# AATRIZINVENTOR SOLUTION FOR INNOVATION BASED ON NATURE'S L.I.
# Working Document to Build a Specific Solution.

## INNOVATION CHALLENGE: Improve Leadership skills of orangutan leader affected by difficulty in communicating orders and dangers to the pack

**APLICATION OF NATURE'S LANGUAGE OF INNOVATION / Nature's L.I.**
Web site: www.aatrizinventor.com
Reference book: The Nature's Language of Innovation, José Roberto Espinoza, Amazon, Kindle.
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**FACTORS OF INNOVATION:**
ACTION VERB: Improve
FUNCTION AFFECTED: Leadership skills of orangutan leader affected by difficulty in communicating orders and dangers to the pack
PHYSICAL VARIABLE OR CHARACTERISTIC: Ability to communicate with the pack
S1 OBJECT: ORANGUTAN LEADER Type: Moving
S2 OBJECT: PACK Type: Moving

**INNOVATION CHALLENGE:**
CHALLENGE: Improve Leadership skills of orangutan leader affected by difficulty in communicating orders and dangers to the pack
DESIRED GOAL: More Ability to communicate with the pack
EVALUATED OBJECT: ORANGUTAN LEADER
**NEED TO SATISFY > 13. Stability**

**SELECTED INNOVATION PARAMETERS TO EVALUATE:**
**A. UNDESIRABLE EFFECTS CAUSES OF DISSATISFACTION (UDEs)**
There are More difficulty to Improve Leadership skills of orangutan leader affected by difficulty in communicating orders and dangers to the pack because:
ORANGUTAN LEADER Has Less Heaviness, value, cost, or restriction, whether physical or figurative interacting with S2
ORANGUTAN LEADER Has Less Appropriate shape, composition, or configuration interacting with S2
ORANGUTAN LEADER Has Less Quantity of substance delivered or produced per control unit interacting with S2
ORANGUTAN LEADER Has Less Achievement of desired outcome interacting with S2
There are undesirable effects that cause dissatisfaction because:
There is Less Ability to communicate with the pack
**B. DESIRED EFFECT FOR NEED TO SATISFY**
There is More ease to Improve Leadership skills of orangutan leader affected by difficulty in communicating orders and dangers to the pack because:
ORANGUTAN LEADER Has More Desired stability to interact with S2
There is desirable effect for need to satisfy because:
There is More Ability to communicate with the pack

**Table I. RELATIONSHIP WITH UNIVERSAL TRIZ INNOVATION PARAMETERS** ( maximum of 7 undesirable effects)
CHALLENGE: Improve Leadership skills of orangutan leader affected by difficulty in communicating orders and dangers to the pack

This table presents the selected innovation parameters to evaluate the challenge that must be resolved for the interaction between an Object S1 and an Object S2, and no others. The choice of undesirable effects must be based on a thorough review of the current situation, identifying them based on the objective evidence present within the predefined space and time of evaluation. Fulfilling this requirement is crucial: If you do not connect the dots of the current situation properly, the algorithm will deliver a disconnected solution.
The selection of the need to satisfy should reflect the best estimation of the innovation-evolution state of the object S1 being evaluated.
Recognizing the criticality of this selection process, the Aatrizinventor algorithm provides flexibility to change parameters and conducts a sensitivity analysis in order to offer alternative solutions. These alternatives are based on different combinations of the entered parameters, also including a different need to satisfy from the one originally posed.

| **Parameters to evaluate(s)** | **It is understood as ORANGUTAN LEADER has:** |
|---|---|
| **Parámeters of undesirable effects (UDE):** | **Undesirable effects causes of dissatisfaction:** |
| (-) 1. Heaviness of moving object | Less Heaviness, value, cost, or restriction, whether physical or figurative interacting with S2 |
| (-) 12. Shape / composition / configuration | Less Appropriate shape, composition, or configuration interacting with S2 |
| (-) 26. Quantity of substance / Capacity gains | Less Quantity of substance delivered or produced per control unit interacting with S2 |
| (-) 29. Fulfillment of desired outcome | Less Achievement of desired outcome interacting with S2 |
| **Desirable parameter (DE):** | **Desirable Effect for Need to satisfy:** |
| (+) 13. Stability | More Desired stability to interact with S2 |
| **TRIZ undesirables parameters for sensitivity analysis** | **It is understood as ORANGUTAN LEADER has:** |
| (+) 24. Loss of Information | More Loss of information or lack of communication interacting with S2 |
| n/a | |
| n/a | |
| n/a | |

| | |
|---|---|
| n/a | |

**EVALUTION RESULTS TABLES**

**TABLE II. SPECIFIC CONTRADICTION MATRIX FOR UNDESIRABLE EFFECTS AND NEED TO SATISFY. FOR EVALUATED OBJECT: ORANGUTAN LEADER AND NEED TO BE SATISFIED > 13. Stability**
CHALLENGE: Improve Leadership skills of orangutan leader affected by difficulty in communicating orders and dangers to the pack

(*) Preferred parameters: Improve 1. Heaviness of moving object & Attenuate or preserve 29. Fulfillment of desired outcome.
Contradictions/ E.C: Essential, Comp.:Complementary, Top 5: Up to the major fifth, noted if outside the preferred parameters.
Parameters in the first row are the same as those in the first column.

| Parameter to attenuate or preserve => Parameter to improve | Var. | (-) Par.1 | (-) Par.12 | (-) Par.26 | **(-) Par.29 PREF.** | (+) Par.13 | Sum wt |
|---|---|---|---|---|---|---|---|
| **(-) 1. Heaviness of moving object PREF.** | wt | | **wt.5 Compl.** | **wt.16 Compl.** | **wt.1 E.C.** | **wt.19 Compl.** | 93% |
| | IP(s) | 0,0,0,0 | 10,14,35,40 | 3,26,18,31 | 28,35,26,18 | 1,35,19,39 | |
| (-) 12. Shape / composition / configuration | wt | wt.17 | | wt.14 | **wt.7 Compl.** | wt.10 | 49% |
| | IP(s) | 8,10,29,40 | 0,0,0,0 | 36,22,0,0 | 32,30,40,0 | 33,1,18,4 | |
| (-) 26. Quantity of substance / Capacity gain | wt | wt.13 | wt.12 | | **wt.6 Compl.** | wt.20 | 45% |
| | IP(s) | 35,6,18,31 | 35,14,0,0 | 0,0,0,0 | 33,30,0,0 | 15,2,17,40 | |
| (-) 29. Fulfillment of desired outcome | wt | **wt.3 Top 5** | wt.8 | **wt.4 Top 5** | | wt.9 | 83% |
| | IP(s) | 28,32,13,18 | 32,30,40,0 | 32,30,0,0 | 0,0,0,0 | 30,18,0,0 | |
| (+) 13. Stability | wt | wt.15 | wt.11 | **wt.2 Top 5** | **wt.18 Compl.** | | 70% |
| | IP(s) | 21,35,2,39 | 22,1,18,4 | 15,32,35,0 | 18,0,0,0 | 0,0,0,0 | |
| Sum wt | | 53% | 61% | 82% | 100% | 44% | |

This table shows the essential contradiction (E.C.) that determines the solution strategy. Additionally, preferred parameters are established where complementary contradictions (Compl.) are found, allowing the definition of the Base Solution shown in Table III.
As a complement to the Base Solution, Table II also provides the following information that could be

relevant to obtain an optimal solution:
a) The algorithm identifies the top 5 contradictions from the entire Table II and highlights those that are outside the preferred parameters for further review.
b) There are inventive principles present in Table II that are not part of the Recommended Solution proposed in Table V. In the latter, the top three most relevant ones are highlighted, and the contradictions they involve are presented to evaluate whether they contribute significant aspects to the desired solution. For further details, Table VIII provides a prioritization of the inventive principles from Table II, and those not included in the Recommended Solution in Table V are marked with ***.

**TABLE III. BASE SOLUTION FOR THE EVALUATED OBJECT: ORANGUTAN LEADER**
**NEED TO SATISFY > 13. Stability**
CHALLENGE: Improve Leadership skills of orangutan leader affected by difficulty in communicating orders and dangers to the pack

**Table II Selection: Essential Contradiction wt.1 y Complementary contradictions with preferred parameters (*) wt.5/wt.6/wt.7/wt.16**

| Parameter to improve | Parameter to attenuate or preserve | Contradict. | Wt.n | IP. Ord.1 | IP Ord 2 | IP Ord 3 | IP Ord 4 |
|---|---|---|---|---|---|---|---|
| (-) 1. Heaviness of moving object | (-) 29. Fulfillment of desired outcome | Essential | wt.1 | **28 Es.** | **35 Es.** | **26 Es.** | **18 Es.** |
| (-) 1. Heaviness of moving object | (-) 12. Shape / composition / configuration | Compl. 1 | wt.5 | 10 | 14 | **35 Es.** | 40 |
| (-) 26. Quantity of substance / Capacity gains | (-) 29. Fulfillment of desired outcome | Compl. 2 | wt.6 | 33 | 30 | 0 | 0 |
| (-) 12. Shape / composition / configuration | (-) 29. Fulfillment of desired outcome | Compl. 3 | wt.7 | 32 | 30 | 40 | 0 |
| (-) 1. Heaviness of moving object | (-) 26. Quantity of substance / Capacity gains | Compl. 4 | wt.16 | 3 | **26 Es.** | **18 Es.** | 31 |

**Inventive Principles (IP) selected for the Base Solution**
IP.28. Mechanics Substitution - strategic type
IP.35. Transformation / Parameter Changes - strategic type
IP.26. Copying/ Replicating - strategic type
IP.18. Mechanical Vibrations/ Energy Variations - tactical type
IP.10. Preliminary Action - strategic type
IP.14. Spheroidality - Curvature - Angle - tactical type

IP.40. Composite Materials/ Conditions - **operative type**
IP.33. Homogeneity / Compatibility - **operative type**
IP.30. Simple Shapes/ Ways to Interact - tactical type
IP.32. Perception/ Appearance/ Color Changes - strategic type
IP.3. Local Quality - strategic type
IP.31. Using/ Removing Unused Parts - **operative type**

Table III shows the essential contradiction, the one with the highest weight, plus the following 4 complementary contradictions in weight, which are located in the row and column of the preferred parameters selected in Table II. These contradictions are considered relevant for the solution and are described as the Base Solution in Table IX.
Keep in mind that all inventive principles selected for a solution must be evaluated according to the specific context of the contradictions in which they participate.
Inventive principles marked with 'Es.' correspond to inventive principles that belong to the essential contradiction.

