

WEBINAR RULES

- You'll be **muted** all along the Webinar
- There's a '**Question**' section to ask your questions whenever you want, you don't need to wait until the end. All questions will be addressed at the **end of the webinar**.
- If you have any **technical issues** please use this chatting box, or mail us at: support@reusecompany.com
- You will receive a survey either after the webinar or by mail. Your **opinion** is **EXTREMELY VALUABLE!**
- The Webinar **will be recorded**. A link to the recording will be **sent to you** in few days.



STARTING SOON

17:00

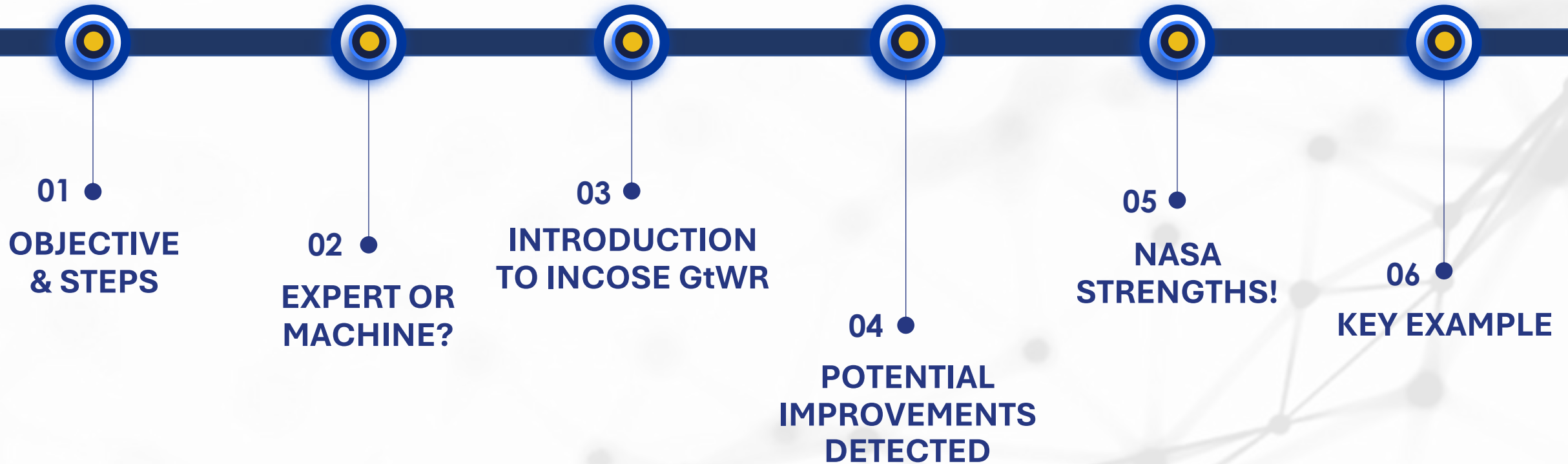
CEST

NASA VS INCOSE

DO NASA SPECIFICATIONS
FOLLOW THE INCOSE GTWR RULES?



OUR JOURNEY



WHY?

CORE OBJECTIVE of this session will be:

1. Check the coverage of the **INCOSE GtWR rules** for a **PUBLISHED NASA document**.
2. Revise the main potential **IMPROVEMENTS** detected.
3. Showcase the result of **EXPERT & MACHINE** collaboration.
4. Discuss the **results!**

HOW TO GET THERE?

The following **STEPS** have been taken:

1. Take the **NASA PUBLIC Gateway System Requirements** document:
<https://ntrs.nasa.gov/citations/20190029153>
2. Connect it to **SES ENGINEERING Studio**.
3. Assess the requirements quality using the **RQA according** to the **INCOSE GtWR rules**.
4. Discuss the **results!**

EXPERT ~~VS~~ MACHINE

...are **AWARE** of the real world...

...are **OBJECTIVE** during the assessment...

...know the actual **USAGE** of each requirement...

...are **FAST** to evaluate huge amounts of information...

With the experts' **domain knowledge** applied to the **configuration** of advanced tools...

Machines become what they are intended to, tools for the knowledgeable human individual to exponentially improve **PRODUCTIVITY** and **EFFICIENCY**.

INCOSE GtWR

The diagram illustrates the INCOSE Guide to Writing Requirements (GtWR) process flow, structured into three main levels: Enterprise, Business Management, and Business Operations. Each level includes a central concept, a set of needs, a set of requirements, and a process for analysis and distribution.

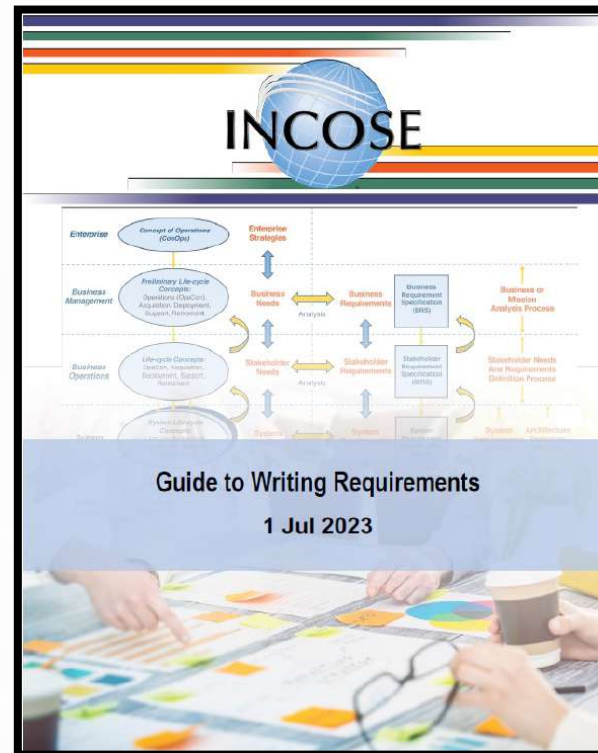
- Enterprise Level:**
 - Concept of Operations (ConOps)
 - Enterprise Strategies
 - Business Needs
 - Business Requirements
 - Business Requirement Specification (BRS)
 - Business or Mission Analysis Process
- Business Management Level:**
 - Preliminary Life-cycle Concepts (Operations, Acquisition, Deployment, Support, Retirement)
 - Stakeholder Needs
 - Stakeholder Requirements
 - Stakeholder Requirement Specification (SRS)
 - Stakeholder Needs and Requirements Distribution Process
- Business Operations Level:**
 - Life-cycle Concepts (Operation, Acquisition, Deployment, Support, Retirement)
 - System Needs
 - System Requirements
 - System Requirement Specification (SRS)
 - System Architecture

Arrows indicate the flow of information and analysis between these components across the different levels.

Guide to Writing Requirements
1 Jul 2023

INCOSE GtWR

...describes **HOW** to **EXPRESS** needs (...) and requirements **CLEARLY** and **PRECISELY**...



REQUIREMENTS QUALITY RULES I

Accuracy

- R1 - Structured Statements: Need and requirement statements must conform to one of the agreed patterns, thus resulting in a well-structured complete statement.
- R2 - Active Voice: Use the active voice in the need or requirement statement with the responsible entity clearly identified as the subject of the sentence.
- R3 - Appropriate Subject-Verb: Ensure the subject and verb of the need or requirement statement are appropriate to the entity to which the statement refers.
- R4 - Defined Terms: Define all terms used within the need statement and requirement statement within an associated glossary and/or data dictionary.
- R5 - Definite Articles: Use the definite article "the" rather than the indefinite article "a".
- R6 - Common Units of Measure: When stating quantities, all numbers should have appropriate and consistent units of measure explicitly stated using a common measurement system in terms of the thing the number refers.
- R7 - Vague Terms: Avoid the use of vague terms that provide vague quantification, such as "some", "any", "allowable", "several", "many", "a lot of", "a few", "almost always", "very nearly", "nearly", "about", "close to", "almost", and "approximate". Avoid vague adjectives such as "ancillary", "relevant", "routine", "common", "generic", "significant", "flexible", "expandable", "typical", "sufficient", "adequate", "appropriate", "efficient", "effective", "proficient", "reasonable" and "customary."
- R8 - Escape Clauses: Avoid the inclusion of escape clauses that state vague conditions or possibilities, such as "so far as is possible", "as little as possible", "where possible", "as much as possible", "if it should prove necessary", "if necessary", "to the extent necessary", "as appropriate", "as required", "to the extent practical", and "if practicable".
- R9 - Open-Ended Clauses: Avoid open-ended, non-specific clauses such as "including but not limited to", "etc." and "and so on".

Concision

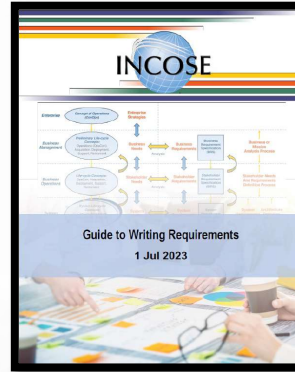
- R10 - Superfluous Infinitives: Avoid the use of superfluous infinitives such as "to be designed to", "to be able to", "to be capable of", "to enable", "to allow".
- R11 - Separate Clauses: Use a separate clause for each condition or qualification.

Non-ambiguity

- R12 - Correct Grammar, 13 - Correct Spelling, 14 - Correct Punctuation - Use correct grammar, spelling, punctuation.
- R15 - Logical Expressions: Use a defined convention to express logical expressions such as "[X AND Y]", "[X OR Y]", "[X XOR Y]", "NOT [X OR Y]".
- R16 - Use of "Not": Avoid the use of "not."
- R17 - Use of Oblique Symbol: Avoid the use of the oblique ("/") symbol except in units, i.e., Km/hr, or fractions.

Singularity

- R18 - Single Thought Sentence: Write a single sentence that contains a single thought conditioned and qualified by relevant sub-clauses.
- R19 - Combinators: Avoid words that join or combine clauses, such as "and", "or", "then", "unless", "but", "as well as", "but also", "however", "whether", "meanwhile", "whereas", "on the other hand", or "otherwise".
- R20 - Purpose Phrases: Avoid phrases that indicate the "purpose of", "intent of", or "reason for" the need statement or requirement statement.
- R21 - Parentheses: Avoid parentheses and brackets containing subordinate text.
- R22 - Enumeration: Enumerate sets explicitly instead of using a group noun to name the set.
- R23 - Supporting Diagram, Model, or ICD: When a need or requirement is related to complex behavior, refer to a supporting diagram, model, or ICD.



REQUIREMENTS QUALITY RULES II

Completeness

R24 – **Pronouns**: Avoid the use of personal and indefinite pronouns.

R25 – **Headings**: Avoid relying on headings to support explanation or understanding of the need or requirement.

Realism

R26 – **Absolutes**: Avoid using unachievable absolutes such as 100% reliability, 100% availability, all, every, always, never, etc.

