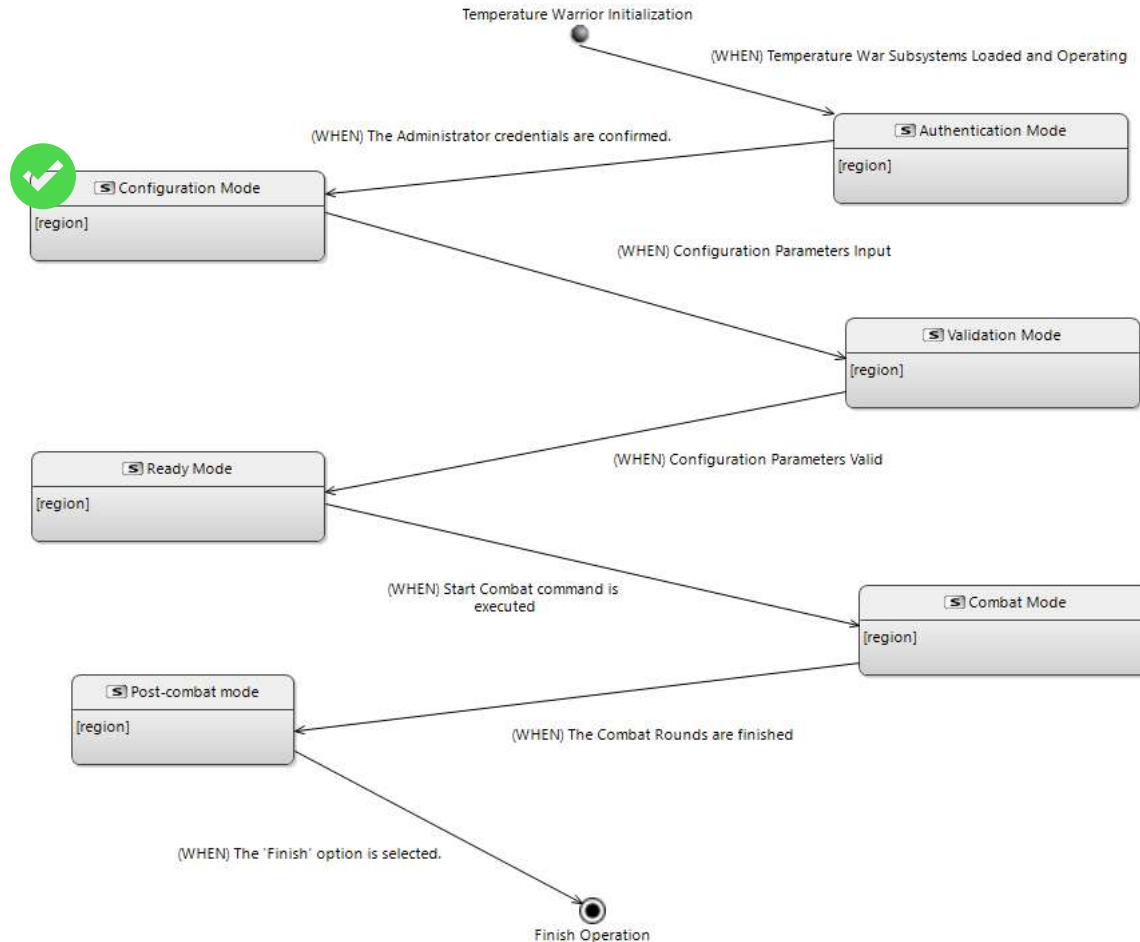
When the Temperature Warrior is in the CONFIGURATION MODE (and the Configuration Parameters are input), the Temperature Warrior shall activate the VALIDATION MODE.

When the Temperature Warrior is in the COMBAT MODE (and the Combat Rounds are finished), the Temperature Warrior shall activate the POST-COMBAT MODE.

When the Temperature Warrior is in the POST-COMBAT MODE (and the Administrator selects the New Combat command), the Control System shall activate the AUTHENTICATION MODE.