**TABLE IV. CONTRADICTION MATRIX COVERAGE FOR SOLUTION AMONG NEEDS TO SATISFY FOR EVALUATED OBJECT: ORANGUTAN LEADER, NEED TO BE SATISFY: 13. Stability**

Coverage is defined as the extent to which the inventive principles from Table II encompass the inventive principles from Table IV. If weighted coverage is higher, it has been observed that the obtained solution is more likely to have the lowest cost and the maximum benefit-to-cost ratio.

| Parameter to improve | Parameter to preserve | IP. Ord.1 | IP Ord 2 | IP Ord 3 | IP Ord 4 |
|---|---|---|---|---|---|
| 13. Stability | 39. Productivity | **23 nT2** | 35 | 40 | 3 |
| 13. Stability | 15. Duration of action of moving object | 13 | **27 nT2** | 10 | 35 |
| 13. Stability | 35. Adaptability or versatility | 35 | 30 | **34 nT2** | 2 |
| 13. Stability | 34. Ease of change, repair or maintain | 2 | 35 | 10 | **16 nT2** |
| 13. Stability | 33. Ease of operation | 32 | 35 | 30 | 0 |
| 13. Stability | 32. Ease of achieving desired outcome | 35 | 19 nT3 | 0 | 0 |
| 13. Stability | 19. Use of energy by moving object | 13 | 19 nT3 | 0 | 0 |
| 13. Stability | 27. Reliability | 0 | 0 | 0 | 0 |
| 13. Stability | 38. Extent of automation/ autonomy | 1 nT3 | 8 nT3 | 35 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| 13. Stability | 13. Stability | 0 | 0 | 0 | 0 |

**Inventive Principles (IP) selected for the Solution of relevant Contradictions between Needs to Satisfy**
IP.23. Feedback - **operative type**
IP.35. Transformation / Parameter Changes - strategic tpe
IP.40. Composite Materials/ Conditions - **operative type**
IP.3. Local Quality - strategic tpe
IP.13. Reverse or Indirect Action - strategic tpe
IP.27. Cheap Short-Living Objects - strategic tpe
IP.10. Preliminary Action - strategic tpe
IP.30. Simple Shapes/ Ways to Interact - tactical type
IP.34. Discarding and Recovering - tactical type
IP.2. Taking out/ Adding - strategic tpe

87.6 % weighted coverage of the inventive principles (IP) included in Table IV. of Contradictions between Needs to Satisfy (NS), in relation to the IP included in Table II Specific Contradiction Matrix.
The inventive principles labeled with nT2 are not found in Table II. Due to this condition, the first three contradictions in Table IV containing principles marked with nT2 are described as a Solution among Needs to Satisfy in Table IX. This solution, combined with the previously mentioned Base Solution, forms the Recommended Solution by the Aatrizinventor Algorithm, shown in Table V.
**From practical experience, if Table IV contains more than 3 contradictions with inventive principles not included in Table II, then it is likely to be more challenging to construct a specific solution. In that case, it is recommended to look for an alternative combination of parameters in Table VI of sensitivity analysis. It is also an option to select another need to satisfy, which is shown in Table VII Essential Contradictions of Needs to Satisfy (NS) for the same undesirable effects already evaluated for ORANGUTAN LEADER.**
To evaluate the recommended inventive principles here and the corresponding contradictions in which they participate, it is necessary for the Base Solution to guide an initial context for the solution, as the contradictions between Needs to Satisfy do not identify which variable of the evaluated object S1 should be operated.
Inventive principles labeled with nT3 are included in Table II, but do not participate in the Recommended Solution shown in Table V. The Innovation Team must review the contradictions where they participate, to determine if there were other specific aspects that could be significant for the solution.
Unmarked inventive principles are included in Table II Specific Contradiction Matrix and in Table V Recommended Solution.

**TABLE V. RECOMMENDED SOLUTION FOR INNOVATION CHALLENGE FOR EVALUATED OBJECT ORANGUTAN LEADER**
CHALLENGE: Improve Leadership skills of orangutan leader affected by difficulty in communicating orders and dangers to the pack
Evaluated need to satisfy in this report: **13. Stability**
UDEs: (-) 1. Heaviness of moving object// (-) 12. Shape / composition / configuration// (-) 26. Quantity of substance / Capacity gains// (-) 29. Fulfillment of desired outcome

| Parameter to improve | Parameter to attenuate or preserve | Contradict. | Wt.n | IP. Ord.1 | IP Ord 2 | IP Ord 3 | IP Ord 4 |
|---|---|---|---|---|---|---|---|
| (-) 1. Heaviness of moving object | (-) 29. Fulfillment of desired outcome | Essential | wt.1 | **28 Es.** | **35 Es.** | **26 Es.** | **18 Es.** |
| (-) 1. Heaviness of moving object | (-) 12. Shape / composition / configuration | Compl. 1 | wt.5 | 10 | 14 | **35 Es.** | 40 |
| (-) 26. Quantity of substance / Capacity gains | (-) 29. Fulfillment of desired outcome | Compl. 2 | wt.6 | 33 | 30 | 0 | 0 |
| (-) 12. Shape / composition / configuration | (-) 29. Fulfillment of desired outcome | Compl. 3 | wt.7 | 32 | 30 | 40 | 0 |
| (-) 1. Heaviness of moving object | (-) 26. Quantity of substance / Capacity gains | Compl. 4 | wt.16 | 3 | **26 Es.** | **18 Es.** | 31 |
| 13. Stability | 39. Productivity | NS.1 | wns.1 | 23 | **35 Es.** | 40 | 3 |
| 13. Stability | 15. Duration of action of moving object | NS.2 | wns.2 | 13 | 27 | 10 | **35 Es.** |
| 13. Stability | 35. Adaptability or versatility | NS.3 | wns.3 | **35 Es.** | 30 | 34 | 2 |

**Relevant inventive principles from Table II not included in Recommended Solution**

Before deciding on the solution, make sure you have previously reviewed the contradictions with relevant Inventive Principles from Table II, not included in the Recommended Solution. The 3 most relevant are shown below.

| | | |
|---|---|---|
| IP.15. Dynamics (Pos.6) *** | IP. Str. | [Par.13][Par.26][ IP(s) : 15,32,35,0] - [Par.26][Par.13][ IP(s) : 15,2,17,40] - |
| IP.1. Segmenting/ Integrating (Pos.8) *** | IP. Str. | [Par.13][Par.12][ IP(s) : 22,1,18,4] - [Par.1][Par.13][ IP(s) : 1,35,19,39] - [Par.12][Par.13][ IP(s) : 33,1,18,4] - |
| IP.22. Convert harm in benefit (Pos.9) *** | IP. Str. | [Par.13][Par.12][ IP(s) : 22,1,18,4] - [Par.12][Par.26][ IP(s) : 36,22,0,0] - |

**Inventive Principles (IP) selected for Recommended Solution:**

To develop a Specific Solution based on the contradictions provided in Table V, where S1: ORANGUTAN LEADER interacts with S2: PACK, the Innovation Team must analyze the recommended innovation concepts for each selected inventive principle listed below. At least one concept from each principle that is applicable to the challenge under evaluation should be chosen.
Once the concepts are selected per inventive principle, it is essential to conduct an 'integrated reading' of the contradictions indicated in Table V. If this 'integrated reading' can demonstrate a coherent logical thread for each selected contradiction and as a whole, then it can be considered that there is a potential innovation solution.
To complete the definition of the specific solution, it is necessary to review the relevant inventive principles from Table II that were not included in the Recommended Solution in Table V, which are presented above.
For more details on the selected contradictions, you can review the complete descriptions of the inventive principles by contradiction, as shown in Table IX.
In the Starting Manual, Fundamentals of Aatrizinventor, Point 11, an example is provided for developing the Specific Solution based on the Recommended Solution by the Aatrizinventor algorithm, based on the 'Language of Nature Innovation.' The identification of a specific solution is a systematic and iterative process involving multiple concepts, aiming to determine a comprehensive solution with minimal implementation costs and maximum benefit-to-cost ratio.
It's important noting that an asterisk (*) has been added to the name of the object under evaluation to remind that the descriptions of the inventive principles may consider that ORANGUTAN LEADER can be in its current physical and functional state, or in a modified state, or even in a new state, as needed to achieve the desired objective. Please, make the most of your relational thinking skills.

**Summary description of the Inventive Principles included in the Recommended Solution shown above, applicable to the challenge under evaluation for the defined space and time:**

**N°1 Improve: (-) 1. Heaviness of moving object and Attenuate or Preserve: (-) 29. Fulfillment of desired outcome**

**IP.28. Mechanics Substitution - strategic type** (1)

**a.** Replace a direct or manual action in, or for, ORANGUTAN LEADER*, with a mechanical action or a tool.
**b.** Replace a mechanical means in, or for, ORANGUTAN LEADER*, with sensory (optical, acoustic, vibration, taste, smell, feelings or other sensory fields) means.
**c.** Use mechanical, pneumatic, hydraulic, electric, magnetic, and electromagnetic, chemical, biological, psychological or other fields gto improve action of ORANGUTAN LEADER*.
**d.** Change from static fields in, or for, ORANGUTAN LEADER* to moving fields, from unstructured fields to those with structure, or vice versa.
**e.** Use fields in conjunction with field-activated parts, components, or particles (e.g., magnetic field and ferromagnetic particles) in, or for, ORANGUTAN LEADER*.