Conditions

R27 – **Explicit Conditions**: State conditions' applicability explicitly instead of leaving applicability to be inferred from the context.

R28 – **Multiple Conditions**: Express the propositional nature of a condition explicitly for a single action instead of giving lists of actions for a specific condition.

Uniqueness

R29 – **Classification**: Classify needs and requirements according to the aspects of the problem or system it addresses.

R30 – **Unique Expression**: Express each need and requirement once and only once.

Abstraction

R31 – **Solution Free**: Avoid stating implementation in a need statement or requirement statement unless there is rationale for constraining the design.

Quantifiers

R32 – **Universal Qualification**: Use "each" instead of "all", "any", or "both" when universal quantification is intended.

Tolerance

R33 – **Range of Values**: Define each quantity with a range of values appropriate to the entity to which the quantity applies and against which the entity will be verified or validated.

Quantification

R34 – **Measurable Performance**: Provide specific measurable performance targets appropriate to the entity to which the need or requirement is stated and against which the entity will be verified to meet.

R35 – **Temporal Dependencies**: Define temporal dependencies explicitly instead of using indefinite temporal keywords such as "eventually", "until", "before", "after", "as", "once", "earliest", "latest", "instantaneous", "simultaneous", and "at last".

Uniformity of Language

R36 – **Consistent Terms and Units**: Ensure each term and unit of measure used throughout need and requirement sets as well as associated models and other SE artefacts developed across the lifecycle are consistent with the project's defined ontology.

R37 – **Acronyms**: If acronyms are used, they must be consistent throughout need and requirement sets as well as associated models and other SE artefacts developed across the lifecycle.

R38 – **Abbreviations**: Avoid the use of abbreviations in needs and requirement statements as well as associated models and other SE lifecycle artefacts.

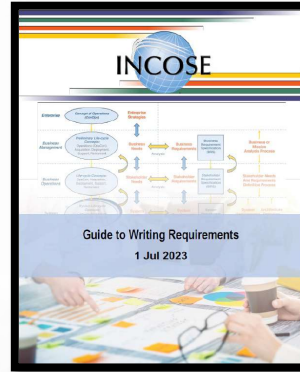
R39 – **Style Guide**: Use a project-wide style guide for individual need statements and requirement statements.

R40 – **Decimal Format**: Use a consistent format and number of significance digits for the specification of decimal numbers.

Modularity

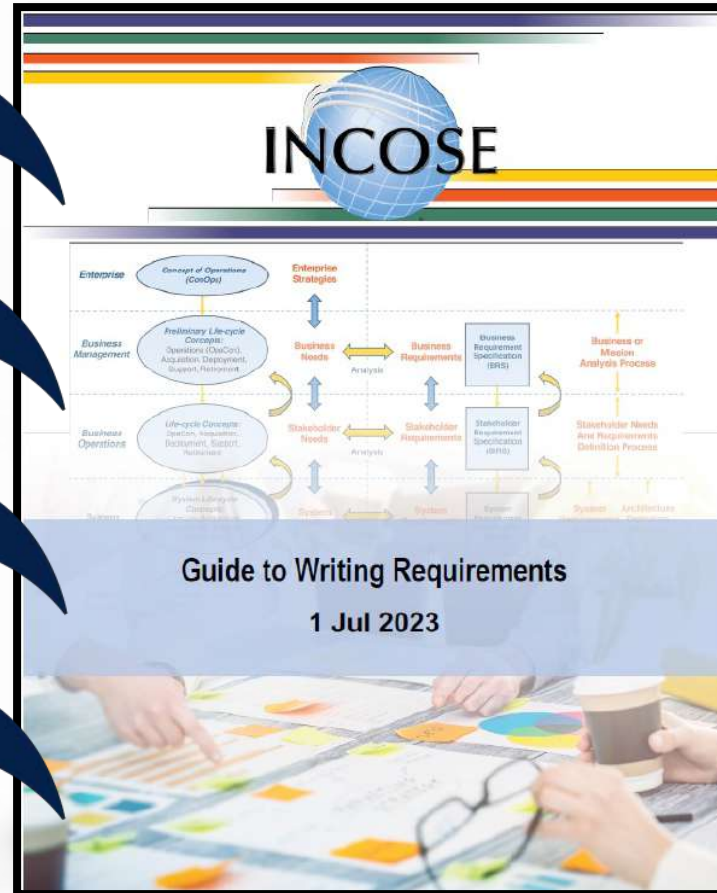
R41 – **Related Needs and Requirements**: Group related needs and requirements together.

R42 – **Structured Sets**: Conform to a defined structure or template for organizing sets of needs and requirements.

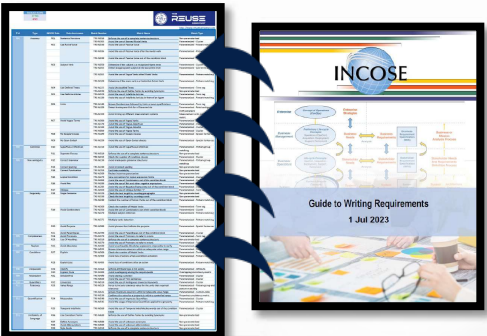


HOW DO WE APPLY THOSE RULES?

Tid	Type	INCOSE Rule	Rule short name	Match Number	Match Name	Match Type
199	Assistant	R02	Termines Divisions	TRC-A020	Define the use of a sentence structure effectively	Non-parameterized
			Avoid the use of Senses/Modal Verbs	TRC-A035	Avoid the use of Senses/Modal Verbs	Parameterized - Cluster
			Avoid the use of Passive Voice	TRC-A030	Avoid the use of Passive Voice	Parameterized - Pattern matching
			Avoid the use of Passive Voice after the modal verb	TRC-A035	Avoid the use of Passive Voice after the modal verb	Parameterized - Pattern matching
			Avoid the use of Passive Voice out of the condition block	TRC-A040	Avoid the use of Passive Voice out of the condition block	Parameterized - Pattern matching
			Defensiveness if the subject is a recognized Agent term	TRC-A050	Defensiveness if the subject is a recognized Agent term	Parameterized - Cluster
			Detect Misapprehensive Subjects at the document level	TRC-A055	Detect Misapprehensive Subjects at the document level	Parameterized - Sub-terms
			Avoid the use of Vague Verbs after Modal Verbs	TRC-A065	Avoid the use of Vague Verbs after Modal Verbs	Parameterized - Pattern matching
			Determine if the main verb is a Controlled Action Verb	TRC-A120	Determine if the main verb is a Controlled Action Verb	Parameterized - Pattern matching
			Avoid Unidentified Terms	TRC-A025	Avoid Unidentified Terms	Parameterized - Term tag
204	Use Defined Terms	TRC-A030	Enforce the use of Define Terms by avoiding Subjunctives	TRC-A030	Enforce the use of Define Terms by avoiding Subjunctives	Non-parameterized
			Avoid the use of Define Articles	TRC-A030	Avoid the use of Define Articles	Parameterized - Term tag
			Avoid the use of indefinite Articles in front of an Agent	TRC-A120	Avoid the use of indefinite Articles in front of an Agent	Parameterized - Pattern matching
			Ensure Numbers are followed by Units or exact qualifiers	TRC-A140	Ensure Numbers are followed by Units or exact qualifiers	Parameterized - Term tag
			Detect Incomplete Units for a Characteristic	TRC-A150	Detect Incomplete Units for a Characteristic	Parameterized - Sub-terms
			Ensure compliance with ISO 9001	TRC-A150	Ensure compliance with ISO 9001	Non-parameterized
			Avoid mixing up different measurement systems	TRC-A160	Avoid mixing up different measurement systems	Non-parameterized
			Avoid the use of Vague Verbs	TRC-A060	Avoid the use of Vague Verbs	Parameterized - Cluster
			Avoid the use of Vague Adjectives	TRC-A170	Avoid the use of Vague Adjectives	Parameterized - Cluster
			Avoid the use of Vague Adverbs	TRC-A180	Avoid the use of Vague Adverbs	Parameterized - Cluster
208	No Escape Clauses	TRC-A220	Avoid the use of Vague Terms	TRC-A220	Avoid the use of Vague Terms	Parameterized - Cluster
			Avoid the use of Escape Clauses	TRC-A220	Avoid the use of Escape Clauses	Parameterized - Special Sentences
			No Open Endless	TRC-A020	Avoid the use of Open-Ended clauses	Parameterized - Special Sentences
			Avoid the use of Superfluous infinitives	TRC-A020	Avoid the use of Superfluous infinitives	Parameterized - Pattern group matching
			Enforce the use of a complete sentence structure	TRC-A030	Enforce the use of a complete sentence structure	Non-parameterized
			Check the number of condition blocks	TRC-A035	Check the number of condition blocks	Parameterized - Cluster
			Avoid inadequate grammar structures	TRC-A030	Avoid inadequate grammar structures	Parameterized - Pattern group matching
			Avoid incorrect spelling	TRC-A040	Avoid incorrect spelling	Non-parameterized
			Facilitate readability	TRC-A040	Facilitate readability	Non-parameterized
			Review incorrect punctuation	TRC-A040	Review incorrect punctuation	Non-parameterized
213	Logical Conditions	TRC-A030	Avoid the use of Compound out of the condition block	TRC-A030	Avoid the use of Compound out of the condition block	Parameterized - Cluster
			Avoid the use of Negation out of the condition block	TRC-A030	Avoid the use of Negation out of the condition block	Parameterized - Cluster
			Avoid the use of Negation out of the condition block	TRC-A030	Avoid the use of Negation out of the condition block	Parameterized - Cluster
			Avoid the use of Multiple Expressions out of the condition block	TRC-A030	Avoid the use of Multiple Expressions out of the condition block	Parameterized - Cluster
			Avoid the use of oblique Verbs	TRC-A030	Avoid the use of oblique Verbs	Parameterized - Term tag
			Check the text length by counting paragraphs	TRC-A120	Check the text length by counting paragraphs	Non-parameterized
			Check the text length by counting words	TRC-A120	Check the text length by counting words	Non-parameterized
			Control the number of Active Verbs out of the condition block	TRC-A040	Control the number of Active Verbs out of the condition block	Parameterized - Pattern matching
			Check the number of Main Verbs	TRC-A030	Check the number of Main Verbs	Parameterized - Term tag
			Avoid the use of compound out of the condition block	TRC-A030	Avoid the use of compound out of the condition block	Parameterized - Cluster
219	Avoid Compound	TRC-A030	Multiple verbs detection	TRC-A030	Multiple verbs detection	Parameterized - Pattern matching
			Avoid phrases that indicate the purpose	TRC-A030	Avoid phrases that indicate the purpose	Parameterized - Spatial Sentences
			Avoid Parentheses	TRC-A030	Avoid the use of Parentheses out of the condition block	Parameterized - Cluster
			Avoid Prepositional Phrases	TRC-A030	Avoid the use of Prepositional Phrases out of the condition block	Parameterized - Term tag
			Use of Compound	TRC-A030	Use of Compound	Non-parameterized
			Avoid the use of Compound sentence structures	TRC-A030	Avoid the use of Compound sentence structures	Non-parameterized
			Avoid the use of Prepositional Phrases	TRC-A030	Avoid the use of Prepositional Phrases	Parameterized - Term tag
			Avoid unbreakable absolute expressions impossible to verify	TRC-A040	Avoid unbreakable absolute expressions impossible to verify	Parameterized - Cluster
			Ensure tolerance value are within an adequate value range	TRC-A050	Ensure tolerance value are within an adequate value range	Parameterized - Cluster
			Check the number of Modal Verbs	TRC-A050	Check the number of Modal Verbs	Parameterized - Term tag
227	Explicit Lists	TRC-A050	Avoid lists of actions after a condition activation	TRC-A050	Avoid lists of actions after a condition activation	Parameterized - Pattern matching
			Avoid lists of conditions after an action	TRC-A055	Avoid lists of conditions after an action	Parameterized - Pattern matching
			Clarify	TRC-A060	Clarify	Parameterized - Attribute
			Express Once	TRC-A060	Express once	Parameterized - Cluster
			Avoid parallel verbs	TRC-A060	Avoid parallel verbs	Parameterized - Cluster
			Avoid the use of few sentences	TRC-A060	Avoid the use of few sentences	Parameterized - Cluster
			Avoid the use of Antipodal Universal Keywords	TRC-A070	Avoid the use of Antipodal Universal Keywords	Parameterized - Cluster
			Force to include tolerance value for the units that required tolerance	TRC-A070	Force to include tolerance value for the units that required tolerance	Parameterized - Pattern group and pattern matching
			Ensure tolerance value are within an adequate value range	TRC-A075	Ensure tolerance value are within an adequate value range	Parameterized - Custom code
			Confirm the value of a property with a controlled range	TRC-A080	Confirm the value of a property with a controlled range	Parameterized - Cluster
234	Measurable	TRC-A080	Avoid the use of Ingressive Quantifiers	TRC-A080	Avoid the use of Ingressive Quantifiers	Parameterized - Cluster
			Avoid the usage of Ingressive Quantifiers applied to a property	TRC-A085	Avoid the usage of Ingressive Quantifiers applied to a property	Parameterized - Pattern matching
			Avoid the use of Temporal Verbs/ize keywords out of the condition block	TRC-A050	Avoid the use of Temporal Verbs/ize keywords out of the condition block	Parameterized - Cluster
			Enforce the use of Define Terms by avoiding Subjunctives	TRC-A030	Enforce the use of Define Terms by avoiding Subjunctives	Non-parameterized
			Avoid the use of Abbreviated acronyms	TRC-A080	Avoid the use of Abbreviated acronyms	Non-parameterized
			Avoid Abbreviations	TRC-A080	Avoid the use of Abbreviations	Non-parameterized
			Enforce the use of a complete sentence structure	TRC-A030	Enforce the use of a complete sentence structure	Non-parameterized
			Clarify	TRC-A060	Clarify	Parameterized - Attribute
			Express Once	TRC-A060	Express once	Parameterized - Cluster
			Avoid parallel verbs	TRC-A060	Avoid parallel verbs	Parameterized - Cluster
239	Style Guide	TRC-A030	Avoid the use of a complete sentence structure	TRC-A030	Avoid the use of a complete sentence structure	Non-parameterized



