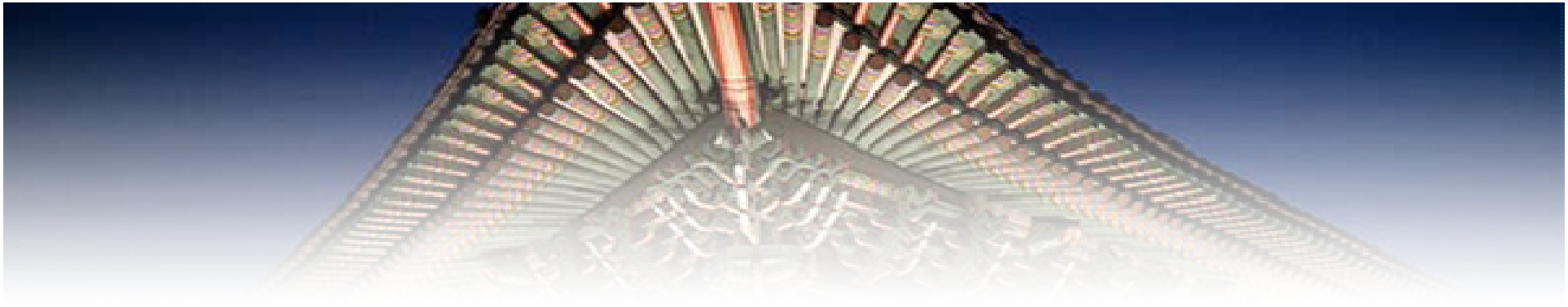

‘Occasion Axis’ to select the proper TRIZ thinking tools through investigation of the initial problem situation

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Background

- In many real cases, TRIZ idea generation tools like 40 Principles, Separation Principles and inventive standards cannot be applied directly to the initial problem situation because of complexity and obscurity of it.

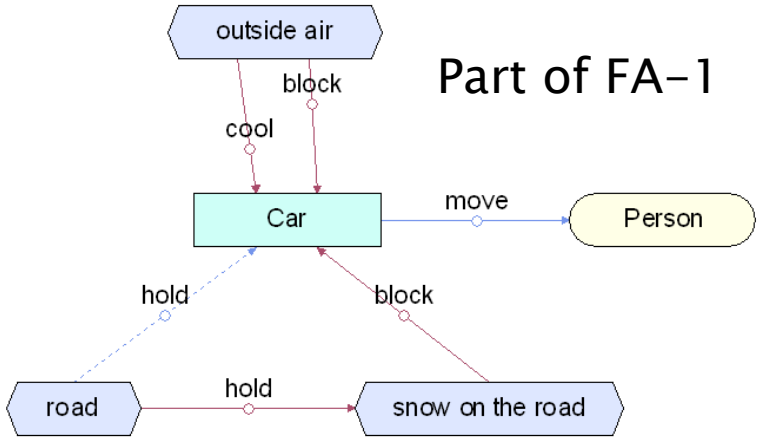
http://ko.wikipedia.org/wiki/%ED%8C%8C%EC%9D%BC:Laptop_innen.jpg

Background

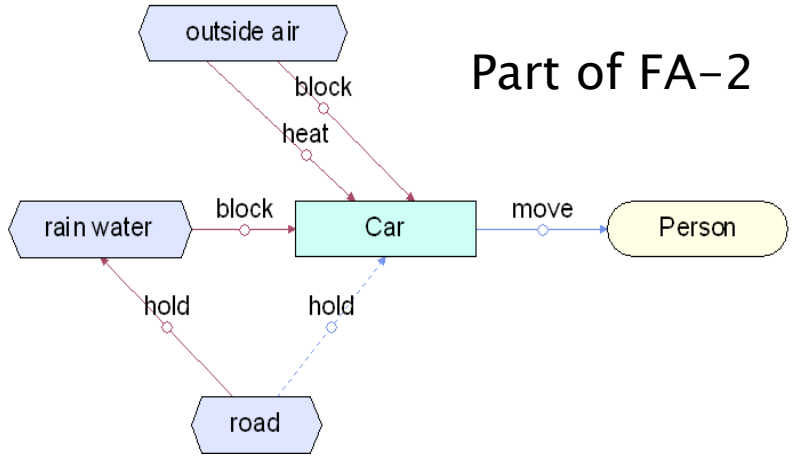
- Not only idea generation thinking tools of TRIZ but also analytic tools of modern TRIZ like Function Analysis, Root Cause Analysis, Feature Transfer, etc. are hardly used directly from perception of the initial situation. Additionally, we need to decide which TRIZ tool should be adopted for problem solving after investigation of the initial problem situation.