**IP.35. Transformation / Parameter Changes - strategic type** (2)

**a.** Change ORANGUTAN LEADER*'s physical or chemical state (e.g., in shape, in composition, to a gas, liquid, solid or plasma).
**b.** Change the composition or condition of ORANGUTAN LEADER* by adding or removing components.
**c.** Change the concentration or consistency; change the degree of flexibility; change the temperature or the level of internal activity of ORANGUTAN LEADER*.

**IP.26. Copying/ Replicating - strategic type** (3)
**a.** Instead of using ORANGUTAN LEADER*, or any of its unavailable, expensive, fragile parts or properties, use simpler and inexpensive copies or replicates to perform the desired function and, if possible, do so with improved characteristics and properties, while disregarding the harmful, undesirable, or unnecessary ones.
**b.** Imitate ORANGUTAN LEADER*, or any of its parts or properties, leveraging the relevant available environment.
**c.** If simple copies, or replicates are already being used, apply copies, or replicates of a higher level or technical
**IP.18. Mechanical Vibrations/ Energy Variations - tactical type** (4)
**a.** Move ORANGUTAN LEADER* by cycles with energies that activate it.
**b.** Cause ORANGUTAN LEADER* to oscillate or vibrate. Increase its frequency (even up to the ultrasonic). Use the resonant frequency of ORANGUTAN LEADER*. If necessary, decrease frequency.
**c.** Use vibration-generating fields in, or for, ORANGUTAN LEADER* instead of mechanical vibration generators. Combine sources of oscillations.
**d.** Apply alternation of ORANGUTAN LEADER* or its parts or functions.

**N°2 Improve: (-) 1. Heaviness of moving object and Attenuate or Preserve: (-) 12. Shape / composition / configuration**
**IP.10. Preliminary Action - strategic type** (5)
**a.** Perform the required change in, or for, ORANGUTAN LEADER*, before it is needed (either fully or partially).
**b.** Pre-arrange ORANGUTAN LEADER* and other objects, if necessary, in such a way that they can come into action from the most convenient place and without losing time for their delivery.
**IP.14. Spheroidality - Curvature - Angle - tactical type** (6)
**a.** For the interaction between ORANGUTAN LEADER* and Object S2, instead of using rectilinear parts, surfaces, or shapes, use curvilinear, enveloping, or angled parts.
**b.** For the interaction between ORANGUTAN LEADER* and Object S2, instead of acting in a linear or direct way, interact in an indirect way or with curvilinear, surrounding, or angled movements.
**c.** Move ORANGUTAN LEADER* from flat to spherical surfaces; from parts shaped as a cube (parallelepiped) to ball-shaped structures. **d.** Use rolls, balls, spirals, domes in, or for, ORANGUTAN LEADER*.
**e.** Go from linear to rotary motion, use centrifugal forces in, or for, ORANGUTAN LEADER*.
f. If there is Spheroidality , curvature or angle, increase or reduce, as applicable, in, or for, ORANGUTAN LEADER*.
**IP.35. Transformation / Parameter Changes - strategic type** (7)
**a.** Change ORANGUTAN LEADER*'s physical or chemical state (e.g., in shape, in composition, to a gas, liquid, solid or plasma).
**b.** Change the composition or condition of ORANGUTAN LEADER* by adding or removing components.
**c.** Change the concentration or consistency; change the degree of flexibility; change the temperature or the level of internal activity of ORANGUTAN LEADER*.
**IP.40. Composite Materials/ Conditions - operative type** (8)
**a.** Change from a uniform material, property, state, or condition in, or for, ORANGUTAN LEADER* , to a composite one, or vice versa.

**N°3 Improve: (-) 26. Quantity of substance / Capacity gains and Attenuate or Preserve: (-) 29. Fulfillment of desired outcome**

**IP.33. Homogeneity / Compatibility - operative type** (9)

**a.** Make ORANGUTAN LEADER* or any of its parts interact with another given object of the same material or function (material or function with identical or compatible properties).

**IP.30. Simple Shapes/ Ways to Interact - tactical type** (10)

**a.** Use flexible rods and ropes, or similar one-dimensional functionality, or shells and thin films, or similar two-dimensional functionality, for ORANGUTAN LEADER*, instead of complex three-dimensional structures, in type and number of components and shapes.

**b.** Separate/isolate ORANGUTAN LEADER* from the external environment with simple shapes, using flexible rods and ropes, or similar one-dimensional, or shells and thin films, or similar two-dimensional.

**c.** Use in or for ORANGUTAN LEADER* simple forms or ways of interacting with object S2, predominantly in one or two dimensions, with other dimensions reduced to a minimum. This is in order to reduce the number of resources and actions necessary to achieve the desired objective.

**N°4 Improve: (-) 12. Shape / composition / configuration and Attenuate or Preserve: (-) 29. Fulfillment of desired outcome**

**IP.32. Perception/ Appearance/ Color Changes - strategic type** (11)

**a.** Change how is perceived, the appearance or shape of ORANGUTAN LEADER* in relation to the object S2 with which it interacts.

**b.** Change the color, or appearance, of ORANGUTAN LEADER* or its external environment.

**c.** Change the transparency of ORANGUTAN LEADER* or its external environment.

**IP.30. Simple Shapes/ Ways to Interact - tactical type** (12)

**a.** Use flexible rods and ropes, or similar one-dimensional functionality, or shells and thin films, or similar two-dimensional functionality, for ORANGUTAN LEADER*, instead of complex three-dimensional structures, in type and number of components and shapes.

**b.** Separate/isolate ORANGUTAN LEADER* from the external environment with simple shapes, using flexible rods and ropes, or similar one-dimensional, or shells and thin films, or similar two-dimensional.

**c.** Use in or for ORANGUTAN LEADER* simple forms or ways of interacting with object S2, predominantly in one or two dimensions, with other dimensions reduced to a minimum. This is in order to reduce the number of resources and actions necessary to achieve the desired objective.

**IP.40. Composite Materials/ Conditions - operative type** (13)

**a.** Change from a uniform material, property, state, or condition in, or for, ORANGUTAN LEADER* , to a composite one, or vice versa.

**N°5 Improve: (-) 1. Heaviness of moving object and Attenuate or Preserve: (-) 26. Quantity of substance / Capacity gains**

**IP.3. Local Quality - strategic type** (14)

**a.** Improve quality in a localized way, for parts, components, or conditions of ORANGUTAN LEADER*.

**b.** Change the structure, action, or procedure of ORANGUTAN LEADER* from uniform to non-uniform, or vice versa.

**c.** Change the external environment (or external influence) of ORANGUTAN LEADER* from uniform to non-uniform, or vice versa.

**d.** Make each part of ORANGUTAN LEADER* function in the conditions that are most suitablx for its operation.

**e.** Make each part of ORANGUTAN LEADER* fulfill a different and useful function.

**IP.26. Copying/ Replicating - strategic type** (15)

**a.** Instead of using ORANGUTAN LEADER*, or any of its unavailable, expensive, fragile parts or properties, use simpler and inexpensive copies or replicates to perform the desired function and, if possible, do so with improved characteristics and properties, while disregarding the harmful, undesirable, or unnecessary ones.

**b.** Imitate ORANGUTAN LEADER*, or any of its parts or properties, leveraging the relevant available environment.

**c.** If simple copies, or replicates are already being used, apply copies, or replicates of a higher level or technical

**IP.18. Mechanical Vibrations/ Energy Variations - tactical type** (16)

**a.** Move ORANGUTAN LEADER* by cycles with energies that activate it.

**b.** Cause ORANGUTAN LEADER* to oscillate or vibrate. Increase its frequency (even up to the ultrasonic). Use the resonant frequency of ORANGUTAN LEADER*. If necessary, decrease frequency.

**c.** Use vibration-generating fields in, or for, ORANGUTAN LEADER* instead of mechanical vibration generators. Combine sources of oscillations.

**d.** Apply alternation of ORANGUTAN LEADER* or its parts or functions.

**IP.31. Using/ Removing Unused Parts - operative type** (17)

**a.** Take advantage of unused parts of ORANGUTAN LEADER*.

**b.** Remove or do not use unnecessary parts of ORANGUTAN LEADER*.

**N°6 Improve: 13. Stability and Preserve: 39. Productivity**

**IP.23. Feedback - operative type** (18)

**a.** To interact with ORANGUTAN LEADER*, introduce feedback (referring to cross-checking) to improve a process or action.

**b.** If feedback with ORANGUTAN LEADER*, is already being used, change its magnitude or influence.

**IP.35. Transformation / Parameter Changes - strategic type** (19)

**a.** Change ORANGUTAN LEADER*'s physical or chemical state (e.g., in shape, in composition, to a gas, liquid, solid or plasma).

**b.** Change the composition or condition of ORANGUTAN LEADER* by adding or removing components.

**c.** Change the concentration or consistency; change the degree of flexibility; change the temperature or the level of internal activity of ORANGUTAN LEADER*.

**IP.40. Composite Materials/ Conditions - operative type** (20)

**a.** Change from a uniform material, property, state, or condition in, or for, ORANGUTAN LEADER* , to a composite one, or vice versa.

**IP.3. Local Quality - strategic type** (21)

**a.** Improve quality in a localized way, for parts, components, or conditions of ORANGUTAN LEADER*.

**b.** Change the structure, action, or procedure of ORANGUTAN LEADER* from uniform to non-uniform, or vice versa.

**c.** Change the external environment (or external influence) of ORANGUTAN LEADER* from uniform to non-uniform, or vice versa.