APPLICABILITY MATRIX



↑ NEEDS

Quality Assurance - Metrics set templates

Metrics set templates: _____

Search...

Identifier	Name
187	1A - INCOSE GtWR v4.0 CROSS-DOMAIN METRICS x NEED Statements
188	1B - INCOSE GtWR v4.0 CROSS-DOMAIN METRICS x REQUIREMENT Statements
189	2A - INCOSE GtWR v4.0 CROSS-DOMAIN & DOMAIN-SPECIFIC METRICS x NEED Statements
190	2B - INCOSE GtWR v4.0 CROSS-DOMAIN & DOMAIN-SPECIFIC METRICS x REQUIREMENT Statements

YELLOW Belt Metrics

BLACK Belt Metrics

Reqs verification

↓ REQUIREMENTS

NASA RULES



C.1 Use of Correct Terms

- Shall = requirement
- Will = facts or declaration of purpose
- Should = goal

C.2 Editorial Checklist

Personnel Requirement

- The requirement is in the form “responsible party shall perform such and such.” In other words, use **the active, rather than the passive voice**. A requirement should state who shall (do, perform, provide, weigh, or other verb) followed by a description of what should be performed.

Product Requirement

- The requirement is in the form “product ABC shall XYZ.” A requirement should state “The product shall” (do, perform, provide, weigh, or other verb) followed by a description of what should be done.
- The requirement uses consistent terminology to refer to the product and its lower-level entities.
- Complete with tolerances for qualitative/performance values (e.g., less than, greater than or equal to, plus or minus, 3 sigma root sum squares).
- Is the requirement free of implementation? (Requirements should state WHAT is needed, NOT HOW to provide it; i.e., state the problem

not the solution. Ask, “Why do you need the requirement?” The answer may point to the real requirement.)

- Free of descriptions of operations? (Is this a need the product should satisfy or an activity involving the product? Sentences like “The operator shall...” are almost always operational statements not requirements.)

Example Product Requirements

- The system shall operate at a power level of...
- The software shall acquire data from the...
- The structure shall withstand loads of...
- The hardware shall have a mass of...

C.3 General Goodness Checklist

- The requirement is **grammatically correct**.
- The requirement is **free of typos, misspellings, and punctuation errors**.
- The requirement complies with the project’s template and style rules.
- The requirement is stated positively (as opposed to negatively, i.e., “shall not”).
- The use of **“To Be Determined” (TBD) values should be minimized**. It is better to use a best

estimate for a value and mark it “To Be Resolved” (TBR) with the rationale along with what should be done to eliminate the TBR, who is responsible for its elimination, and by when it should be eliminated.

- The requirement is accompanied by an intelligible **rationale, including any assumptions**. Can you validate (concur with) the assumptions? Assumptions should be confirmed before baselining.
- The requirement is located in the proper section of the document (e.g., not in an appendix).

C.4 Requirements Validation Checklist

Clarity

- Are the requirements clear and unambiguous? (Are all aspects of the requirement understandable and not subject to misinterpretation? Is the requirement free from indefinite pronouns (this, these) and ambiguous terms (e.g., “as appropriate,” “etc.,” “and/or,” “but not limited to”)?)

- Are the requirements concise and simple?

- Do the requirements express only one thought per requirement statement, a stand-alone statement as opposed to multiple requirements in a single statement, or a paragraph that contains both requirements and rationale?

- Does the requirement statement have one subject and one predicate?

Completeness

- Are requirements stated as completely as possible? Have all incomplete requirements been captured

as TBDs or TBRs and a complete listing of them maintained with the requirements?

- Are any requirements missing? For example, have any of the following requirements areas been overlooked: functional, performance, interface, environment (development, manufacturing, test, transport, storage, and operations), facility (manufacturing, test, storage, and operations), transportation (among areas for manufacturing, assembling, delivery points, within storage facilities, loading), training, personnel, operability, safety, security, appearance and physical characteristics, and design.

- Have all assumptions been explicitly stated?

Compliance

- Are all requirements at the correct level (e.g., system, segment, element, subsystem)?
- Are requirements free of implementation specifics? (Requirements should state what is needed, not how to provide it.)

- Are requirements free of descriptions of operations? (Don’t mix operation with requirements: update the ConOps instead.)

- Are requirements free of personnel or task assignments? (Don’t mix personnel/task with product requirements: update the SOW or Task Order instead.)

Consistency

- Are the requirements stated consistently without contradicting themselves or the requirements of related systems?

- Is the terminology consistent with the user and sponsor’s terminology? With the project glossary?

POTENTIAL IMPROVEMENTS DETECTED

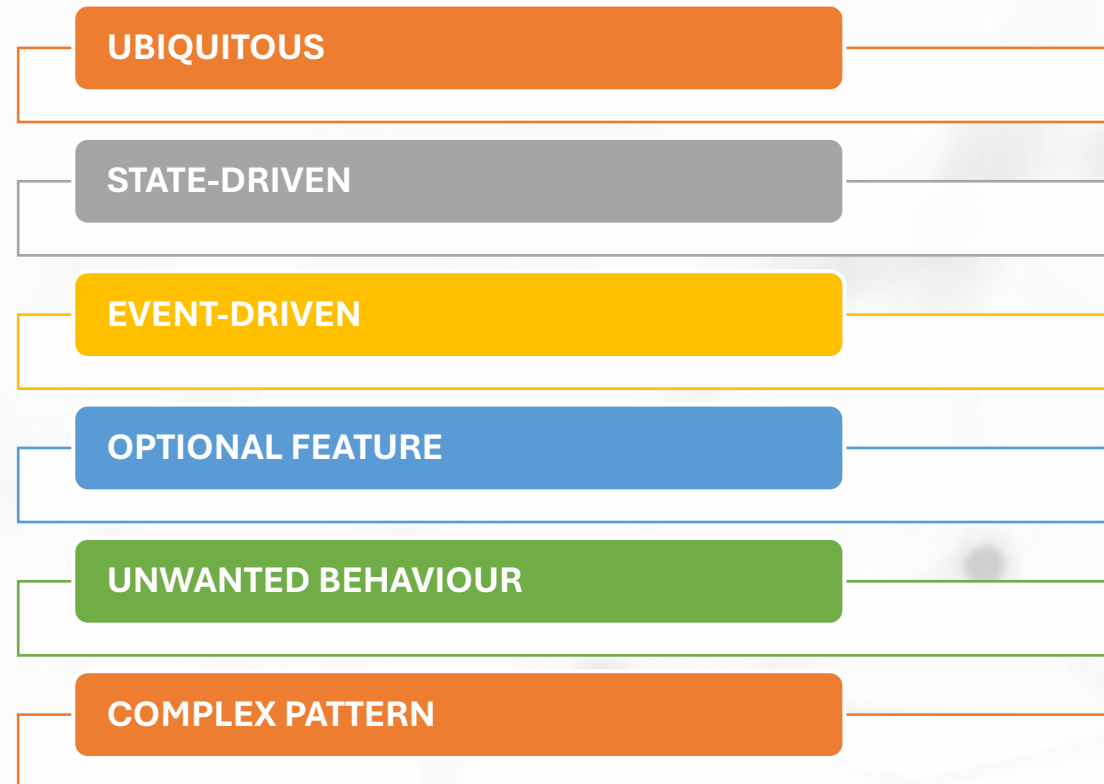
IMPORTANT before we begin:

1. These **suggestions** were made by our **team** supported by the **RQA tool**.
2. These are improvements detected **according** to the **INCOSE GtWR**.
3. The vast majority of improvements are **MINOR ISSUES**.