WRONG STATES & TRANSITIONS

USE CASES: SYSTEMS ENGINEERING SUITE



WRONG STATES & TRANSITIONS

USE CASES: SYSTEMS ENGINEERING SUITE

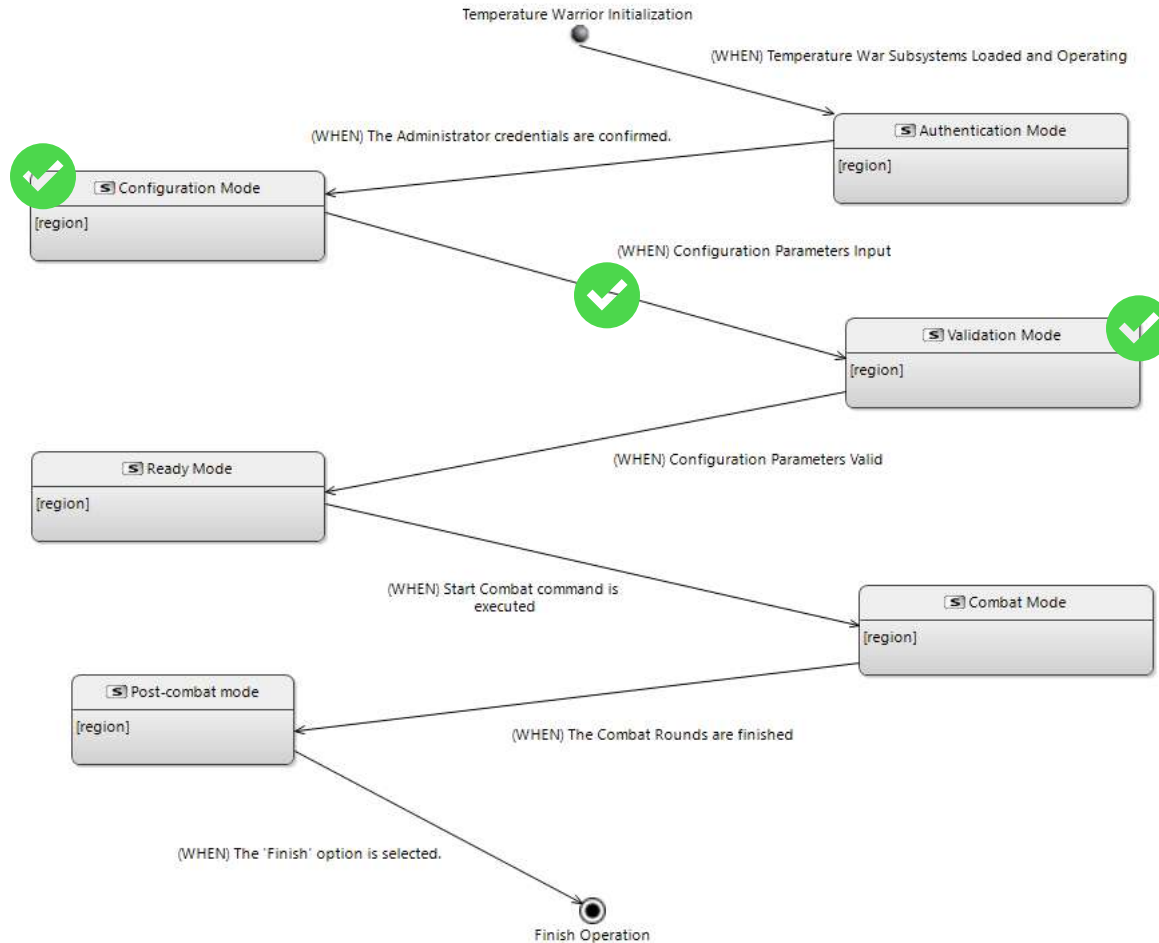
When the Temperature Warrior is in the CONFIGURATION MODE (and the Configuration Parameters are input), the Temperature Warrior shall activate the VALIDATION MODE.

When the Temperature Warrior is in the COMBAT MODE (and the Combat Rounds are finished), the Temperature Warrior shall activate the POST-COMBAT MODE.

When the Temperature Warrior is in the POST-COMBAT MODE (and the Administrator selects the New Combat command), the Control System shall activate the AUTHENTICATION MODE.