**d.** Make each part of ORANGUTAN LEADER* function in the conditions that are most suitablx for its operation.

**e.** Make each part of ORANGUTAN LEADER* fulfill a different and useful function.

**N°7 Improve: 13. Stability and Preserve: 15. Duration of action of moving object**

**IP.13. Reverse or Indirect Action - strategic type** (22)

**a.** Inverse the applied action or apply an indirect action to perform the current function of ORANGUTAN LEADER* to interact with object S2 It should be identified how ORANGUTAN LEADER* currently performs an action with Object S2 and from there evaluate an inverse or indirect action.

**b.** Make moving parts of ORANGUTAN LEADER* (or the external environment) fixed, and fixed parts moving.

**c.** Turn ORANGUTAN LEADER* (or process) 'upside down', 'change the position', 'change the condition'.

**IP.27. Cheap Short-Living Objects - strategic type** (23)

**a.** Replace or divide (either fully or partially) ORANGUTAN LEADER* or its action with multiple inexpensive or short-living objects, actions, or sub-parts, which compress or simplify its characteristics and properties, and/or are limited but sufficient to achieve the desired objective.

**b.** Compress certain qualities of ORANGUTAN LEADER* (e.g., the degree of participation, complexity, or lifetime), with no loss of functionality, to achieve the desired objective.

**IP.10. Preliminary Action - strategic type** (24)

**a.** Perform the required change in, or for, ORANGUTAN LEADER*, before it is needed (either fully or partially).

**b.** Pre-arrange ORANGUTAN LEADER* and other objects, if necessary, in such a way that they can come into action from the most convenient place and without losing time for their delivery.

**IP.35. Transformation / Parameter Changes - strategic type** (25)

**a.** Change ORANGUTAN LEADER*'s physical or chemical state (e.g., in shape, in composition, to a gas, liquid, solid or plasma).

**b.** Change the composition or condition of ORANGUTAN LEADER* by adding or removing components.

**c.** Change the concentration or consistency; change the degree of flexibility; change the temperature or the level of internal activity of ORANGUTAN LEADER*.

**N°8 Improve: 13. Stability and Preserve: 35. Adaptability or versatility**

**IP.35. Transformation / Parameter Changes - strategic type** (26)

**a.** Change ORANGUTAN LEADER*'s physical or chemical state (e.g., in shape, in composition, to a gas, liquid, solid or plasma).

**b.** Change the composition or condition of ORANGUTAN LEADER* by adding or removing components.

**c.** Change the concentration or consistency; change the degree of flexibility; change the temperature or the level of internal activity of ORANGUTAN LEADER*.

**IP.30. Simple Shapes/ Ways to Interact - tactical type** (27)

**a.** Use flexible rods and ropes, or similar one-dimensional functionality, or shells and thin films, or similar two-dimensional functionality, for ORANGUTAN LEADER*, instead of complex three-dimensional structures, in type and number of components and shapes.

**b.** Separate/isolate ORANGUTAN LEADER* from the external environment with simple shapes, using flexible rods and ropes, or similar one-dimensional, or shells and thin films, or similar two-dimensional.

**c.** Use in or for ORANGUTAN LEADER* simple forms or ways of interacting with object S2, predominantly in one or two dimensions, with other dimensions reduced to a minimum. This is in order to reduce the number of resources and actions necessary to achieve the desired objective.

**IP.34. Discarding and Recovering - tactical type** (28)

**a.** Make portions of ORANGUTAN LEADER*, which have fulfilled their functions or are unnecessary, go away (discard by absorption, dissolving, evaporating, et**c.**).

**b.** Conversely, restore consumable parts of ORANGUTAN LEADER* directly in operation.
**IP.2. Taking out/ Adding - strategic type** (29)
**a.** Separate an interfering part or a property from ORANGUTAN LEADER*, or single out the only necessary part (or property) of ORANGUTAN LEADER*. **b.** Add new parts or properties to ORANGUTAN LEADER*.

**Relevant inventive principles from Table II not included in Recommended Solution**
**IP.15. Dynamics (Pos.(6) - strategic type** (30)
**a.** Allow (or design) the characteristics of ORANGUTAN LEADER*, external environment, or process to change to an optimal, or to find an optimal, operating condition.
**b.** Divide ORANGUTAN LEADER* into parts that are capable of relative movement between each other.
**c.** If ORANGUTAN LEADER* (or process) is rigid or inflexible, make it flexible or adaptive.
**d.** To enhance the dynamics of ORANGUTAN LEADER* or the process, use feature(s) or object(s) available in the nearby environment.
**IP.1. Segmenting/ Integrating (Pos.(8) - strategic type** (31)
**a.** Divide ORANGUTAN LEADER* into existing and/or new parts, shapes, phases, states, or conditions.
**b.** Integrate different existing or new parts, forms, phases, states or conditions of ORANGUTAN LEADER* in a single entity.
**c.** Make ORANGUTAN LEADER* easy to disassemble or assemble.
**d.** Increase or reduce the degree of fragmentation or segmentation of ORANGUTAN LEADER*.
**IP.22. Convert harm in benefit (Pos.(9) - strategic type** (32)
**a.** Use harmful factors, or external effects related to harmful factors, for OBJECT S1 (particularly, effects of the environment or surroundings) to achieve a positive effect with ORANGUTAN LEADER*.
**b.** Eliminate a harmful primary action by adding another action to ORANGUTAN LEADER*, which counteracts the harmful action to solve the problem.
**c.** Amplify a harmful factor or a part of ORANGUTAN LEADER*, to such a degree that it is no longer harmful.

**TABLE VI. RESULTS OF SENSITIVITY ANALYSIS FOR THE EVALUATED OBJECT ORANGUTAN LEADER**
CHALLENGE: Improve Leadership skills of orangutan leader affected by difficulty in communicating orders and dangers to the pack

**Coverage obtained for the current evaluation to compare with sensitivity analysis**

| Order | Par.1 | Par.2 | Par.3 | Par.4 | Par.5 | Cob. NS (%) | Cob. EC (%) | Cob. GL (%) |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 12 | 26 | 29 | 13. Stability | 87.6 | 100 | 90.7 |

Table VI presents the 10 most favorable parameter combinations recommended by the Aatrizinventor algorithm. It is suggested to evaluate the 2 or 3 most relevant ones. Practice teaches that they often contain the best solution for the evaluated challenge.

(E) Combination of TRIZ innovation parameters evaluated in this Aatrizinventor Solution is prioritized here

(U) Combination of TRIZ innovation parameters shows a match only in the evaluated undesirable effects.

**A. PRIORITISED CONTRADICTIONS BY GLOBAL COVERAGE (Cob.GL)**

Par.5 is automatically selected

| Order | Par.1 | Par.2 | Par.3 | Par.4 | Par.5 | Cob. NS (%) | Cob. EC (%) | Cob. GL (%) |
|---|---|---|---|---|---|---|---|---|
| I.a | 1 | 12 | 26 | 29 | 13. Stability **(E)** | 87.6 | 100 | 90.7 |
| II.a | 1 | 12 | 26 | 29 | 39. Productivity **(U)** | 85.62 | 100 | 89.21 |
| III.a | 1 | 26 | 29 | 0 | 39. Productivity | 84.41 | 100 | 88.31 |
| IV.a | 1 | 26 | 29 | 0 | 27. Reliability | 83.57 | 100 | 87.67 |
| V.a | 1 | 12 | 24 | 26 | 33. Ease of operation | 88.81 | 82.06 | 87.12 |

**B. PRIORITIZATION OF CONTRADICTIONS BY COVERAGE OF NEEDS TO SATISFY (Cob.NS)**

**Par.5 is automatically selected**

| Order | Par.1 | Par.2 | Par.3 | Par.4 | Par.5 | Cob. NS (%) | Cob. EC (%) | Cob. GL (%) | Table VI.A |
|---|---|---|---|---|---|---|---|---|---|
| I.b | 1 | 12 | 24 | 26 | 33. Ease of operation | 88.81 | 82.06 | 87.12 | V.a |
| II.b | 1 | 12 | 26 | 29 | 33. Ease of operation **(U)** | 87.61 | 44.73 | 76.89 | - |
| III.b | 1 | 12 | 26 | 29 | 13. Stability **(E)** | 87.6 | 100 | 90.7 | I.a |
| IV.b | 1 | 12 | 29 | 0 | 13. Stability | 86.71 | 34.79 | 73.73 | - |
| V.b | 1 | 12 | 24 | 29 | 13. Stability | 86.71 | 31.34 | 72.87 | - |

**TABLE VII ESSENTIAL CONTRADICTIONS MATRIX FOR NEEDS TO SATISFY (NS) FOR THE SAME UNDESIRABLE EFFECTS EVALUATED OF: ORANGUTAN LEADER**

CHALLENGE: Improve Leadership skills of orangutan leader affected by difficulty in communicating orders and dangers to the pack

Evaluated need to satisfy in this report: **13. Stability**

UDEs: (-) 1. Heaviness of moving object// (-) 12. Shape / composition / configuration// (-) 26. Quantity of substance / Capacity gains// (-) 29. Fulfillment of desired outcome

This table allows the Innovation Team to compare the coverages obtained for the evaluated need to satisfy with those of the other defined needs, for the same undesirable effects. This way, they can decide whether to choose any of the suggested innovation parameter combinations here that offer better coverage.