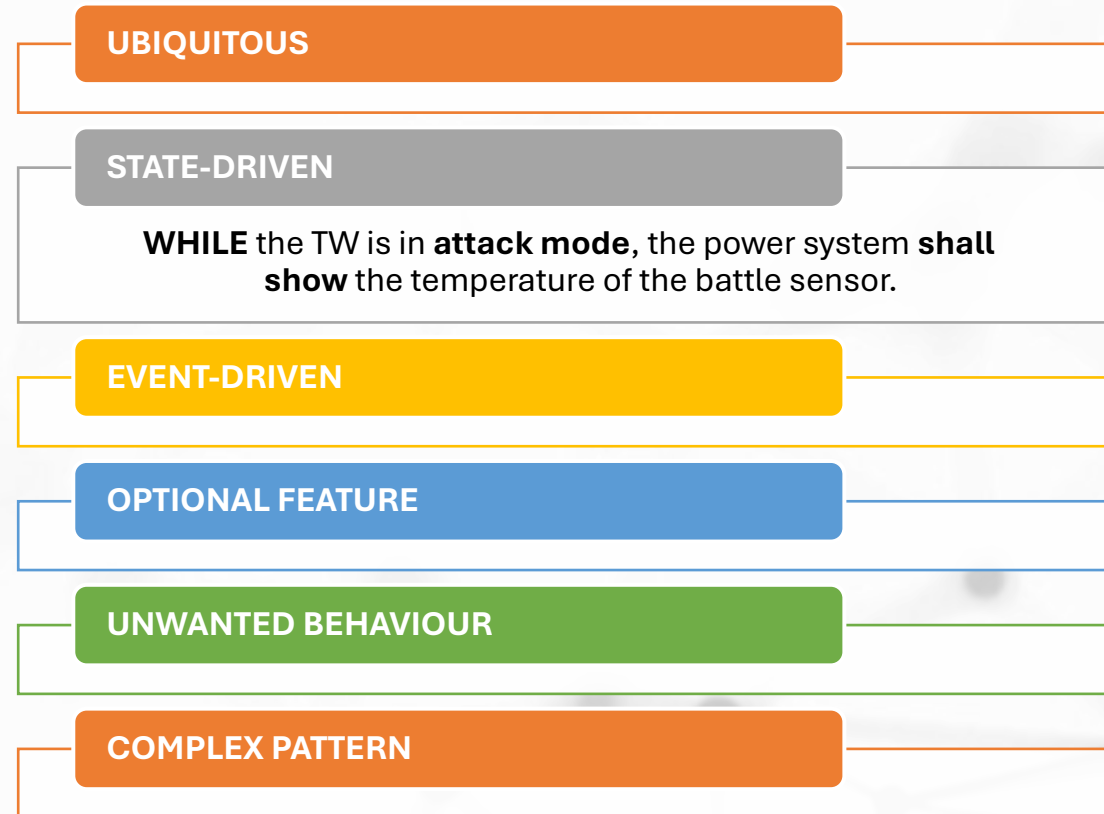
UBIQUITOUS REQUIREMENTS

Pattern Coverage Metric: EARS (Open) – 01. Ubiquitous Requirement

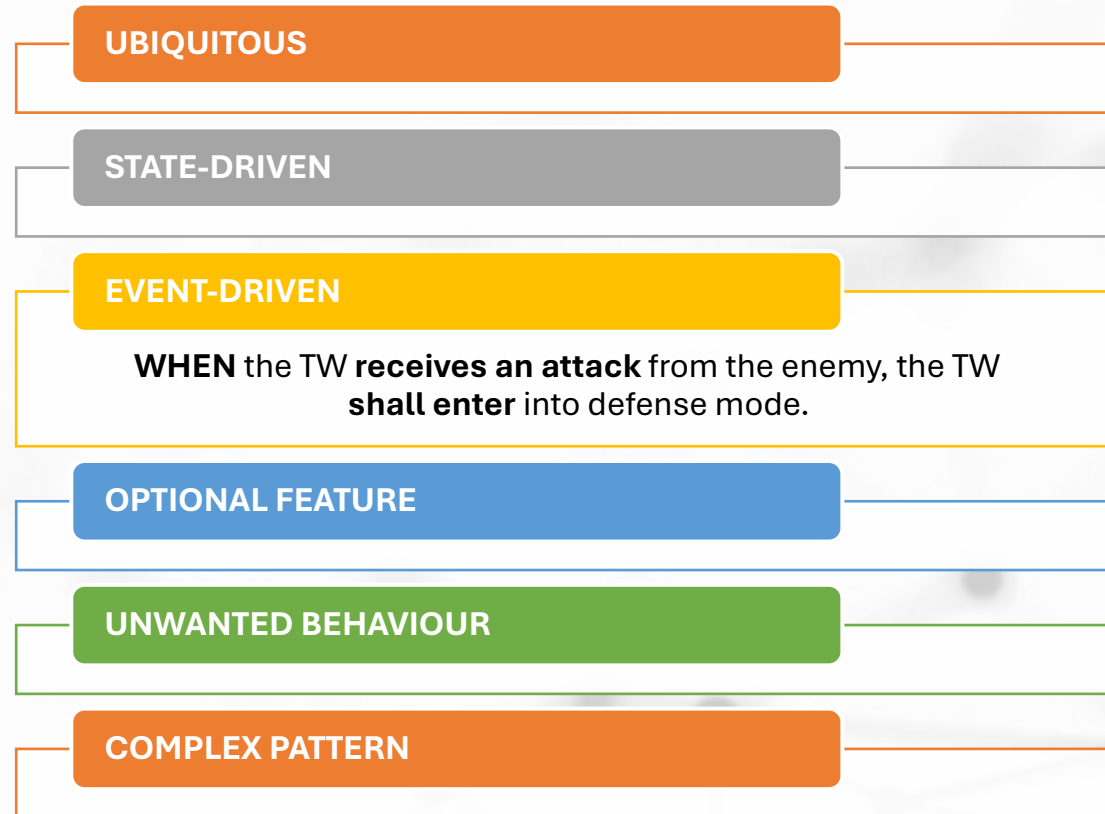
- Every requirement in the document is expressed as Ubiquitous Requirement.
- Which means, it's always “activated” (<https://alistairmavin.com/ears/>).
- Even if ubiquitous is a valid syntax for system requirements, there is no trace of other structures:



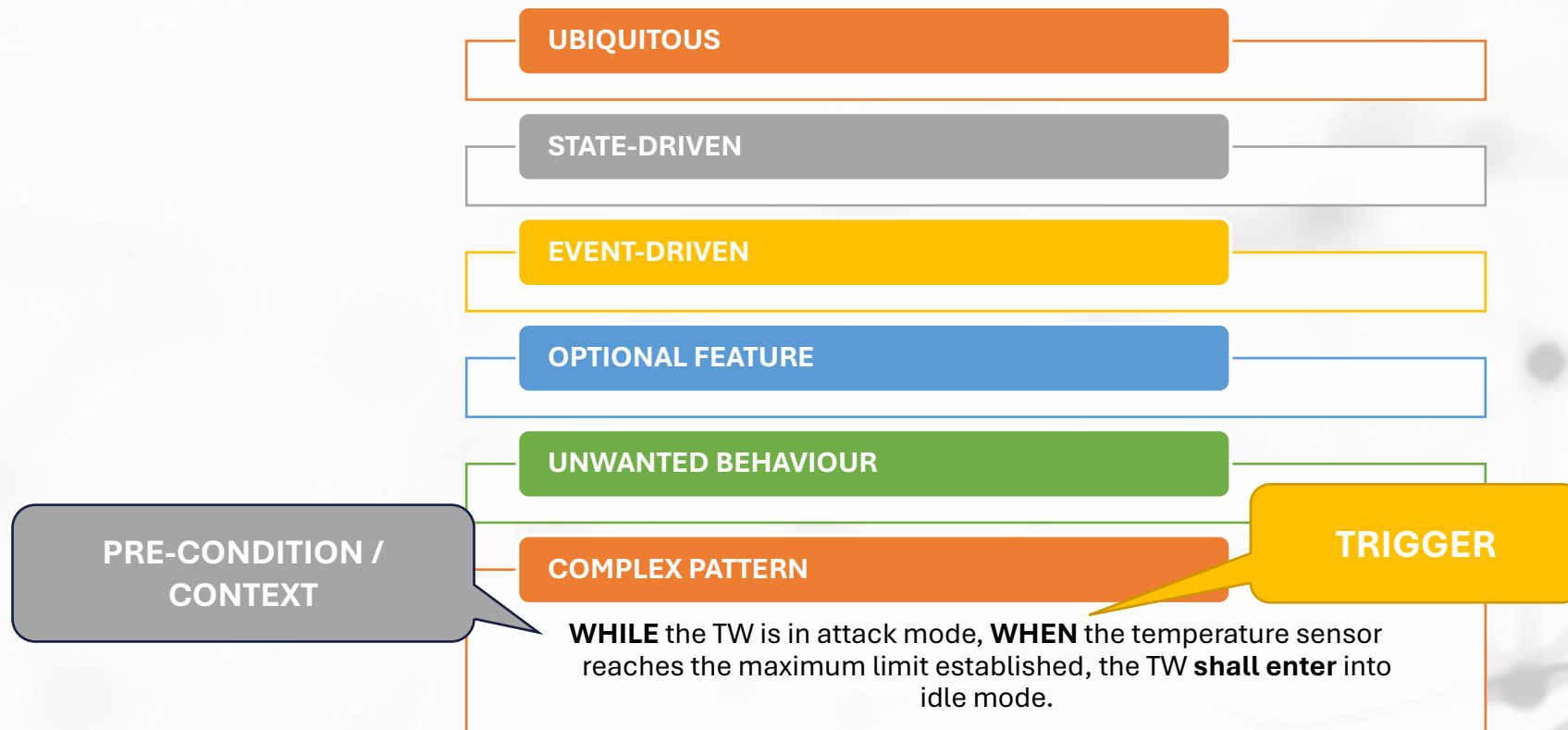
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- Every requirement in the document is expressed as Ubiquitous Requirement.
- Which means, it's always “activated” (<https://alistairmavin.com/ears/>).
- Even if ubiquitous is a valid syntax for system requirements, there is no trace of other structures:

UBIQUITOUS**L2-GW-0013** Gateway Transition to Crew-Ingress Configuration

The Gateway shall remotely transition from an uncrewed state to accommodate a safe crew ingress.