Background

Function Analysis requires a certain time viewpoint among several time options.



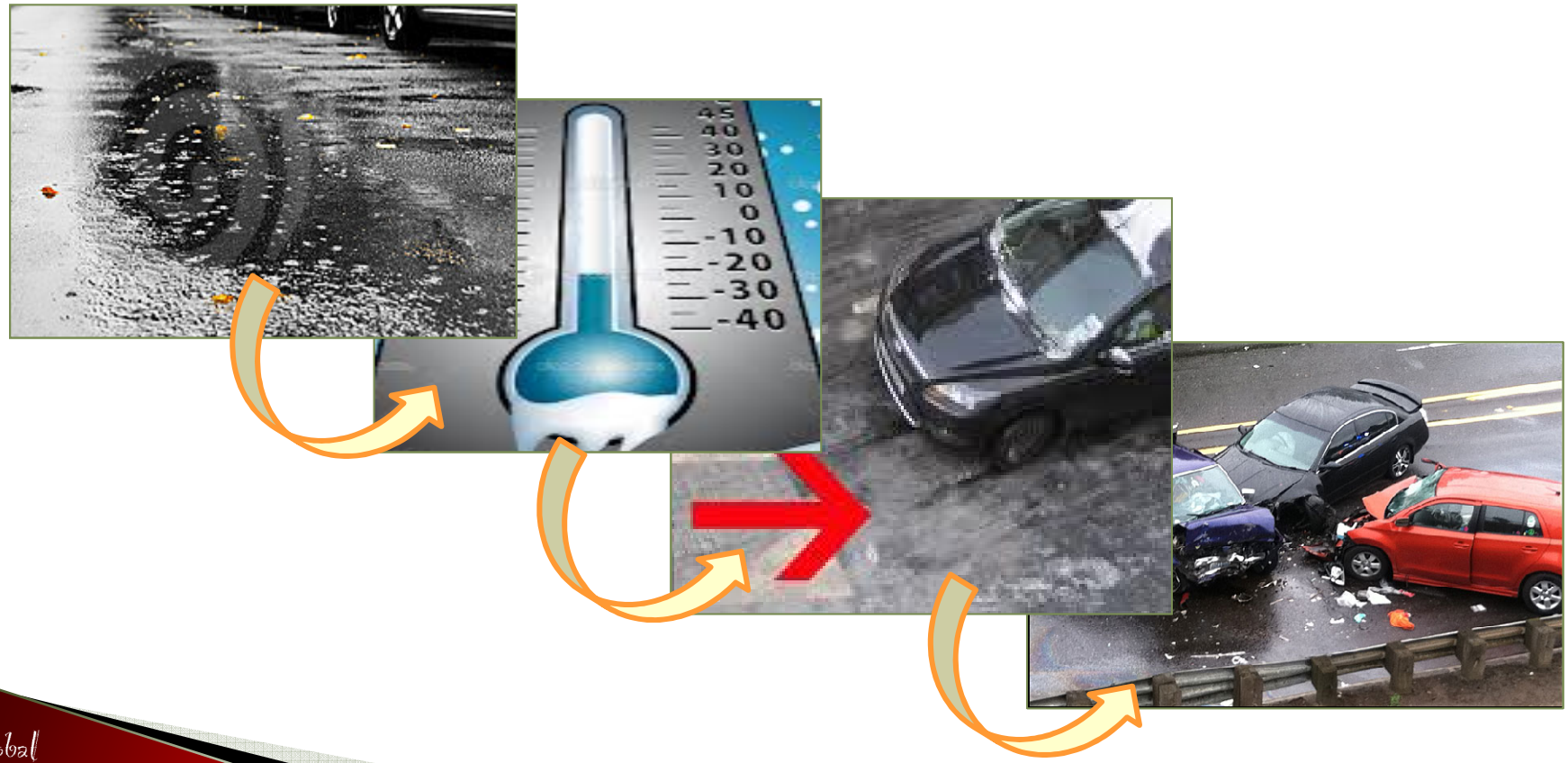
Part of FA-1



Part of FA-2

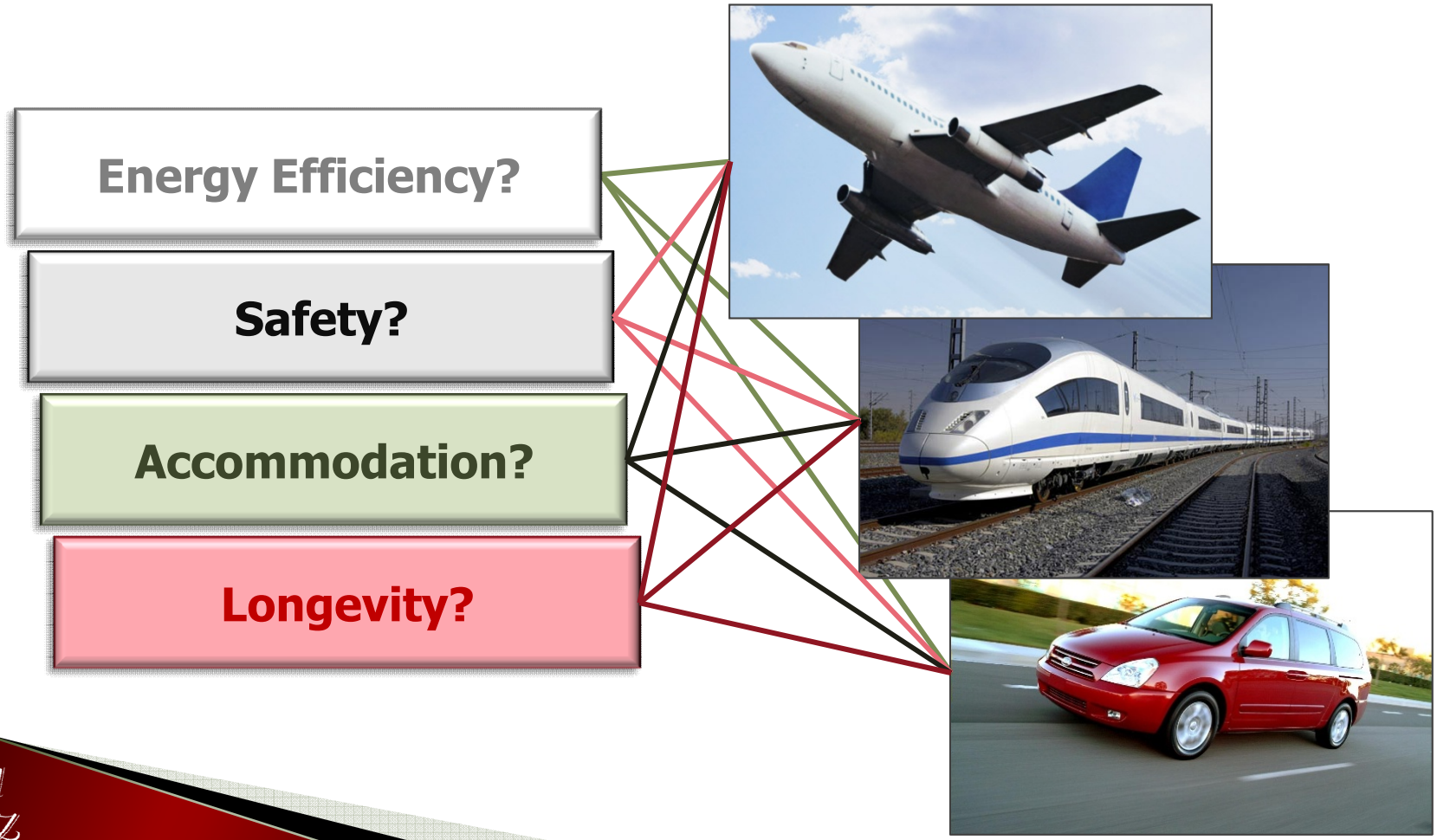
Background

Root Cause Analysis needs a previous research on a series of events along change of time and parametric condition.



Background

Feature Transfer is done based on the preliminary understanding of the overall operation diagnosis of the competing systems.