| Need to Satisfy | Parameter to improve | Parameter to attenuate or preserve | Contradict. Essential | Cob. NS (%) | Cob. between EC (%) | Cob. GL (%) 3/1 |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| **13. Stability** | (-) 1. Heaviness of moving object | (-) 29. Fulfillment of desired outcome | [28,35,26,18] | 87.6 | 100 | 90.7 |
| 39. Productivity | (-) 1. Heaviness of moving object | (-) 29. Fulfillment of desired outcome | [28,35,26,18] | 85.62 | 100 | 89.21 |
| 33. Ease of operation | (-) 26. Quantity of substance / Capacity gains | (+) 33. Ease of operation | [35,29,25,10] | 87.61 | 44.73 | 76.89 |
| 38. Extent of automation/ autonomy | (+) 38. Extent of automation/ autonomy | (-) 1. Heaviness of moving object | [28,26,18,35] | 59.31 | 100 | 69.49 |
| 27. Reliability | (+) 27. Reliability | (-) 1. Heaviness of moving object | [3,8,10,40] | 84.93 | 19.1 | 68.47 |
| 32. Ease of achieving desired outcome | (-) 26. Quantity of substance / Capacity gains | (+) 32. Ease of achieving desired outcome | [29,1,35,27] | 71.56 | 47.09 | 65.44 |
| 15. Duration of action of moving object | (-) 26. Quantity of substance / Capacity gains | (+) 15. Duration of action of moving object | [3,35,10,40] | 70.96 | 40.28 | 63.29 |
| 35. Adaptability or versatility | (+) 35. Adaptability or versatility | (-) 1. Heaviness of moving object | [1,6,15,8] | 75.56 | 18.9 | 61.39 |
| 34. Ease of change, repair or maintain | (-) 26. Quantity of substance / Capacity gains | (+) 34. Ease of change, repair or maintain | [2,32,10,25] | 72.76 | 18.59 | 59.22 |
| 19. Use of energy by moving object | (-) 1. Heaviness of moving object | (+) 19. Use of energy by moving object | [35,12,34,31] | 53.39 | 12.4 | 43.14 |

Table VII shows the essential contradictions obtained for each of the defined Needs to Satisfy, taking into account the same undesirable effects that have been evaluated. This table is based on the calculation of a global coverage (Cob.GL), which is determined by combining two values: the coverage from Table IV (Cob.NS) already explained, and a relative coverage (Cob. between EC) that is obtained in this table VII, when each other comparing the essential contradictions identified for the 10 parameters of Needs to Satisfy.

This global coverage (GL) is based on expert weighting criteria to prioritize the solutions for the different Needs to Satisfy. Experience with aatrizinventor indicates that the most effective solutions are those with higher global coverage, preferably exceeding 90%, if possible.

**The Innovation Team may decide if it is appropriate to carry out a new evaluation with another Need to Satisfy, selected from the results provided in Table VII. This decision will be primarily made when the**

**evaluated Need to Satisfy is not ranked in the first position of Table VII. In this table, the position of the evaluated Need to Satisfy is highlighted:** 13. Stability.

**TABLE VIII. ORDER OF INCIDENCE OF INVENTIVE PRINCIPLES (POS.n)**

CHALLENGE: Improve Leadership skills of orangutan leader affected by difficulty in communicating orders and dangers to the pack

Participation analysis of inventive principles in TABLE II SPECIFIC CONTRADICTION MATRIX.

Evaluated parameters for Object ORANGUTAN LEADER:

Par. UDEs:

(-) 1. Heaviness of moving object

(-) 12. Shape / composition / configuration

(-) 26. Quantity of substance / Capacity gains

(-) 29. Fulfillment of desired outcome

Par. NS: (+) 13. Stability

***: Inventive Principles from the Specific Contradiction Matrix (Table II) not described in the Recommend Solution (Table IX). It is recommended to perform an additional review following the order of position.

| Inventive principles of Table II | IP type | Tables | Contradictions |
|---|---|---|---|
| IP.32. Perception/ Appearance/ Color Changes (Pos.1) | IP. Str. | II / III / IV | [Par.29][Par.1][ IP(s) : 28,32,13,18] - [Par.29][Par.12][ IP(s) : 32,30,40,0] - [Par.29][Par.26][ IP(s) : 32,30,0,0] - [Par.13][Par.26][ IP(s) : 15,32,35,0] - [Par.12][Par.29][ IP(s) : 32,30,40,0] - |
| IP.35. Transformation / Parameter Changes (Pos.2) | IP. Str. | II / III / IV | [Par.26][Par.1][ IP(s) : 35,6,18,31] - [Par.13][Par.1][ IP(s) : 21,35,2,39] - [Par.1][Par.12][ IP(s) : 10,14,35,40] - [Par.26][Par.12][ IP(s) : 35,14,0,0] - [Par.13][Par.26][ IP(s) : 15,32,35,0] - [Par.1][Par.29][ IP(s) : 28,35,26,18] - [Par.1][Par.13][ IP(s) : 1,35,19,39] - |
| IP.30. Simple Shapes/ Ways to Interact (Pos.3) | IP. Tac. | II / III / IV | [Par.29][Par.12][ IP(s) : 32,30,40,0] - [Par.29][Par.26][ IP(s) : 32,30,0,0] - [Par.12][Par.29][ IP(s) : 32,30,40,0] - [Par.26][Par.29][ IP(s) : 33,30,0,0] - [Par.29][Par.13][ IP(s) : 30,18,0,0] - |
| IP.33. Homogeneity / Compatibility (Pos.4) | **IP. Oper.** | II / III / | [Par.26][Par.29][ IP(s) : 33,30,0,0] - [Par.12][Par.13][ IP(s) : 33,1,18,4] - |
| IP.28. Mechanics Substitution (Pos.5) | IP. Str. | II / III / | [Par.29][Par.1][ IP(s) : 28,32,13,18] - [Par.1][Par.29][ IP(s) : 28,35,26,18] - |
| IP.15. Dynamics (Pos.6) *** | IP. Str. | II / | [Par.13][Par.26][ IP(s) : 15,32,35,0] - [Par.26][Par.13][ IP(s) : 15,2,17,40] - |

| | | | |
|---|---|---|---|
| IP.18. Mechanical Vibrations/ Energy Variations (Pos.7) | IP. Tac. | II / III / | [Par.26][Par.1][ IP(s) : 35,6,18,31] - [Par.29][Par.1][ IP(s) : 28,32,13,18] - [Par.13][Par.12][ IP(s) : 22,1,18,4] - [Par.1][Par.26][ IP(s) : 3,26,18,31] - [Par.1][Par.29][ IP(s) : 28,35,26,18] - [Par.13][Par.29][ IP(s) : 18,0,0,0] - [Par.12][Par.13][ IP(s) : 33,1,18,4] - [Par.29][Par.13][ IP(s) : 30,18,0,0] - |
| IP.1. Segmenting/ Integrating (Pos.8) *** | IP. Str. | II / IV | [Par.13][Par.12][ IP(s) : 22,1,18,4] - [Par.1][Par.13][ IP(s) : 1,35,19,39] - [Par.12][Par.13][ IP(s) : 33,1,18,4] - |
| IP.22. Convert harm in benefit (Pos.9) *** | IP. Str. | II / | [Par.13][Par.12][ IP(s) : 22,1,18,4] - [Par.12][Par.26][ IP(s) : 36,22,0,0] - |
| IP.10. Preliminary Action (Pos.10) | IP. Str. | II / III / IV | [Par.12][Par.1][ IP(s) : 8,10,29,40] - [Par.1][Par.12][ IP(s) : 10,14,35,40] - |
| IP.36. Phase, State or Condition Transitions (Pos.11) *** | **IP. Oper.** | II / | [Par.12][Par.26][ IP(s) : 36,22,0,0] - |
| IP.21. Skipping/ Avoiding (Pos.12) *** | IP. Tac. | II / | [Par.13][Par.1][ IP(s) : 21,35,2,39] - |
| IP.8. Anti-Weight/ Compensation (Pos.13) *** | IP. Tac. | II / IV | [Par.12][Par.1][ IP(s) : 8,10,29,40] - |
| IP.3. Local Quality (Pos.14) | IP. Str. | II / III / IV | [Par.1][Par.26][ IP(s) : 3,26,18,31] - |
| IP.14. Spheroidality - Curvature - Angle (Pos.15) | IP. Tac. | II / III / | [Par.1][Par.12][ IP(s) : 10,14,35,40] - [Par.26][Par.12][ IP(s) : 35,14,0,0] - |
| IP.26. Copying/ Replicating (Pos.16) | IP. Str. | II / III / | [Par.1][Par.26][ IP(s) : 3,26,18,31] - [Par.1][Par.29][ IP(s) : 28,35,26,18] - |
| IP.2. Taking out/ Adding (Pos.17) | IP. Str. | II / IV | [Par.13][Par.1][ IP(s) : 21,35,2,39] - [Par.26][Par.13][ IP(s) : 15,2,17,40] - |
| IP.6. Universality (Pos.18) *** | IP. Tac. | II / | [Par.26][Par.1][ IP(s) : 35,6,18,31] - |
| IP.40. Composite Materials/ Conditions (Pos.19) | **IP. Oper.** | II / III / IV | [Par.12][Par.1][ IP(s) : 8,10,29,40] - [Par.1][Par.12][ IP(s) : 10,14,35,40] - [Par.29][Par.12][ IP(s) : 32,30,40,0] - [Par.12][Par.29][ IP(s) : 32,30,40,0] - [Par.26][Par.13][ IP(s) : 15,2,17,40] - |
| IP.29. Controllable Soft Variables (Pos.20) *** | IP. Tac. | II / | [Par.12][Par.1][ IP(s) : 8,10,29,40] - |

| | | | |
|---|---|---|---|
| IP.19. Time-Varying Action/ Periodic or Pulsating (Pos.21) *** | IP. Str. | II / IV | [Par.1][Par.13][ IP(s) : 1,35,19,39] - |
| IP.17. Another Dimension or Field (Pos.22) *** | IP. Tac. | II / | [Par.26][Par.13][ IP(s) : 15,2,17,40] - |
| IP.13. Reverse or Indirect Action (Pos.23) | IP. Str. | II / IV | [Par.29][Par.1][ IP(s) : 28,32,13,18] - |
| IP.39. Inert Atmosphere / Environment (Pos.24) *** | **IP. Oper.** | II / | [Par.13][Par.1][ IP(s) : 21,35,2,39] - [Par.1][Par.13][ IP(s) : 1,35,19,39] - |
| IP.31. Using/ Removing Unused Parts (Pos.25) | **IP. Oper.** | II / III / | [Par.26][Par.1][ IP(s) : 35,6,18,31] - [Par.1][Par.26][ IP(s) : 3,26,18,31] - |
| IP.4. Asymmetry/ Symmetry (Pos.26) *** | **IP. Oper.** | II / | [Par.13][Par.12][ IP(s) : 22,1,18,4] - [Par.12][Par.13][ IP(s) : 33,1,18,4] - |

**TABLE IX. RECOMMENDED SOLUTION ACCORDING TO THE MOST RELEVANT CONTRADICTIONS IDENTIFIED FOR THE EVALUATED OBJECT: ORANGUTAN LEADER**

CHALLENGE: Improve Leadership skills of orangutan leader affected by difficulty in communicating orders and dangers to the pack

This table displays the relevant contradictions identified by the algorithm, which are crucial for determining the direction and scope of the solution to the innovation challenge under evaluation. The specific solution will be obtained by applying the updated inventive principles detailed below.