EVENT-DRIVEN**L2-GW-0013** Gateway Transition to Crew-Ingress Configuration

When commanded by the Ground Station, the Gateway shall transition from an uncrewed state to accommodate a safe crew ingress.

- Every requirement in the document is expressed as Ubiquitous Requirement.
- Which means, it's always “activated” (<https://alistairmavin.com/ears/>).
- Even if ubiquitous is a valid syntax for system requirements, there is no trace of other structures:

L2-GW-0079 Gateway Nominal Power

The Gateway shall provide a minimum of 32kW for Gateway use **when** SEP is inactive.

- When vs While:
 - ✓ When for instant triggers (not this case).
 - ✓ While for states/models (context).

L2-GW-0079 Gateway Nominal Power

The Gateway shall provide a minimum of 32kW for Gateway use while SEP is inactive.

- Every requirement in the document is expressed as Ubiquitous Requirement.
- Which means, it's always “activated” (<https://alistairmavin.com/ears/>).
- Even if ubiquitous is a valid syntax for system requirements, there is no trace of other structures:

L2-GW-0079 Gateway Nominal Power

The Gateway shall provide a minimum of 32kW for Gateway use **when** SEP is inactive.

- When vs While:
 - ✓ In any case, the whole document shall be consistent with this.

L2-GW-0301 Workmanship-Exterior Cleanliness

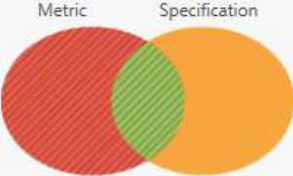
The Gateway shall be designed so that exterior Gateway surfaces are cleaned before close-out, including areas that are inaccessible in the final assembly and that may act as contamination sources while on orbit.

Patterns coverage metric results - Patterns coverage metric #2

Metric result | **Patterns coverage** | Requirements | Filtering | Pattern tree

Patterns selected in the metric vs patterns matched in the specification:

- Pattern selected in the metric
- Patterns selected in the metric but not matched in the specification
- Patterns selected in the metric matched in the specification



Pattern selected in the metric:

Drag a column header here to group by that column

Pattern	Pattern group	Instances in the specification
[EARS (Open) - 01.Ubiquitous Requirement]	EARS - Open patterns	171
[EARS (Open) - 06.Standard Requirement]	EARS - Open patterns	0
[EARS (Open) - 05.Optional feature]	EARS - Open patterns	0
[EARS (Open) - 04.Unwanted behavior]	EARS - Open patterns	0
[EARS (Open) - 03.Event-driven Requirement]	EARS - Open patterns	0
[EARS (Open) - 02.State-driven Requirement]	EARS - Open patterns	0

Total: 6

Configuration | Create report | Close

MULTIPLE MODAL VERBS

Singularity R18 / Conditions R27 / TRC-M360: Check the number of Modal Verbs

PASSIVE VOICE

Accuracy R02 / TRC-M040: Avoid the use of Passive Voice out of the condition block

- Avoid using **2 MODAL VERBS** in the same requirement:

L2-GW-0026 Propulsion System Capability

The Gateway shall provide a fuel capacity that would support performing a minimum of two round-trip uncrewed low-energy cislunar orbit transfers between a near-rectilinear halo orbit (NRHO) and a distant retrograde orbit (DRO) and orbit maintenance for a period of 15 years between refueling <TBR-HEOR-002>.

L2-GW-0154 Stowage System

The Gateway shall provide a stowage system that can be monitored via the IMS.

L2-GW-0154-1 Stowage System

The Gateway shall provide a stowage system.

L2-GW-0154-2 Stowage System monitoring

The Gateway shall monitor the stowage system via the IMS.

MISSING MEASUREMENT UNITS

Accuracy R06 / TRC-M140: Ensure Numbers are followed by Units or noun qualifications

L2-GW-0002: Crew Size

“The Gateway shall support a crew of two, three, and four.”

Contains no further information on **which measurement unit** is assigned to those numbers.

We can assume it is referring to the crew **MEMBERS**, right?

Well...

It could also mean **PERSON**...

Are **ROBOTS** counted as part of the **CREW**?



RECOGNIZED SUBJECT

Accuracy R03 / TRC-M050: Determine if the subject is a recognized Agent term

Accuracy R03 / TRC-M050: Determine if the subject is a recognized Agent term - Correctness analysis

Statistics Requirements Filtering

Requirements analysis:

Drag a column header here to group by that column.

Absolute Number	Workproduct Heading	Comment	Quality value	Number of issues	Summary
L2-GW-0114	Th Gateway Probability of LOC shall have a mean value no greater than 1 i...	No agent detected in...	☆☆☆	0	
L2-GW-0115	Th Gateway Probability of LOM shall have a mean value no greater than 1...	No agent detected in...	☆☆☆	0	
L2-GW-0320	Th Gateway critical systems shall be designed to be maintainable.	No agent detected in...	☆☆☆	0	

Total: 5

QualityId = 3

Close

Editing L2-GW-0115 - SES ENGINEERING Studio

File Tools View Log

Authoring without patterns: < No pattern group >

No selected pattern group implies no writing assistance

The Gateway Probability of LOM shall have a mean value no greater than 1 in 10, for a one year mission including a 30-day crewed mission.

Metric: Accuracy R05 / TRC-M140: Ensure Numbers are followed by Units or noun qualifications

10

- Scope Note: N/A
- Clusters: N/A

Correctness metrics summary:

Medium Quality 0.98

Metric	Value
Accuracy R03 / TRC-M050: Determine if the subject is a recognized Agent term	0
Accuracy R06 / TRC-M140: Ensure Numbers are followed by Units or noun qualifications	1
Non-ambiguity R16 / TRC-M285: Avoid the use of Negative Expressions out of...	1

Other quality elements:

Metric	Correctness	Value	Summary	Mandatory	Weight
Accuracy R03 / TRC-M050: Determine if the subject is a recognized Agent term	☆☆☆☆	0	No agent detected in this requirement	<input type="checkbox"/>	1
Accuracy R06 / TRC-M140: Ensure Numbers are followed by Units or noun qualifications	☆☆☆☆	1	Missing quantifier (Measurement unit or noun)	<input checked="" type="checkbox"/>	1
Non-ambiguity R16 / TRC-M285: Avoid the use of Negative Expressions out of the condition block	☆☆☆☆	1	Avoid negative expressions	<input type="checkbox"/>	1
Abstraction R31 / TRC-M500: Avoid the use of Abstractions out of the condition block	☆☆☆☆	0	N/A	<input type="checkbox"/>	1
Accuracy R01 / TRC-M365: Avoid the use of Ambiguities out of the condition block	☆☆☆☆	0	N/A	<input type="checkbox"/>	1
Accuracy R02 / TRC-M040: Avoid the use of Ambiguities out of the condition block	☆☆☆☆	0	N/A	<input type="checkbox"/>	1
Accuracy R03 / TRC-M065: Avoid the use of Ambiguities out of the condition block	☆☆☆☆	0	N/A	<input type="checkbox"/>	1
Accuracy R04 / TRC-M225: Avoid the use of Ambiguities out of the condition block	☆☆☆☆	0	N/A	<input type="checkbox"/>	1
Accuracy R05 / TRC-M130: Avoid the use of Ambiguities out of the condition block	☆☆☆☆	0	N/A	<input type="checkbox"/>	1
Accuracy R07 / TRC-M950: Avoid the use of Ambiguities out of the condition block	☆☆☆☆	0	N/A	<input type="checkbox"/>	1
Accuracy R08 / TRC-M190: Avoid the use of Ambiguities out of the condition block	☆☆☆☆	0	N/A	<input type="checkbox"/>	1
Completeness R24 / Complete the condition block	☆☆☆☆	0	N/A	<input type="checkbox"/>	1
Concision R10 / TRC-M210: Avoid the use of Ambiguities out of the condition block	☆☆☆☆	0	N/A	<input type="checkbox"/>	1
Non-ambiguity R12 / TRC-M230: Avoid the use of Ambiguities out of the condition block	☆☆☆☆	0	N/A	<input type="checkbox"/>	1
Non-ambiguity R13 / TRC-M240: Avoid the use of Ambiguities out of the condition block	☆☆☆☆	0	N/A	<input type="checkbox"/>	1
Non-ambiguity R14 / TRC-M260: Avoid the use of Ambiguities out of the condition block	☆☆☆☆	78	N/A	<input type="checkbox"/>	1
Non-ambiguity R15 / Singularity	☆☆☆☆	0	N/A	<input type="checkbox"/>	1

Accuracy R05 / TRC-M140: Ensure Numbers are followed by Units or noun qualifications

- NUMBER
- Non-ambiguity R16 / TRC-M285: Avoid the use of Negative Expressions out of the condition block
- «Negations»
- Singularity R18 / Conditions R27 / TRC-M360: Check the number of Modal Verbs

Save and close Cancel

The screenshot displays the REUSE ENGINEERING Studio interface. The main text editor shows the sentence: "The Gateway shall have a Probability of LOM less than 10%, for a one year mission Including a 30-day crewed mission." The words "Probability of LOM" are highlighted in red, with red circles numbered 1, 2, and 3 below them. A red box highlights the entire sentence. The 'Correctness metrics summary' panel on the right shows a green header with 'High Quality' and a score of '0.00'. Below this is a table with columns 'Metric' and 'Value'. At the bottom of the panel is a link 'Edit manual assessment' and the word 'Ready'.

Other quality elements:

Metric	Correctness	Value	Summary	Mandatory	Weight
Abstraction R31 / TRC-M500: A...	★★★★	0	N/A	<input type="checkbox"/>	1
Accuracy R01 / TRC-M355: Av...	★★★★	0	N/A	<input type="checkbox"/>	1
Accuracy R02 / TRC-M040: Av...	★★★★	0	N/A	<input type="checkbox"/>	1
Accuracy R03 / TRC-M050: Det...	★★★★	1	N/A	<input type="checkbox"/>	1
Accuracy R03 / TRC-M055: Av...	★★★★	0	N/A	<input type="checkbox"/>	1
Accuracy R04 / TRC-M225: Av...	★★★★	0	N/A	<input type="checkbox"/>	1
Accuracy R05 / TRC-M130: Av...	★★★★	0	N/A	<input type="checkbox"/>	1
Accuracy R06 / TRC-M140: Ens...	★★★★	0	N/A	<input type="checkbox"/>	1
Accuracy R07 / TRC-M950: Av...	★★★★	0	N/A	<input type="checkbox"/>	1
Accuracy R08 / TRC-M190: Av...	★★★★	0	N/A	<input type="checkbox"/>	1
Completeness R24 / Comple...	★★★★	0	N/A	<input type="checkbox"/>	1
Concision R10 / TRC-M210: Av...	★★★★	0	N/A	<input type="checkbox"/>	1
Non-ambiguity R12 / TRC-M23...	★★★★	0	N/A	<input type="checkbox"/>	1
Non-ambiguity R13 / TRC-M24...	★★★★	0	N/A	<input type="checkbox"/>	1
Non-ambiguity R14 / TRC-M25...	★★★★	57	N/A	<input type="checkbox"/>	1
Non-ambiguity R15 / Singula...	★★★★	0	N/A	<input type="checkbox"/>	1
Non-ambiguity R15 / TRC-M27...	★★★★	0	N/A	<input type="checkbox"/>	1

Additional quality elements:

- Accuracy R03 / TRC-M050: Determine if the subject is a recognized Agent term
- Singularity R18 / Conditions R27 / TRC-M360: Check the number of Modal Verbs

VAGUE TERMS

Accuracy R07 / TRC-M950: Avoid the use of Vague Terms

We are checking here for terms which **lack precision** when defining an action, quantification, characteristic, constraint, etc.