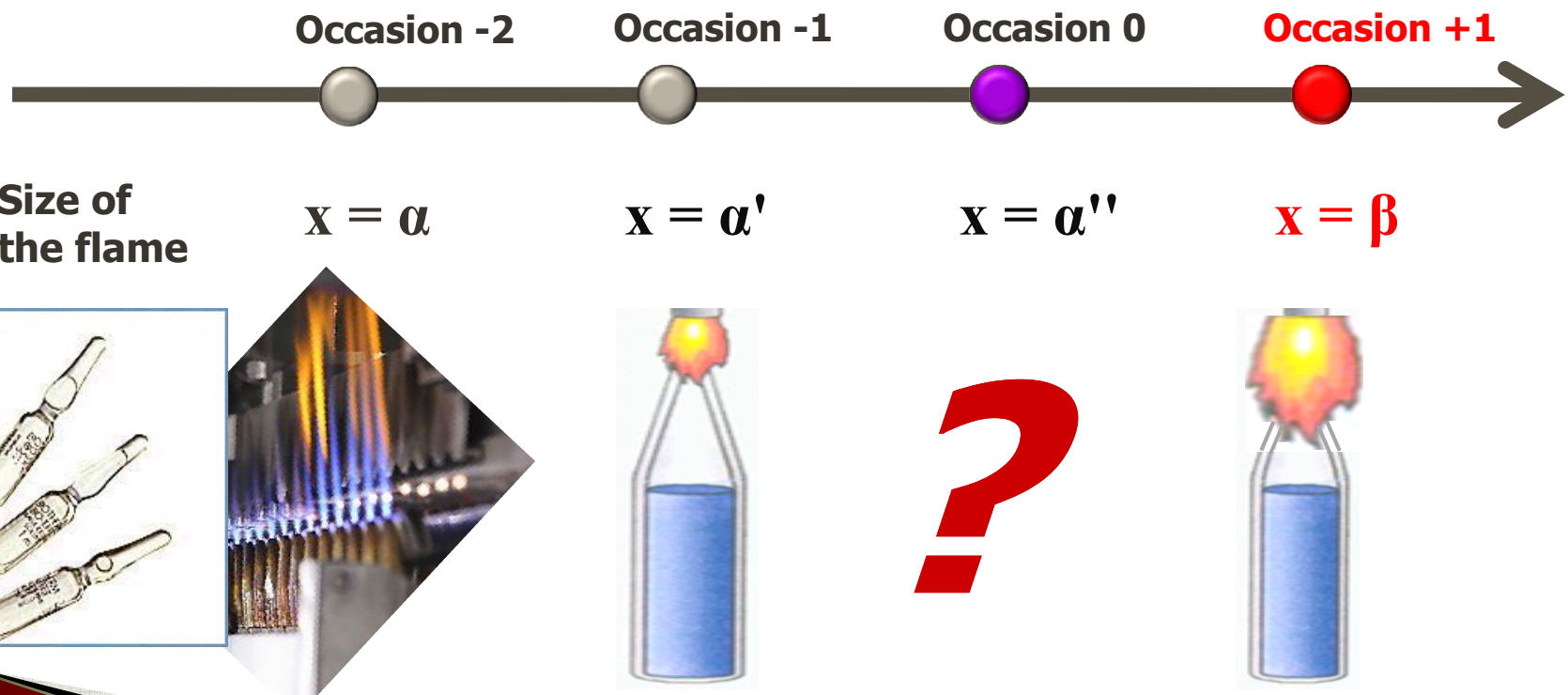


Occasion Axis

- 'Occasion Axis' is a novel analytic thinking tool
  to guide problem solvers to proper idea generation tools or analytic ones
  according to investigation of the initial problem situation.