It is essential to bear in mind that we are evaluating ORANGUTAN LEADER when it interacts with PACK and there is an affected function: Leadership skills of orangutan leader affected by difficulty in communicating orders and dangers to the pack, in a specific space and time. ORANGUTAN LEADER may require changes in space, time, its physical composition, or its functional characteristic, as well as partial or total replacement with another object or other recommended changes. To emphasize this concept, we mark ORANGUTAN LEADER with an asterisk. Do not read the name of the evaluated object literally; associate it with a possible solution for ORANGUTAN LEADER*.

Each inventive principle described here may contain more than one innovation concept recommended by TRIZ, identified as a, b, c, ..., not all of which are applicable to a specific case under evaluation. The Innovation Team must select those innovation concepts that best relate to the evaluated innovation challenge, based on their own knowledge and the analysis of relational thinking that they must carry out.

Additionally, technological research may be necessary for its solution, as the specific solution

recommended by the inventive principles described here likely already exists somewhere in the world. The interpretation of the inventive principles, to apply them specifically to the evaluated case, is a recursive process that generally ranges from strategic to tactical and operational levels. We recommend completing the reading of the inventive principles described below to envision a possible solution and then rereading the principles to reinforce the coherence of the emerging solution. As a result of the finally determined innovation solution, there will be a change in ORANGUTAN LEADER, in a new context guided by the inventive principles, probably not previously imagined.

The Language of Nature's Innovation provides speed and focus for guided and systematic innovation thinking for individuals. The foundation for innovation is a profound understanding of the current situation.

**IX.A BASE SOLUTION FOR INNOVATION CHALLENGE FOR THE EVALUATED OBJECT ORANGUTAN LEADER NEED TO SATISFY: 13. Stability**
Strategic inventive principles: Str. IP
Tactical inventive principles: Tac. IP
Operative inventive principles: Oper. IP
Pos.n : Order of importance n of an inventive principle included in Table II.

**ESSENTIAL CONTRADICTION**
**Contradiction order wt.1**

**Parameter to improve: (-) 1. Heaviness of moving object**
TO IMPROVE (UDE): ORANGUTAN LEADER has Less Heaviness, value, cost, or restriction, whether physical or figurative interacting with S2
**Parameter to attenuate or preserve: (-) 29. Fulfillment of desired outcome**
TO ATTENUATE OR PRESERVE (UDE): ORANGUTAN LEADER has Less Achievement of desired outcome interacting with S2
**Inventive principles IP(s) : [28,35,26,18]**
**28. Mechanics Substitution, Str. IP (Pos.5):**
**a.** Replace a direct or manual action in, or for, ORANGUTAN LEADER*, with a mechanical action or a tool.
**b.** Replace a mechanical means in, or for, ORANGUTAN LEADER*, with sensory (optical, acoustic, vibration, taste, smell, feelings or other sensory fields) means.
**c.** Use mechanical, pneumatic, hydraulic, electric, magnetic, and electromagnetic, chemical, biological, psychological or other fields to improve action of ORANGUTAN LEADER*.
**d.** Change from static fields in, or for, ORANGUTAN LEADER* to moving fields, from unstructured fields to those with structure, or vice versa.
**e.** Use fields in conjunction with field-activated parts, components, or particles (e.g., magnetic field and ferromagnetic particles) in, or for, ORANGUTAN LEADER*.
Separation principle for ORANGUTAN LEADER* : Separation by condition
Solution strategy for ORANGUTAN LEADER* : Improving attributes
**35. Transformation/ Parameter Changes, Str. IP (Pos.2):**
**a.** Change ORANGUTAN LEADER*'s physical or chemical state (e.g., in shape, in composition, to a gas, liquid, solid or plasma).

**b.** Change the composition or condition of ORANGUTAN LEADER* by adding or removing components.
**c.** Change the concentration or consistency; change the degree of flexibility; change the temperature or the level of internal activity of ORANGUTAN LEADER*.
Separation principle for ORANGUTAN LEADER* : Separation by condition / Separation alternative
Solution strategy for ORANGUTAN LEADER* : Improving attributes; Improving 7 quality factors (Quality, Reliability, Maintainability, Supportability, Human Factors, Safety, Security)
**26. Copying/ Replicating, Str. IP (Pos.16):**
**a.** Instead of using ORANGUTAN LEADER*, or any of its unavailable, expensive, fragile parts or properties, use simpler and inexpensive copies or replicates to perform the desired function and, if possible, do so with improved characteristics and properties, while disregarding the harmful, undesirable, or unnecessary ones.
**b.** Imitate or replicate ORANGUTAN LEADER*, or any of its parts or properties, leveraging the relevant available environment.
**c.** If simple copies, or replicates are already being used, apply copies, or replicates of a higher level or technical complexity.
Separation principle for ORANGUTAN LEADER* : Separation in space
Solution strategy for ORANGUTAN LEADER* : Improving if a solution has not yet emerged
**18. Mechanical Vibrations/ Energy Variations, Tac. IP (Pos.7):**
**a.** Move ORANGUTAN LEADER* by cycles with energies that activate it
**b.** Cause ORANGUTAN LEADER* to oscillate or vibrate. Increase its frequency (even up to the ultrasonic). Use the resonant frequency of ORANGUTAN LEADER*. If necessary, decrease frequency.
**c.** Use vibration-generating fields in, or for, ORANGUTAN LEADER* instead of mechanical vibration generators. Combine sources of oscillations (e.g., ultrasonic, and electromagnetic).
**d.** Apply alternation of ORANGUTAN LEADER* or its functions.
Separation principle for ORANGUTAN LEADER* : Separation in time
Solution strategy for ORANGUTAN LEADER* : Improving 7 quality factors (Quality, Reliability, Maintainability, Supportability, Human Factors, Safety, Security)

**COMPLEMENTARY CONTRADICTION 1**
**Contradiction order wt.5**

**Parameter to improve: (-) 1. Heaviness of moving object**
TO IMPROVE (UDE): ORANGUTAN LEADER has Less Heaviness, value, cost, or restriction, whether physical or figurative interacting with S2
**Parameter to attenuate or preserve: (-) 12. Shape / composition / configuration**
TO ATTENUATE OR PRESERVE (UDE): ORANGUTAN LEADER has Less Appropriate shape, composition, or configuration interacting with S2
**Inventive principles IP(s) : [10,14,35,40]**
**10. Preliminary Action, Str. IP (Pos.10):**
**a.** Perform the required change in, or for, ORANGUTAN LEADER*, before it is needed (either fully or partially).
**b.** Pre-arrange ORANGUTAN LEADER* and other objects, if necessary, in such a way that they can come into action from the most convenient place and without losing time for their delivery.
Separation principle for ORANGUTAN LEADER* : Separation in time
Solution strategy for ORANGUTAN LEADER* : Improving attributes; Improving performance

**14. Spheroidality – Curvature - Angle, Tac. IP (Pos.15):**
**a.** For the interaction between ORANGUTAN LEADER* and S2 Object, instead of using rectilinear parts, surfaces, or shapes, use curvilinear, enveloping, or angled parts.
**b.** For the interaction between ORANGUTAN LEADER* and S2 Object, instead of acting in a linear or direct way, interact in an indirect way or with curvilinear, surrounding, or angled movements.
**c.** Move ORANGUTAN LEADER* from flat to spherical surfaces; from parts shaped as a cube (parallelepiped) to ball-shaped structures.
**d.** Use rolls, balls, spirals, domes in, or for, ORANGUTAN LEADER*.
**e.** Go from linear to rotary motion, use centrifugal forces in, or for, ORANGUTAN LEADER*.
**f.** If there is Spheroidality , curvature or angle, increase or reduce, as applicable, in, or for, ORANGUTAN LEADER*.
Separation principle for ORANGUTAN LEADER* : Separation alternative
Solution strategy for ORANGUTAN LEADER* : Improving attributes; Improving if a solution has not yet emerged
**35. Transformation/ Parameter Changes, Str. IP (Pos.2):**
**a.** Change ORANGUTAN LEADER*'s physical or chemical state (e.g., in shape, in composition, to a gas, liquid, solid or plasma).
**b.** Change the composition or condition of ORANGUTAN LEADER* by adding or removing components.
**c.** Change the concentration or consistency; change the degree of flexibility; change the temperature or the level of internal activity of ORANGUTAN LEADER*.
Separation principle for ORANGUTAN LEADER* : Separation by condition / Separation alternative
Solution strategy for ORANGUTAN LEADER* : Improving attributes; Improving 7 quality factors (Quality, Reliability, Maintainability, Supportability, Human Factors, Safety, Security)
**40. Composite Materials/ Conditions, Oper. IP (Pos.19):**
**a.** Change from a uniform material, property, state, or condition in, or for, ORANGUTAN LEADER* , to a composite one, or vice versa.
Separation principle for ORANGUTAN LEADER* : Separation by condition
Solution strategy for ORANGUTAN LEADER* : Improving attributes