Therefore, these should be corrected to **facilitate** the **understanding** of others and the **execution** of the **V&V** processes later on.

Accuracy R07 / TRC-M950: Avoid the use of Vague Terms - Correctness analysis

Statistics Requirements Filtering

Correctness statistics:

Drag a column header here to group by that column

Term	Instances in the specification
«VAGUE VERBS» "Support"	25
«VAGUE ADJECTIVES» "Applicable"	15
«VAGUE VERBS» "Manage"	8
«VAGUE ADVERBS» "Any"	7
«VAGUE ADJECTIVES» "Autonomous"	5
«VAGUE ADJECTIVES» "Nominal"	5
«VAGUE VERBS» "Process"	2
«VAGUE VERBS» "Handle"	2
«VAGUE ACTIONS» "Handle"	2
«VAGUE TERMS» "Handle"	2
«VAGUE VERBS» "Track"	2
«VAGUE ADJECTIVES» "Safe"	2
«VAGUE ADVERBS» "Directly"	1
«VAGUE ADJECTIVES» "Maintainable"	1
«VAGUE VERBS» "Facilitate"	1
«VAGUE ADJECTIVES» "Common"	1
«VAGUE ADVERBS» "Autonomously"	1
«VAGUE VERBS» "Maximize"	1
«VAGUE ADJECTIVES» "Appropriate"	1
«VAGUE ADVERBS» "Continuously"	1
«VAGUE ADVERBS» "Bodily"	1
«VAGUE ADVERBS» "Automatically"	1
«VAGUE ADJECTIVES» "Low"	1
«VAGUE ADJECTIVES» "High"	1

Sum=89

Total: 24

Close



Accuracy R07 / TRC-M950: Avoid the use of Vague Terms - Correctness analysis

Statistics Requirements Filtering

Requirements analysis:

Drag a column header here to group by that column

Ab...	Workproduct Description	Comment	Quality value	Nu...	Summary
<input type="checkbox"/>	L2-... The Gateway shall change the Gateway attitude to any orientation (as needed) to meet operational constraints for all configurations.	Avoid vagu...	☆☆☆	1	Any(x1):any(x1);
<input type="checkbox"/>	L2-... The Gateway shall support autonomous docking, undocking, berthing, and unberthing of Visiting Vehicle and modules while there are no crew present on the arriving/...	Avoid vagu...	☆☆☆	1	Autonomous(x1):autonomou...
<input type="checkbox"/>	L2-... The Gateway shall comply with applicable requirements in DSG-SPEC-COMM-005, Gateway Program Subsystem Specification for Communications.	Avoid vagu...	☆☆☆	1	Applicable(x1):applicable(x1);
<input type="checkbox"/>	L2-... The Gateway shall incorporate modular, reconfigurable communication systems to support expandability and extensibility for additional capabilities.	Avoid vagu...	☆☆☆	1	Support(x1):support(x1);
<input type="checkbox"/>	L2-... The Gateway shall communicate with Earth for data exchange and radiometric tracking.	Avoid vagu...	☆☆☆	1	Track(x1):tracking(x1);
<input type="checkbox"/>	L2-... The Gateway shall support a minimum of 3 simultaneous RF communication links.	Avoid vagu...	☆☆☆	1	Support(x1):support(x1);
<input type="checkbox"/>	L2-... The Gateway shall communicate with Earth without placing constraints on flight attitudes during nominal operations.	Avoid vagu...	☆☆☆	1	Nominal(x1):nominal(x1);
<input type="checkbox"/>	L2-... The Gateway shall support at least 7.49 Tbits per day (~935 GB per day) data downlink capacity to Earth.	Avoid vagu...	☆☆☆	1	Support(x1):support(x1);
<input type="checkbox"/>	L2-... The Gateway shall communicate with up to 4 EVA crewmembers. Gateway will need to communicate with the EVA crew. The same EVA radio used on-board Gateway will be used for lunar surface operations. The requirement to suppo...	Avoid vagu...	☆☆☆	1	Handle(x1):handle(x1);Handle...
<input type="checkbox"/>	L2-... The Gateway shall support at least 1.62 Terabits (TBs) per day data transfer from Lunar Systems.	Avoid vagu...	☆☆☆	1	Support(x1):support(x1);
<input type="checkbox"/>	L2-... The Gateway shall communicate with Visiting Vehicle for data exchange and radiometric tracking.	Avoid vagu...	☆☆☆	1	Track(x1):tracking(x1);
<input type="checkbox"/>	L2-... The Gateway shall support direct voice communications between crewed spacecraft during proximity operations.	Avoid vagu...	☆☆☆	1	Support(x1):support(x1);
<input type="checkbox"/>	L2-... The Gateway shall support internal voice communications between Gateway crew and ground operators.	Avoid vagu...	☆☆☆	1	Support(x1):support(x1);
<input type="checkbox"/>	L2-... The Gateway shall comply with applicable requirements in DSG-SPEC-VSM-003, Gateway Program Subsystem Specification for Vehicle System Manager (VSM).	Avoid vagu...	☆☆☆	1	Applicable(x1):applicable(x1);
<input type="checkbox"/>	L2-... The Gateway shall provide a VSM to manage the Gateway modules and coordinate with crew and ground controllers.	Avoid vagu...	☆☆☆	1	Manage(x1):manage(x1);
<input type="checkbox"/>	L2-... The Gateway shall provide for autonomous operations for up to 21 continuous days independent of ground communications, with or without crew.	Avoid vagu...	☆☆☆	1	Autonomous(x1):autonomou...
<input type="checkbox"/>	L2-... The Gateway shall comply with applicable requirements in DSG-SPEC-FSW-014, Gateway Program Subsystem Specification for Software.	Avoid vagu...	☆☆☆	1	Applicable(x1):applicable(x1);
<input type="checkbox"/>	L2-... The Gateway shall detect, report, and annunciate faults for alerts, caution, warning, and emergency events to the on-orbit crew (IVA and EVA), lunar-surface crew, Earth...	Avoid vagu...	☆☆☆	1	Autonomous(x1):autonomou...
<input type="checkbox"/>	L2-... The Gateway shall be able to update executable Flight Software (FSW) and configuration data to support ongoing vehicle operations and configurations.	Avoid vagu...	☆☆☆	1	Support(x1):support(x1);
<input type="checkbox"/>	L2-... The Gateway shall comply with applicable requirements in DSG-SPEC-CDH-004, Gateway Program Subsystem Specification for Avionics. Handling defines the specific functionality required of the Inter-module network system to enable top level capabilities, associated design standards, and module level...	Avoid vagu...	☆☆☆	1	Handle(x1):Handling(x1);Han...
<input type="checkbox"/>	L2-... The Gateway shall comply with applicable requirements in DSG-SPEC-CHI-018, Gateway Program Subsystem Specification for Computer Human Interface.	Avoid vagu...	☆☆☆	1	Applicable(x1):applicable(x1);
<input type="checkbox"/>	L2-... The Gateway shall provide shared processing.	Avoid vagu...	☆☆☆	1	Process(x1):processing(x1);
<input type="checkbox"/>	L2-... The Gateway shall provide crew display and controls that are available to crew members from within an inhabitable environment.	Avoid vagu...	☆☆☆	1	Support(x1):support(x1);

Total: 76

QualityId = 3

Close



TBDs

TRC-M990: Detection of the TBDs and TBRs

There are several **TBDs** and **TBRs** within this document.

During the **AUTHORING** phases, there is no issue at all to use them.

However, this is labeled as **BASELINE**, which if used, could lead to **many uncertainties** during the **development** and **verification** process.

****This result (like others) could be due to **this document being a public example** version!*

C.3 General Goodness Checklist

- The requirement is grammatically correct.
- The requirement is free of typos, misspellings, and punctuation errors.
- The requirement complies with the project's template and style rules.
- The requirement is stated positively (as opposed to negatively, i.e., "shall not").
- The use of "To Be Determined" (TBD) values should be minimized. It is better to use a best

Source: NASA Systems Engineering Handbook

Views RQA Shared Save Refresh Close connection

Quality Assurance Project Configuration

Module Selector Current State Snapshot Evolution Scoreboard Workproducts Users Correctness Consistency Completeness Suggestions