WRONG STATES & TRANSITIONS

USE CASES: SYSTEMS ENGINEERING SUITE



WRONG STATES & TRANSITIONS

USE CASES: SYSTEMS ENGINEERING SUITE

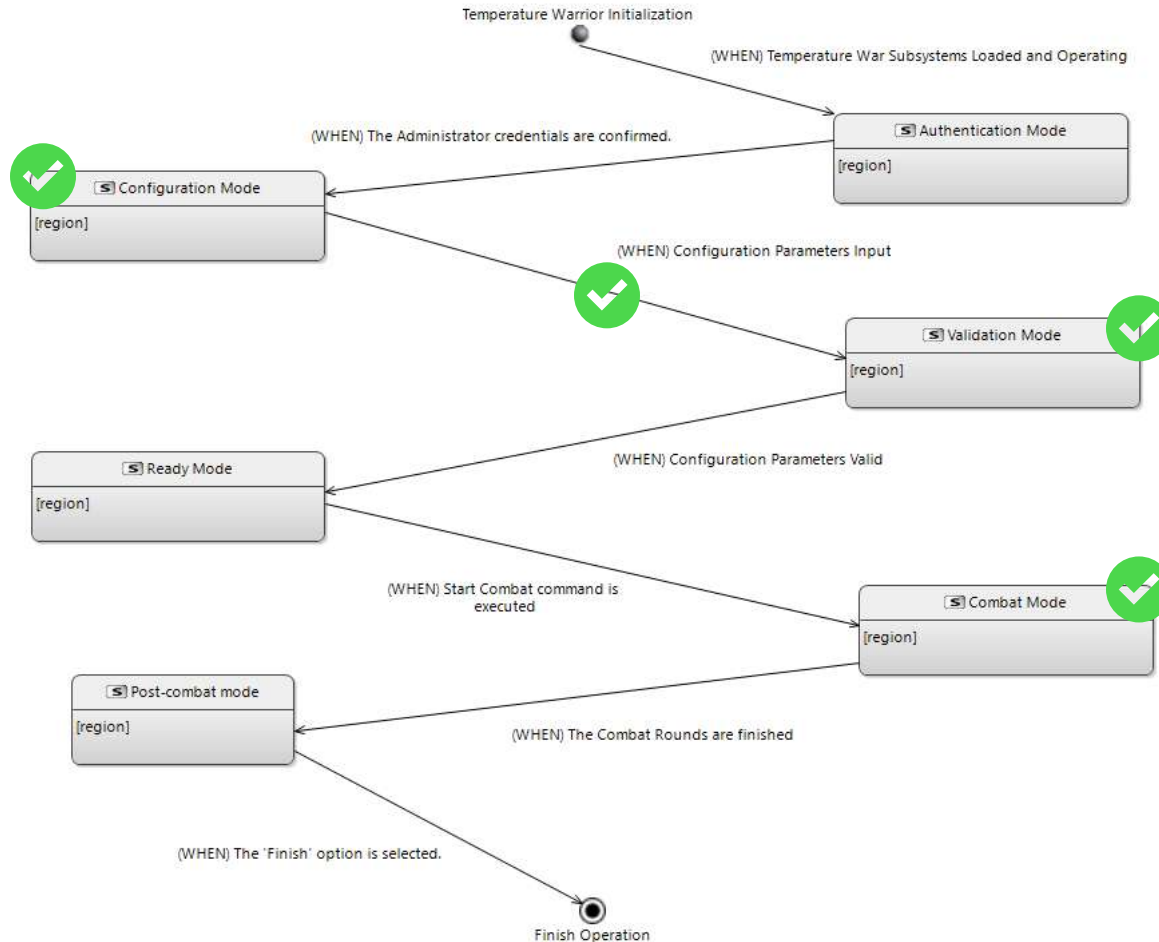
When the Temperature Warrior is in the CONFIGURATION MODE (and the Configuration Parameters are input), the Temperature Warrior shall activate the VALIDATION MODE.

When the Temperature Warrior is in the COMBAT MODE (and the Combat Rounds are finished), the Temperature Warrior shall activate the POST-COMBAT MODE.

When the Temperature Warrior is in the POST-COMBAT MODE (and the Administrator selects the New Combat command), the Control System shall activate the AUTHENTICATION MODE.