**COMPLEMENTARY CONTRADICTION 2**
**Contradiction order wt.6**

**Parameter to improve: (-) 26. Quantity of substance / Capacity gains**
TO IMPROVE (UDE): ORANGUTAN LEADER has Less Quantity of substance delivered or produced per control unit interacting with S2
**Parameter to attenuate or preserve: (-) 29. Fulfillment of desired outcome**
TO ATTENUATE OR PRESERVE (UDE): ORANGUTAN LEADER has Less Achievement of desired outcome interacting with S2
**Inventive principles IP(s) : [33,30,0,0]**
**33. Homogeneity/ Compatibility, Oper. IP (Pos.4):**
**a.** Make ORANGUTAN LEADER* or any of its parts interact with another given object of the same material or function (material or function with identical or compatible properties).
Separation principle for ORANGUTAN LEADER* : Integration in supersystem
Solution strategy for ORANGUTAN LEADER* : Improving if a solution has not yet emerged
**30. Simple Shapes/ Ways to Interact, Tac. IP (Pos.3):**

**a.** Use flexible rods and ropes, or another option with similar one-dimensional functionality, or shells and thin films, or another option with similar two-dimensional functionality, for ORANGUTAN LEADER*, instead of complex three-dimensional structures, in type and number of components and shapes.
**b.** Separate/isolate ORANGUTAN LEADER* from the external environment with simple shapes, using flexible rods and ropes, or another option with similar one-dimensional functionality, or shells and thin films, or another option with similar two-dimensional functionality.
**c.** Instead of using complex forms or methods with ORANGUTAN LEADER* to interact with S2 Object, one should use simpler ways or methods, employing flexible objects or means, either physical or conceptual, operating predominantly in one or two dimensions, with other dimensions to the minimum. This is in order to reduce the number of resources and actions necessary to achieve the desired objective.
Separation principle for ORANGUTAN LEADER* : Separation in space
Solution strategy for ORANGUTAN LEADER* : Improving attributes

**COMPLEMENTARY CONTRADICTION 3**
**Contradiction order wt.7**

**Parameter to improve: (-) 12. Shape / composition / configuration**
TO IMPROVE (UDE): ORANGUTAN LEADER has Less Appropriate shape, composition, or configuration interacting with S2
**Parameter to attenuate or preserve: (-) 29. Fulfillment of desired outcome**
TO ATTENUATE OR PRESERVE (UDE): ORANGUTAN LEADER has Less Achievement of desired outcome interacting with S2
**Inventive principles IP(s) : [32,30,40,0]**
**32. Perception/ Appearance/ Color Changes, Str. IP (Pos.1):**
**a.** Change how is perceived, the appearance or shape of ORANGUTAN LEADER* in relation to the object (S2) with which it interacts.
**b.** Change the color, or appearance, of ORANGUTAN LEADER* or its external environment.
**c.** Change the transparency of ORANGUTAN LEADER* or its external environment.
Separation principle for ORANGUTAN LEADER* : Separation by condition
Solution strategy for ORANGUTAN LEADER* : Improving if a solution has not yet emerged
**30. Simple Shapes/ Ways to Interact, Tac. IP (Pos.3):**
**a.** Use flexible rods and ropes, or another option with similar one-dimensional functionality, or shells and thin films, or another option with similar two-dimensional functionality, for ORANGUTAN LEADER*, instead of complex three-dimensional structures, in type and number of components and shapes.
**b.** Separate/isolate ORANGUTAN LEADER* from the external environment with simple shapes, using flexible rods and ropes, or another option with similar one-dimensional functionality, or shells and thin films, or another option with similar two-dimensional functionality.
**c.** Instead of using complex forms or methods with ORANGUTAN LEADER* to interact with S2 Object, one should use simpler ways or methods, employing flexible objects or means, either physical or conceptual, operating predominantly in one or two dimensions, with other dimensions to the minimum. This is in order to reduce the number of resources and actions necessary to achieve the desired objective.
Separation principle for ORANGUTAN LEADER* : Separation in space
Solution strategy for ORANGUTAN LEADER* : Improving attributes
**40. Composite Materials/ Conditions, Oper. IP (Pos.19):**
**a.** Change from a uniform material, property, state, or condition in, or for, ORANGUTAN LEADER* , to a

composite one, or vice versa.
Separation principle for ORANGUTAN LEADER* : Separation by condition
Solution strategy for ORANGUTAN LEADER* : Improving attributes

**COMPLEMENTARY CONTRADICTION 4**
**Contradiction order wt.16**

**Parameter to improve: (-) 1. Heaviness of moving object**
TO IMPROVE (UDE): ORANGUTAN LEADER has Less Heaviness, value, cost, or restriction, whether physical or figurative interacting with S2
**Parameter to attenuate or preserve: (-) 26. Quantity of substance / Capacity gains**
TO ATTENUATE OR PRESERVE (UDE): ORANGUTAN LEADER has Less Quantity of substance delivered or produced per control unit interacting with S2
**Inventive principles IP(s) : [3,26,18,31]**
**3. Local quality, Str. IP (Pos.14):**
**a.** Improve quality in a localized way, for parts, components, or conditions of ORANGUTAN LEADER*.
**b.** Change the structure, action, or procedure of ORANGUTAN LEADER* from uniform to non-uniform, or vice versa.
**c.** Change the external environment (or external influence) of ORANGUTAN LEADER* from uniform to non-uniform, or vice versa.
**d.** Make each part of ORANGUTAN LEADER* function in the conditions that are most suitablx for its operation.
**e.** Make each part of ORANGUTAN LEADER* fulfill a different and useful function.
Separation principle for ORANGUTAN LEADER* : Separation in space
Solution strategy for ORANGUTAN LEADER* : Improving attributes; Improving performance; Improving 7 quality factors (Quality, Reliability, Maintainability, Supportability, Human Factors, Safety, Security); Improving if a solution has not yet emerged
**26. Copying/ Replicating, Str. IP (Pos.16):**
**a.** Instead of using ORANGUTAN LEADER*, or any of its unavailable, expensive, fragile parts or properties, use simpler and inexpensive copies or replicates to perform the desired function and, if possible, do so with improved characteristics and properties, while disregarding the harmful, undesirable, or unnecessary ones.
**b.** Imitate or replicate ORANGUTAN LEADER*, or any of its parts or properties, leveraging the relevant available environment.
**c.** If simple copies, or replicates are already being used, apply copies, or replicates of a higher level or technical complexity.
Separation principle for ORANGUTAN LEADER* : Separation in space
Solution strategy for ORANGUTAN LEADER* : Improving if a solution has not yet emerged
**18. Mechanical Vibrations/ Energy Variations, Tac. IP (Pos.7):**
**a.** Move ORANGUTAN LEADER* by cycles with energies that activate it
**b.** Cause ORANGUTAN LEADER* to oscillate or vibrate. Increase its frequency (even up to the ultrasonic). Use the resonant frequency of ORANGUTAN LEADER*. If necessary, decrease frequency.
**c.** Use vibration-generating fields in, or for, ORANGUTAN LEADER* instead of mechanical vibration generators. Combine sources of oscillations (e.g., ultrasonic, and electromagnetic).
**d.** Apply alternation of ORANGUTAN LEADER* or its functions.

Separation principle for ORANGUTAN LEADER* : Separation in time
Solution strategy for ORANGUTAN LEADER* : Improving 7 quality factors (Quality, Reliability, Maintainability, Supportability, Human Factors, Safety, Security)

**31. Using/ Removing Unused Parts, Oper. IP (Pos.25):**

**a.** Take advantage of unused parts of ORANGUTAN LEADER*.

**b.** Remove or do not use unnecessary parts of ORANGUTAN LEADER*.

(e.g., make an object porous or add porous elements – inserts, coatings, etc. If an object is already porous, use the pores to introduce a useful substance or function).

Separation principle for ORANGUTAN LEADER* : Separation by condition
Solution strategy for ORANGUTAN LEADER* : Improving if a solution has not yet emerged

**IX.B SOLUTION TO MORE RELEVANT CONTRADICTIONS BETWEEN NEEDS TO SATISFY (Cob.NS)**

Included in each inventive principle described below is the incidence level or position number it occupies in Table II. If it is not shown, it means that it only appears in Table IV. and requires attention.

**CONTRADICTION BETWEEN NEEDS TO SATISFY N°** 1

**Parameter to improve 13. Stability**

IMPROVE: ORANGUTAN LEADER tiene More Desired stability to interact with S2

**Parameter to preserve 39. Productivity**

PRESERVE: ORANGUTAN LEADER tiene más efecto deseable por párametro 39. Productivity

**Inventive principles IP(s) : [23,35,40,3]**

**23. Feedback, Oper. IP (Pos.):**

**a.** To interact with ORANGUTAN LEADER*, introduce feedback (referring to cross-checking) to improve a process or action.

**b.** If feedback with ORANGUTAN LEADER*, is already being used, change its magnitude or influence.

Separation principle for ORANGUTAN LEADER* : Integration in supersystem
Solution strategy for ORANGUTAN LEADER* : Improving performance

**35. Transformation/ Parameter Changes, Str. IP (Pos.2):**

**a.** Change ORANGUTAN LEADER*'s physical or chemical state (e.g., in shape, in composition, to a gas, liquid, solid or plasma).