Module - NASA Document.pdf Quality Scoreboard Workproducts Metrics Repository

Drag a column header here to group by that column

							TBD				
	<input type="checkbox"/>	Module	ID	Workproduct	Correctness	Score	Me...	Corro...	Consistency	Isa...	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Module - NASA Document.pdf	L2-GW-0167	<TBD-L2-GW-005> The Gateway shall allow for full use of available array power.	★★★★	0.85	0	22/10...	★★★★	N/A	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Module - NASA Document.pdf	L2-GW-0147	<TBD-L2-GW-018> The Gateway shall provide enhanced inherent capabilities to facilitate science.	★★★★	1.14	0	22/10...	★★★★	N/A	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Module - NASA Document.pdf	L2-GW-0179	The Gateway shall be equipped with passive or active crew exercise equipment isolation systems to reduce induced loads to the primary structure to less than or equal to <TBD-L2-GW013> per axis at the structural mounting l...	★★★★	1.42	0	22/10...	★★★★	N/A	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Module - NASA Document.pdf	L2-GW-0022	The Gateway shall control attitude and attitude rates, within <TBD-L2-GW-001>.	★★★★	1.14	0	22/10...	★★★★	N/A	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Module - NASA Document.pdf	L2-GW-0326	The Gateway shall design for induced loads in accordance with <TBD-L2-GW-068> Gateway Loads Data Book.	★★★★	0.85	0	22/10...	★★★★	N/A	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Module - NASA Document.pdf	L2-GW-0106	The Gateway shall detect atmospheric leaks greater than <TBD-L2-GW-011>.	★★★★	0.85	0	22/10...	★★★★	N/A	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Module - NASA Document.pdf	L2-GW-0325	The Gateway shall limit disturbances caused by venting of fluids and gasses per the <TBD-L2GW-050> table.	★★★★	1.14	0	22/10...	★★★★	N/A	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Module - NASA Document.pdf	L2-GW-0258	The Gateway shall limit disturbances to the vehicle and robotics, during sensitive External Robotic operations, to a level <TBD-L2-GW-014> that will not affect robot performance and safety, without the need for flight-specific a...	★★★★	2.00	0	22/10...	★★★★	N/A	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Module - NASA Document.pdf	L2-GW-0105	The Gateway shall localize atmospheric leaks to within <TBD-L2-GW-012> location in any pressurized habitable volume.	★★★★	1.71	0	22/10...	★★★★	N/A	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Module - NASA Document.pdf	L2-GW-0201	The Gateway shall operate internal systems, required to maintain control of the Gateway, during and after exposure to pressures from nominal operation pressures down to zero psi, within <TBD-L2-GW-003> minutes (or a dep...	★★★★	2.00	0	22/10...	★★★★	N/A	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Module - NASA Document.pdf	L2-GW-0149	The Gateway shall provide <TBD-L2-GW-016> internal volume for powered multi-use equipment to support utilization, in addition to volume for powered payload locations.	★★★★	1.14	0	22/10...	★★★★	N/A	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Module - NASA Document.pdf	L2-GW-0155	The Gateway shall provide interfaces for the Visiting Vehicle, per the Interface Design Document (IDD) <TBD-L2-GW-021>.	★★★★	0.85	0	22/10...	★★★★	N/A	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Module - NASA Document.pdf	L2-GW-0303	The Gateway shall provide interfaces to the Gateway Ground Segment per documents <TBD-L2-GW-037> Gateway to Ground Network ICD, <TBD-L2-CW-066> VSM to Ground ICD, and <TBD-L2-CW-067> Gateway Program...	★★★★	1.71	0	22/10...	★★★★	N/A	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Module - NASA Document.pdf	L2-GW-0012	The Gateway shall provide resources and interfaces for Utilization payloads and payload accommodations as defined in the Gateway Utilization Payload Interface Requirement Document <TBD-L2-GW-062>.	★★★★	1.28	0	22/10...	★★★★	N/A	

USE OF PARENTHESIS

Singularity R21 / TRC-M390: Avoid the use of Parenthesis out of the condition block

ESCAPE CLAUSES

Accuracy R08 / TRC-M190: Avoid the use of Escape clauses

Editing L2-GW-0016 - SES ENGINEERING Studio

File Tools View Log

Authoring without patterns

< No pattern group >

No selected pattern group implies no writing assistance

Font: Calibri, Font Size: 12

The Gateway shall change the Gateway attitude to any orientation (as needed) to meet operational constraints for all configurations.

Metric: Accuracy R09 / TRC-M200: Avoid the use of Open-Ended clauses

as needed

- Rationale: This expression does not clarify the extent to which the action or condition must be fulfilled. It would be highly recommended to replace this expression with the precise limitations involved.

Correctness metrics summary: 1.76

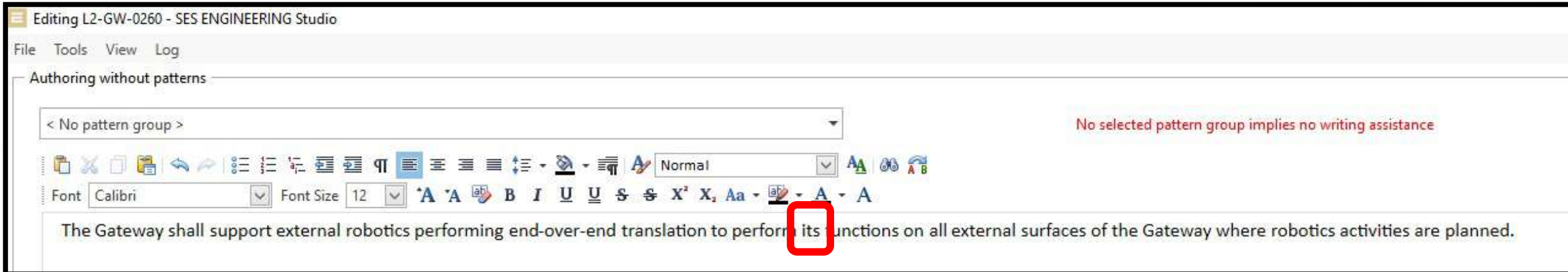
Metric	Value
Accuracy R07 / TRC-M950: Avoid the use of Vague Terms	1
Accuracy R09 / TRC-M200: Avoid the use of Open-Ended clauses	1
Completeness R24 / Completeness R25 / TRC-M070: Avoid the use of Pronoun...	2
Quantifiers R32 / TRC-M510: Avoid the use of Ambiguous Universal Keywords	1
Realism R26 / TRC-M430: Avoid unachievable Absolutes expressions impossibl...	1
Singularity R21 / TRC-M390: Avoid the use of Parenthesis out of the condition...	1

Edit manual assessment Ready

As soon as there is room for **DOUBT** or **INTERPRETATION** by the reader, there is a problem.

USE OF PRONOUNS

Completeness R24 / Completeness R25 / TRC-M070: Avoid the use of Pronouns to refer to nouns



Which functions are we **REFERRING** to here?

Gateway, external robotics...

WRONG REFERENCE FORMAT

Non-ambiguity R13 / TRC-M240: Avoid Incorrect spelling

Detected through the INCORRECT SPELLING quality metric.

According to this very same document instructions, the reference structure is:

B2.0 TO BE RESOLVED

The table To Be Resolved Issues lists the specific To Be Resolved (TBR) issues in the document that are not yet known. The TBR is inserted as a placeholder wherever the required data is needed and is formatted in bold type within carets. The TBR issue is numbered based on the document number, including the annex, volume, and book number, as applicable (i.e., **<TBR-XXXXX-001>** is the first unresolved issue assigned in the document). As each TBR is resolved, the updated text is inserted in each place that the TBR appears in the document and the issue is removed from this table. As new TBR issues are assigned, they will be added to this list in accordance with the above described numbering scheme. Original TBRs will not be renumbered.

Editing L2-GW-0003 - SES ENGINEERING Studio

File Tools View Log

Authoring without patterns

< No pattern group >

No selected pattern group implies no writing assistance

Font: Calibri Font Size: 12

The Gateway shall be capable of uncrewed operations for up to 3 continuous years <TBRHEOR-001> without resupply.

Metric: Non-ambiguity R13 / TRC-M240: Avoid incorrect spelling
N/A

Correctness metrics summary: **Low Quality 1.18**

Metric	Value
Accuracy R04 / TRC-M225: Avoid Unclassified Terms	1
Accuracy R06 / TRC-M140: Ensure Numbers are followed by Units or noun qua...	1
Concision R10 / TRC-M210: Avoid the use of Superfluous infinitives	1
Non-ambiguity R13 / TRC-M240: Avoid incorrect spelling	1

[Edit manual assessment](#) Ready

Other quality elements:

Correctness Consistency Completeness Similar requirements Additional attributes Syntactic information Formal representation

Metric	Correctness	Value	Summary	Mandatory	Weight
Accuracy R04 / TRC-M225: Avo...	☆☆☆	1	Avoid terms not defined in the ontology dictionary	<input type="checkbox"/>	1
Accuracy R06 / TRC-M140: Ens...	☆☆☆	1	Missing quantifier (Measurement unit or noun)	<input type="checkbox"/>	1
Concision R10 / TRC-M210: Av...	☆☆☆	1	Avoid superfluous infinitives	<input type="checkbox"/>	1
Non-ambiguity R13 / TRC-M24...	☆☆☆	1	Avoid misspelling	<input checked="" type="checkbox"/>	1
Abstraction R31 / TRC-M500: A...	☆☆☆	0	N/A	<input type="checkbox"/>	1
Accuracy R01 / TRC-M365: Avo...	☆☆☆	0	N/A	<input type="checkbox"/>	1
Accuracy R02 / TRC-M040: Avo...	☆☆☆	0	N/A	<input type="checkbox"/>	1
Accuracy R03 / TRC-M050: Det...	☆☆☆	1	N/A	<input type="checkbox"/>	1
Accuracy R03 / TRC-M065: Avo...	☆☆☆	0	N/A	<input type="checkbox"/>	1
Accuracy R03 / TRC-M130: Avo...	☆☆☆	0	N/A	<input type="checkbox"/>	1
Accuracy R07 / TRC-M950: Avo...	☆☆☆	0	N/A	<input type="checkbox"/>	1
Accuracy R03 / TRC-M190: Avo...	☆☆☆	0	N/A	<input type="checkbox"/>	1
Completeness R24 / Complete...	☆☆☆	0	N/A	<input type="checkbox"/>	1
Non-ambiguity R12 / TRC-M23...	☆☆☆	0	N/A	<input type="checkbox"/>	1
Non-ambiguity R14 / TRC-M26...	☆☆☆	111	N/A	<input type="checkbox"/>	1
Non-ambiguity R15 / Singularit...	☆☆☆	0	N/A	<input type="checkbox"/>	1
Non-ambiguity R15 / TRC-M27...	☆☆☆	0	N/A	<input type="checkbox"/>	1

- Accuracy R03 / TRC-M050: Determine if the subject is a recognized Agent term
- Accuracy R04 / TRC-M225: Avoid Unclassified Terms
 - UNCLASSIFIED NOUN
- Accuracy R06 / TRC-M140: Ensure Numbers are followed by Units or noun qualifications
- Concision R10 / TRC-M210: Avoid the use of Superfluous infinitives
- Non-ambiguity R13 / TRC-M240: Avoid incorrect spelling
 - TBRHEOR-
- Singularity R13 / Conditions R27 / TRC-M360: Check the number of Modal Verbs

Save and close Cancel

TEXT LENGTH

Singularity R18 / TRC-M330: Check the text length by counting words

USE OF COMBINATORS

Non-ambiguity R15 / Singularity R19 / TRC-M350: Avoid the use of Combinators out of the condition block

Editing L2-GW-0327 - SES ENGINEERING Studio

File Tools View Log

Authoring without patterns

< No pattern group >

No selected pattern group implies no writing assistance

Normal

Font Calibri Font Size 12

The Gateway shall have an external robotic system capable of autonomous operations that implements the following functions on the exterior of Gateway: inspection, installation and removal of payloads, transfer of equipment through the science airlock, off-loading and reloading of logistics vehicles, free-flying vehicle capture and release, lunar and planetary mission equipment transfer, lunar and planetary element assembly, berthing and unberthing of modules and vehicles, removal and replacement of ORUs, self-maintenance, and assistance to EVA.