WRONG STATES & TRANSITIONS

USE CASES: SYSTEMS ENGINEERING SUITE



WRONG STATES & TRANSITIONS

USE CASES: SYSTEMS ENGINEERING SUITE

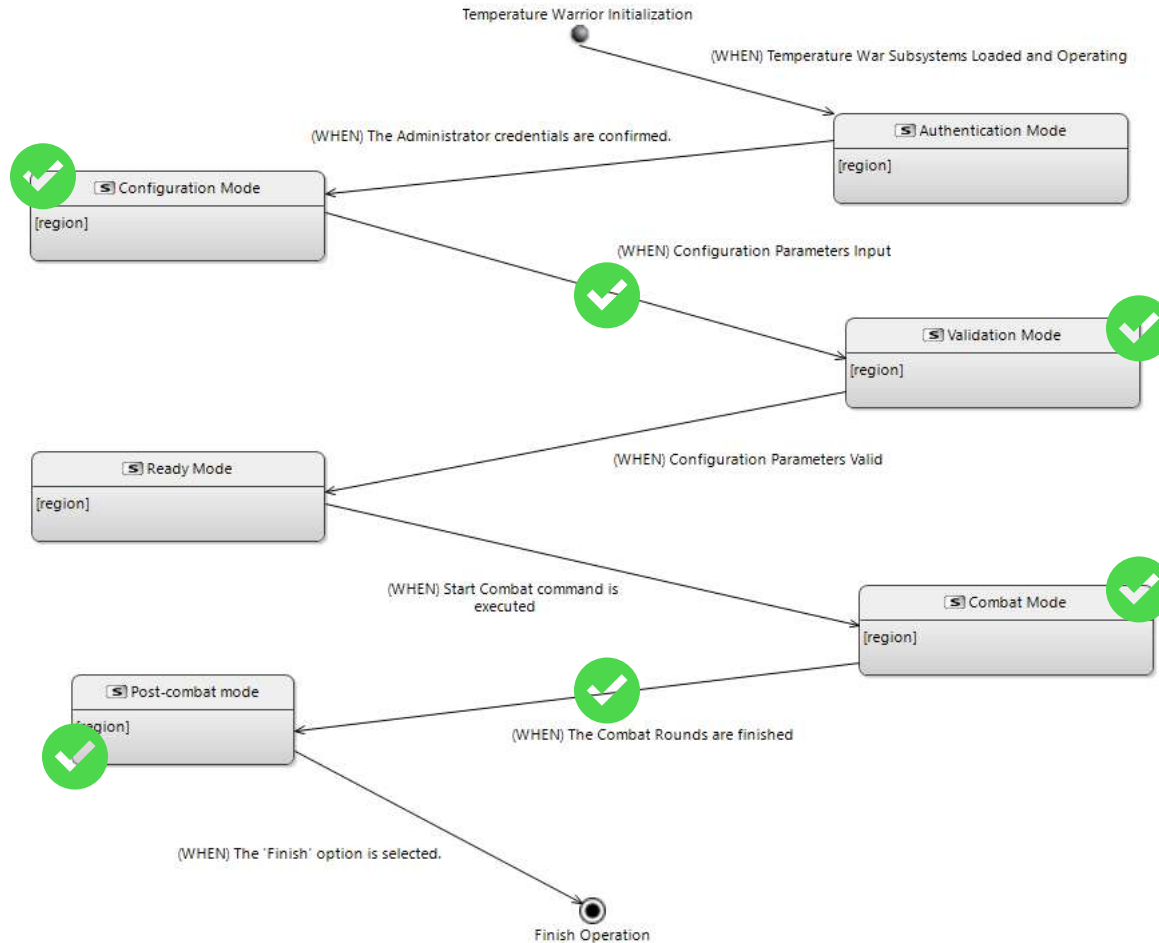
When the Temperature Warrior is in the CONFIGURATION MODE (and the Configuration Parameters are input), the Temperature Warrior shall activate the VALIDATION MODE.

When the Temperature Warrior is in the COMBAT MODE (and the Combat Rounds are finished), the Temperature Warrior shall activate the POST-COMBAT MODE.

When the Temperature Warrior is in the POST-COMBAT MODE (and the Administrator selects the New Combat command), the Control System shall activate the AUTHENTICATION MODE.