**b.** Change the composition or condition of ORANGUTAN LEADER* by adding or removing components.

**c.** Change the concentration or consistency; change the degree of flexibility; change the temperature or the level of internal activity of ORANGUTAN LEADER*.

Separation principle for ORANGUTAN LEADER* : Separation by condition / Separation alternative
Solution strategy for ORANGUTAN LEADER* : Improving attributes; Improving 7 quality factors (Quality, Reliability, Maintainability, Supportability, Human Factors, Safety, Security)

**40. Composite Materials/ Conditions, Oper. IP (Pos.19):**

**a.** Change from a uniform material, property, state, or condition in, or for, ORANGUTAN LEADER* , to a composite one, or vice versa.

Separation principle for ORANGUTAN LEADER* : Separation by condition
Solution strategy for ORANGUTAN LEADER* : Improving attributes

**3. Local quality, Str. IP (Pos.14):**

**a.** Improve quality in a localized way, for parts, components, or conditions of ORANGUTAN LEADER*.

**b.** Change the structure, action, or procedure of ORANGUTAN LEADER* from uniform to non-uniform, or vice versa.

**c.** Change the external environment (or external influence) of ORANGUTAN LEADER* from uniform to

non-uniform, or vice versa.
**d.** Make each part of ORANGUTAN LEADER* function in the conditions that are most suitablx for its operation.
**e.** Make each part of ORANGUTAN LEADER* fulfill a different and useful function.
Separation principle for ORANGUTAN LEADER* : Separation in space
Solution strategy for ORANGUTAN LEADER* : Improving attributes; Improving performance; Improving 7 quality factors (Quality, Reliability, Maintainability, Supportability, Human Factors, Safety, Security); Improving if a solution has not yet emerged

**CONTRADICTION BETWEEN NEEDS TO SATISFY N°** 2
**Parameter to improve 13. Stability**
IMPROVE: ORANGUTAN LEADER tiene More Desired stability to interact with S2
**Parameter to preserve 15. Duration of action of moving object**
PRESERVE: ORANGUTAN LEADER tiene más efecto deseable por párametro 15. Duration of action of moving object
**Inventive principles IP(s) : [13,27,10,35]**
**13. Inverse or Indirect Action, Str. IP (Pos.23):**
**a.** Inverse the applied action or apply an indirect action to perform the current function of ORANGUTAN LEADER* to interact with object (S2)
It should be identified how ORANGUTAN LEADER* currently performs an action with S2 Object and from there evaluate an inverse or indirect action.
**b.** Make moving parts of ORANGUTAN LEADER* (or the external environment) fixed, and fixed parts moving.
**c.** Turn ORANGUTAN LEADER* (or process) “upside down”, “change the position”, “change the condition”.
Separation principle for ORANGUTAN LEADER* : Separation in space / Separation inverse
Solution strategy for ORANGUTAN LEADER* : Improving attributes; Improving performance; Improving 7 quality factors (Quality, Reliability, Maintainability, Supportability, Human Factors, Safety, Security); Improving if a solution has not yet emerged
**27. Cheap Short-Living Objects, Str. IP (Pos.):**
**a.** Replace or divide (either fully or partially) ORANGUTAN LEADER* or its action with multiple inexpensive or short-living objects, actions, or sub-parts, which compress or simplify its characteristics and properties, and/or are limited but sufficient to achieve the desired objective.
**b.** Comprising certain qualities of ORANGUTAN LEADER* (e.g., the degree of participation, complexity, or lifetime), with no loss of functionality, to achieve the desired objective.
Separation principle for ORANGUTAN LEADER* : Separation in subsystem
Solution strategy for ORANGUTAN LEADER* : Improving 7 quality factors (Quality, Reliability, Maintainability, Supportability, Human Factors, Safety, Security)
**10. Preliminary Action, Str. IP (Pos.10):**
**a.** Perform the required change in, or for, ORANGUTAN LEADER*, before it is needed (either fully or partially).
**b.** Pre-arrange ORANGUTAN LEADER* and other objects, if necessary, in such a way that they can come into action from the most convenient place and without losing time for their delivery.
Separation principle for ORANGUTAN LEADER* : Separation in time
Solution strategy for ORANGUTAN LEADER* : Improving attributes; Improving performance
**35. Transformation/ Parameter Changes, Str. IP (Pos.2):**

**a.** Change ORANGUTAN LEADER*'s physical or chemical state (e.g., in shape, in composition, to a gas, liquid, solid or plasma).
**b.** Change the composition or condition of ORANGUTAN LEADER* by adding or removing components.
**c.** Change the concentration or consistency; change the degree of flexibility; change the temperature or the level of internal activity of ORANGUTAN LEADER*.
Separation principle for ORANGUTAN LEADER* : Separation by condition / Separation alternative
Solution strategy for ORANGUTAN LEADER* : Improving attributes; Improving 7 quality factors (Quality, Reliability, Maintainability, Supportability, Human Factors, Safety, Security)

**CONTRADICTION BETWEEN NEEDS TO SATISFY N°** 3
**Parameter to improve 13. Stability**
IMPROVE: ORANGUTAN LEADER tiene More Desired stability to interact with S2
**Parameter to preserve 35. Adaptability or versatility**
PRESERVE: ORANGUTAN LEADER tiene más efecto deseable por párametro 35. Adaptability or versatility
**Inventive principles IP(s) : [35,30,34,2]**
**35. Transformation/ Parameter Changes, Str. IP (Pos.2):**
**a.** Change ORANGUTAN LEADER*'s physical or chemical state (e.g., in shape, in composition, to a gas, liquid, solid or plasma).
**b.** Change the composition or condition of ORANGUTAN LEADER* by adding or removing components.
**c.** Change the concentration or consistency; change the degree of flexibility; change the temperature or the level of internal activity of ORANGUTAN LEADER*.
Separation principle for ORANGUTAN LEADER* : Separation by condition / Separation alternative
Solution strategy for ORANGUTAN LEADER* : Improving attributes; Improving 7 quality factors (Quality, Reliability, Maintainability, Supportability, Human Factors, Safety, Security)
**30. Simple Shapes/ Ways to Interact, Tac. IP (Pos.3):**
**a.** Use flexible rods and ropes, or another option with similar one-dimensional functionality, or shells and thin films, or another option with similar two-dimensional functionality, for ORANGUTAN LEADER*, instead of complex three-dimensional structures, in type and number of components and shapes.
**b.** Separate/isolate ORANGUTAN LEADER* from the external environment with simple shapes, using flexible rods and ropes, or another option with similar one-dimensional functionality, or shells and thin films, or another option with similar two-dimensional functionality.
**c.** Instead of using complex forms or methods with ORANGUTAN LEADER* to interact with S2 Object, one should use simpler ways or methods, employing flexible objects or means, either physical or conceptual, operating predominantly in one or two dimensions, with other dimensions to the minimum. This is in order to reduce the number of resources and actions necessary to achieve the desired objective.
Separation principle for ORANGUTAN LEADER* : Separation in space
Solution strategy for ORANGUTAN LEADER* : Improving attributes
**34. Discarding and Recovering, Tac. IP (Pos.):**
**a.** Make portions of ORANGUTAN LEADER* , which have fulfilled their functions or are unnecessary, go away (discard by absorption, dissolving, evaporating, etc.).
**b.** Conversely, restore consumable parts of ORANGUTAN LEADER* directly in operation.
Separation principle for ORANGUTAN LEADER* : Separation in time
Solution strategy for ORANGUTAN LEADER* : Improving if a solution has not yet emerged
**2. Taking Out/ Adding, Str. IP (Pos.17):**

**a.** Separate an interfering part or a property from ORANGUTAN LEADER*, or single out the only necessary part (or property) of ORANGUTAN LEADER*.
**b.** Add new parts or properties to ORANGUTAN LEADER*.
Separation principle for ORANGUTAN LEADER* : Separation in space
Solution strategy for ORANGUTAN LEADER* : Improving attributes

**Anexo**
**List of applicable Inventive Principles for Innovation Solutions**

| | |
|---|---|
| IP.1. Segmenting/ Integrating | IP.21. Skipping/ Avoiding |
| IP.2. Taking out/ Adding | IP.22. Convert harm in benefit |
| IP.3. Local Quality | IP.23. Feedback |
| IP.4. Asymmetry/ Symmetry | IP.24. Intermediary |
| IP.5. Merging/ Separating | IP.25. Self-service |
| IP.6. Universality | IP.26. Copying/ Replicating |
| IP.7. Nesting/ Dispersing | IP.27. Cheap Short-Living Objects |
| IP.8. Anti-Weight/ Compensation | IP.28. Mechanics Substitution |
| IP.9. Preliminary Anti-action | IP.29. Controllable Soft Variables |
| IP.10. Preliminary Action | IP.30. Simple Shapes/ Ways to Interact |
| IP.11. Beforehand Cushioning | IP.31. 31.Using/ Removing Unused Parts |
| IP.12. Equipotentiality | IP.32. Perception/ Appearance/ Color Changes |
| IP.13. Reverse or Indirect Action | IP.33. Homogeneity / Compatibility |
| IP.14. Spheroidality - Curvature - Angle | IP.34. Discarding and Recovering |
| IP.15. Dynamics | P.35. Transformation / Parameter Changes |
| IP.16. Partial or Excessive Actions | IP.36. Phase, State or Condition Transitions |
| IP.17. Another Dimension or Field | IP.37. Useful Perceptible Change |
| IP.18. Mechanical Vibrations/ Energy Variations | IP.38. Strong or Quick Reactions |
| IP.19. Time-Varying Action/ Periodic or Pulsating | IP.39. Inert Atmosphere / Environment |
| IP.20. Continuity of Useful Action | IP.40. Composite Materials/ Conditions |

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