Metric: Non-ambiguity R15 / Singularity R19 / TRC-M350: Avoid the use of Combinators out of the condition block

- Scope Note: N/A
- Clusters: «COMBINATORS»

Correctness metrics summary:

Low Quality 1.06

Metric	Value
Accuracy R07 / TRC-M950: Avoid the use of Vague Terms	1
Non-ambiguity R15 / Singularity R19 / TRC-M350: Avoid the use of Combinators out of the condition block	9
Singularity R18 / TRC-M340: Control the number of Action Verbs out of the co...	6
Singularity R18 / TRC-M330: Check the text length by counting words	89

Edit manual assessment

Other quality elements:

Correctness Consistency Completeness Similar requirements Additional attributes Syntactic information Formal representation

Metric	Correctness	Value	Summary	Mandatory	Weight
Accuracy R07 / TRC-M950: Avo...	☆☆☆	1	Avoid vague terms in requirement statements	<input type="checkbox"/>	1
Non-ambiguity R15 / Singulant...	☆☆☆	9	Avoid Combinators out of the condition block	<input checked="" type="checkbox"/>	1
Singularity R18 / TRC-M340: Co...	☆☆☆	6	Too many action verbs in the same requirement	<input type="checkbox"/>	1
Singularity R18 / TRC-M330: Ch...	☆☆☆	89	Long requirements (measured in number of words) mu...	<input type="checkbox"/>	1
Abstraction R31 / TRC-M500: A...	☆☆☆	0	N/A	<input type="checkbox"/>	1
Accuracy R01 / TRC-M365: Avo...	☆☆☆	0	N/A	<input type="checkbox"/>	1
Accuracy R02 / TRC-M040: Avo...	☆☆☆	0	N/A	<input type="checkbox"/>	1
Accuracy R03 / TRC-M050: Det...	☆☆☆	1	N/A	<input type="checkbox"/>	1
Accuracy R03 / TRC-M065: Avo...	☆☆☆	0	N/A	<input type="checkbox"/>	1
Accuracy R04 / TRC-M225: Avo...	☆☆☆	0	N/A	<input type="checkbox"/>	1
Accuracy R05 / TRC-M130: Avo...	☆☆☆	0	N/A	<input type="checkbox"/>	1
Accuracy R06 / TRC-M140: Ens...	☆☆☆	0	N/A	<input type="checkbox"/>	1
Accuracy R08 / TRC-M190: Avo...	☆☆☆	0	N/A	<input type="checkbox"/>	1
Completeness R24 / Complet...	☆☆☆	0	N/A	<input type="checkbox"/>	1
Concision R10 / TRC-M210: Av...	☆☆☆	0	N/A	<input type="checkbox"/>	1
Non-ambiguity R12 / TRC-M23...	☆☆☆	0	N/A	<input type="checkbox"/>	1
Non-ambiguity R11 / TRC-M24...	☆☆☆	0	N/A	<input type="checkbox"/>	1

Accuracy R03 / TRC-M050: Determine if the subject is a recognized Agent term

Accuracy R07 / TRC-M950: Avoid the use of Vague Terms

Non-ambiguity R15 / Singularity R19 / TRC-M350: Avoid the use of Combinators out of the condition block

- «COMBINATORS»

Singularity R18 / Conditions R27 / TRC-M350: Check the number of Modal Verbs

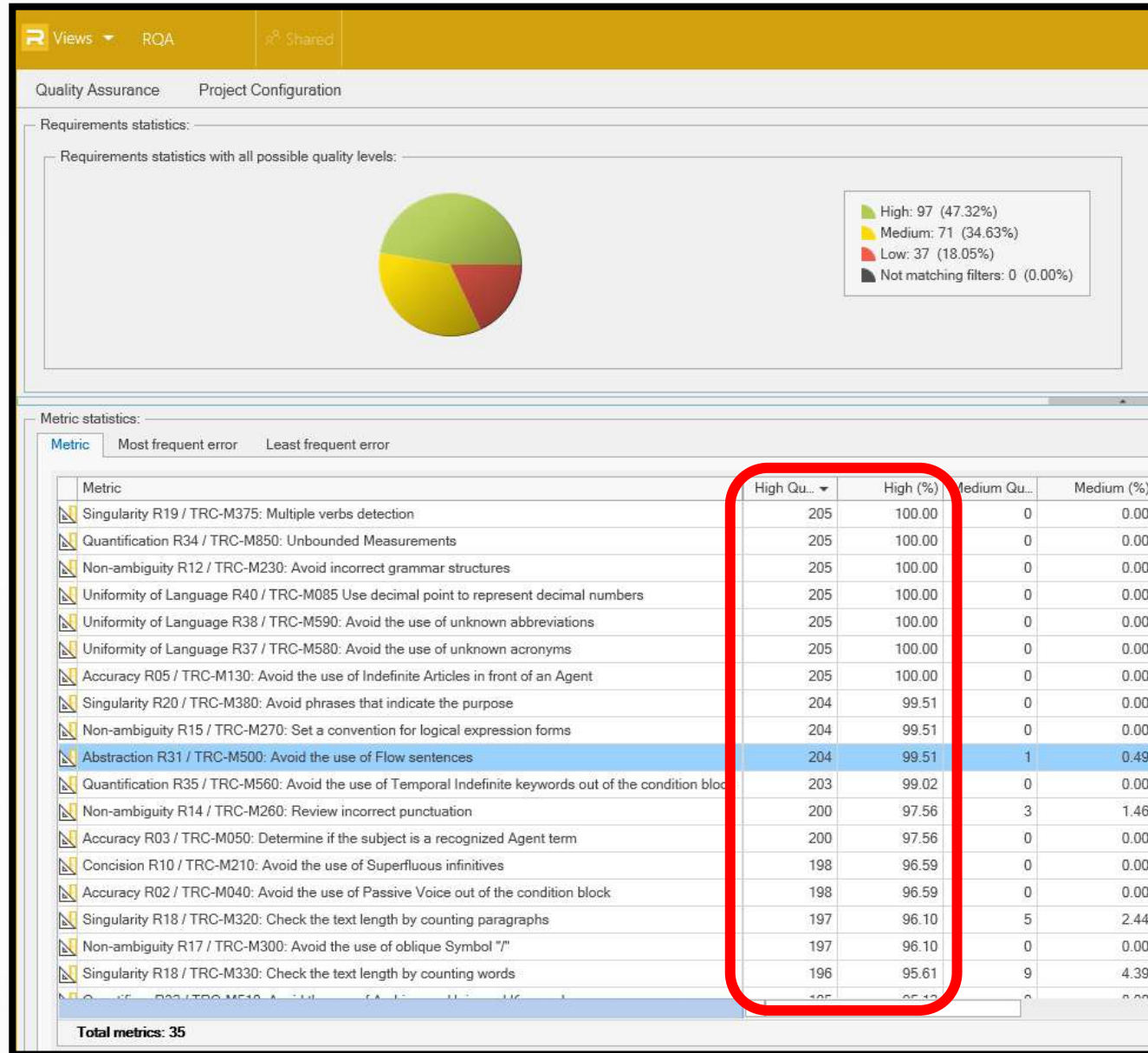
Singularity R18 / TRC-M340: Control the number of Action Verbs out of the condition block

Save and close Cancel

POWER POINTS

Particular requirement with several potential improvements detected.

- ✓ Mostly SHORT requirements.
- ✓ 98% of the requirements with “Gateway” as the SUBJECT.
 - ✓ No UNKNOWN acronyms or abbreviations.
 - ✓ One SHALL in most requirements.
 - ✓ Proper representation of DECIMALS.
- ✓ 97% without PASSIVE VOICE or SUPERFLUOUS INFINITIVES.



KEY EXAMPLE

Particular requirement with several potential improvements detected.

L2-GW-0320: Maintainability

“The Gateway critical systems shall be designed to be maintainable.”

✓ **Passive Voice** out of Condition.

The screenshot shows the SES ENGINEERING Studio interface. The main text area contains the sentence: "The Gateway critical systems shall be designed to be maintainable." A red box highlights the phrase "be designed to be maintainable". A tooltip points to this phrase with the text: "Metric: Accuracy R02 / TRC-M040: Avoid the use of Passive Voice out of the condition block" and "N/A".

On the right side, there is a "Correctness metrics summary" panel. It shows a "Low Quality" score of 1.18. Below this is a table of metrics:

Metric	Value
Accuracy R02 / TRC-M040: Avoid the use of Passive Voice out of the condition...	1
Accuracy R03 / TRC-M050: Determine if the subject is a recognized Agent term	0
Accuracy R07 / TRC-M950: Avoid the use of Vague Terms	1
Concision R10 / TRC-M210: Avoid the use of Superfluous infinitives	1

✓ **No Recognized Agent** as subject.

The Gateway critical systems...



*The Gateway **SHALL HAVE** critical systems **THAT**...*

✓ Use of Superfluous Infinitives.

The screenshot shows the 'Editing L2-GW-0320 - SES ENGINEERING Studio' window. The main text area contains the sentence: "The Gateway critical systems shall be designed to be maintainable." The words "shall be designed to be" are highlighted in red. A tooltip points to this text with the message: "Metric: Concision R10 / TRC-M210: Avoid the use of Superfluous infinitives" and "N/A". On the right, the 'Correctness metrics summary' panel shows a 'Low Quality' score of 1.18. The table below lists the metrics:

Metric	Value
Accuracy R02 / TRC-M040: Avoid the use of Passive Voice out of the condition...	1
Accuracy R03 / TRC-M050: Determine if the subject is a recognized Agent term	0
Accuracy R07 / TRC-M950: Avoid the use of Vague Terms	1
Concision R10 / TRC-M210: Avoid the use of Superfluous infinitives	1

✓ Use of Vague Terms.

The screenshot shows the 'Editing L2-GW-0320 - SES ENGINEERING Studio' window. The main text area contains the sentence: "The Gateway critical systems shall be designed to be maintainable." The word "maintainable" is highlighted in red. A tooltip points to this text with the message: "Metric: Accuracy R07 / TRC-M950: Avoid the use of Vague Terms" and a detailed explanation: "maintainable", "Scope Note: Please, avoid this term as it does not clarify properly the implications or characteristic that the subject requires in order to opt for the 'maintenance'.", and "Clusters: «VAGUE ADJECTIVES»". On the right, the 'Correctness metrics summary' panel shows a 'Low Quality' score of 1.18. The table below lists the metrics:

Metric	Value
Accuracy R02 / TRC-M040: Avoid the use of Passive Voice out of the condition...	1
Accuracy R03 / TRC-M050: Determine if the subject is a recognized Agent term	0
Accuracy R07 / TRC-M950: Avoid the use of Vague Terms	1
Concision R10 / TRC-M210: Avoid the use of Superfluous infinitives	1

CONCLUSION

1. The document has considerable **HIGH QUALITY**.
2. The improvements detected are mostly coming from **MINOR ISSUES**.
3. Human & machine makes a **GREAT TEAM**.

****AGAIN! This result (like others) could be due to **this document being a public example version.***



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