WRONG STATES & TRANSITIONS

USE CASES: SYSTEMS ENGINEERING SUITE



WRONG STATES & TRANSITIONS

USE CASES: SYSTEMS ENGINEERING SUITE

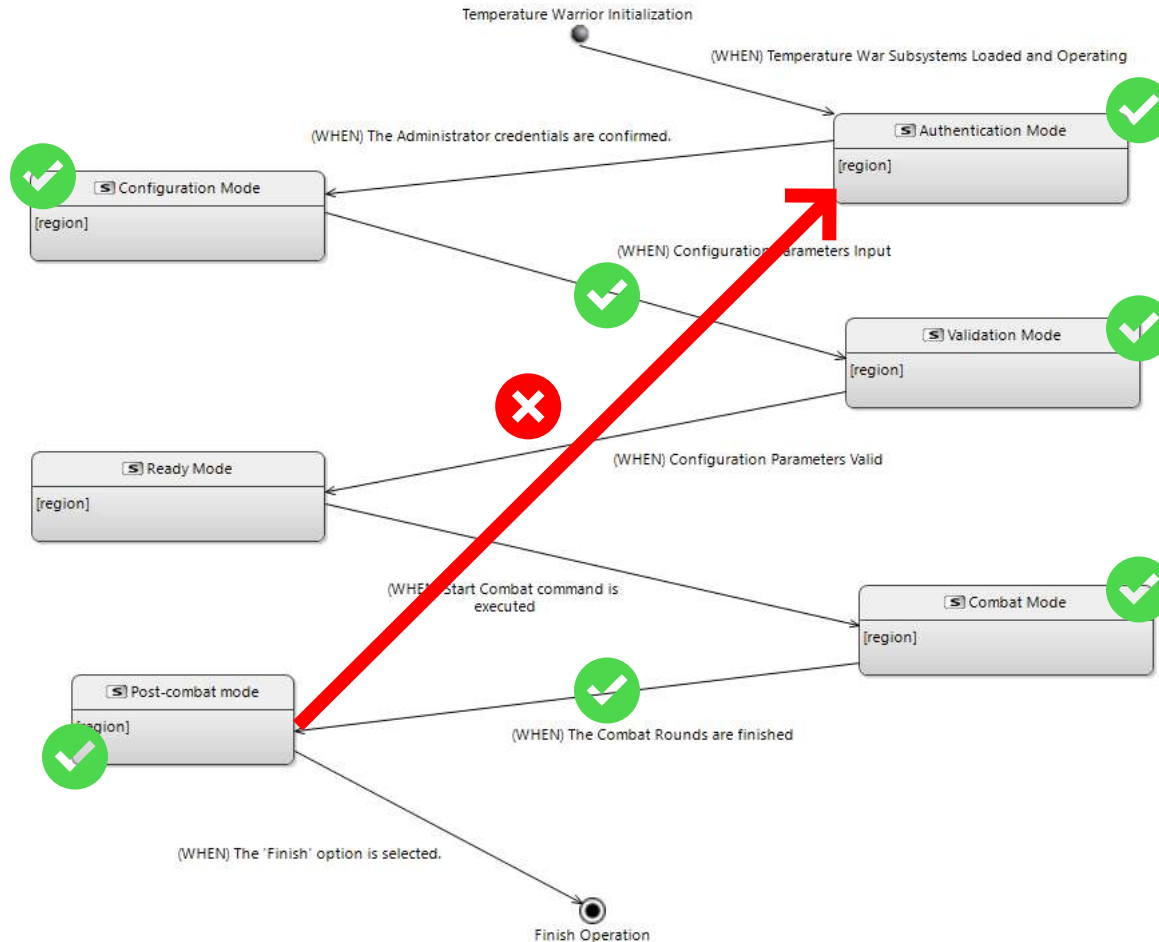
When the Temperature Warrior is in the CONFIGURATION MODE (and the Configuration Parameters are input), the Temperature Warrior shall activate the VALIDATION MODE.

When the Temperature Warrior is in the COMBAT MODE (and the Combat Rounds are finished), the Temperature Warrior shall activate the POST-COMBAT MODE.

When the Temperature Warrior is in the POST-COMBAT MODE (and the Administrator selects the New Combat command), the Control System shall activate the AUTHENTICATION MODE.

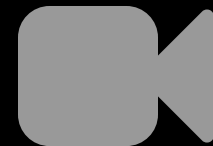
WRONG STATES & TRANSITIONS

USE CASES: SYSTEMS ENGINEERING SUITE



WRONG STATES & TRANSITIONS

USE CASES: SYSTEMS ENGINEERING SUITE



Q&A



THE
REUSE
COMPANY

COMING UP... IN ONLY
10 MINUTES!

HOW TO GENERATE QUALITY REPORTS
BASED ON THE INCOSE GUIDELINES

NOVEMBER **2ND**, 2021

NOVEMBER **3RD**, 2021

DON'T MISS IT!



THE
REUSE
COMPANY

THANK YOU FOR YOUR

TIME AND ATTENTION



THE
REUSE
COMPANY