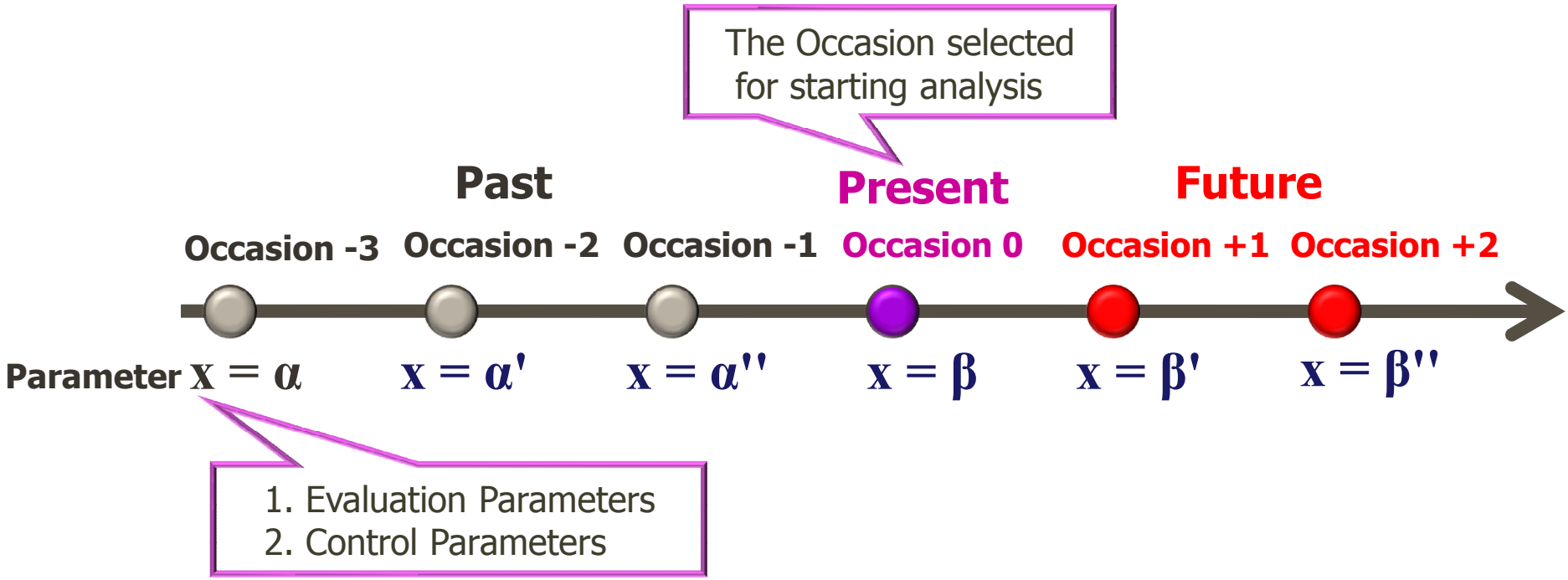
Main notions of 'Occasion Axis'

- 'Occasion Axis' is a thinking process in which we examine what happens under occasions based on certain parameters through the whole problem situation.



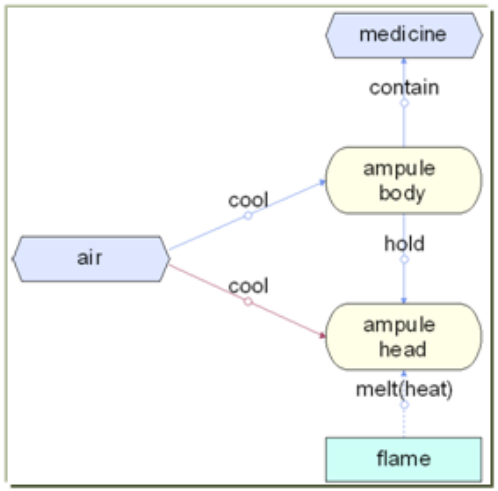
Main notions of 'Occasion Axis'

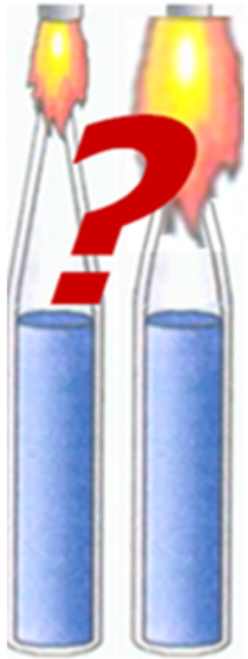
- According to evaluation parameters or control parameters, 'Occasion Axis' is deployed to analyze the initial problem situation

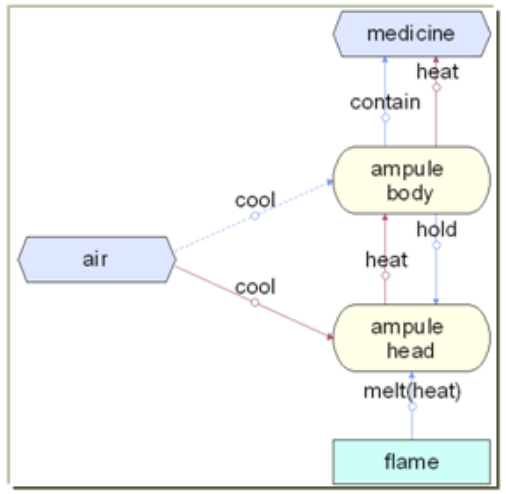


Main notions of 'Occasion Axis'

- At each 'Occasion', the problem situation is examined from the viewpoint of interactions and parameters.
- Interactions are evaluated according to the parameters of each 'Occasion' and then we get different diagnoses.

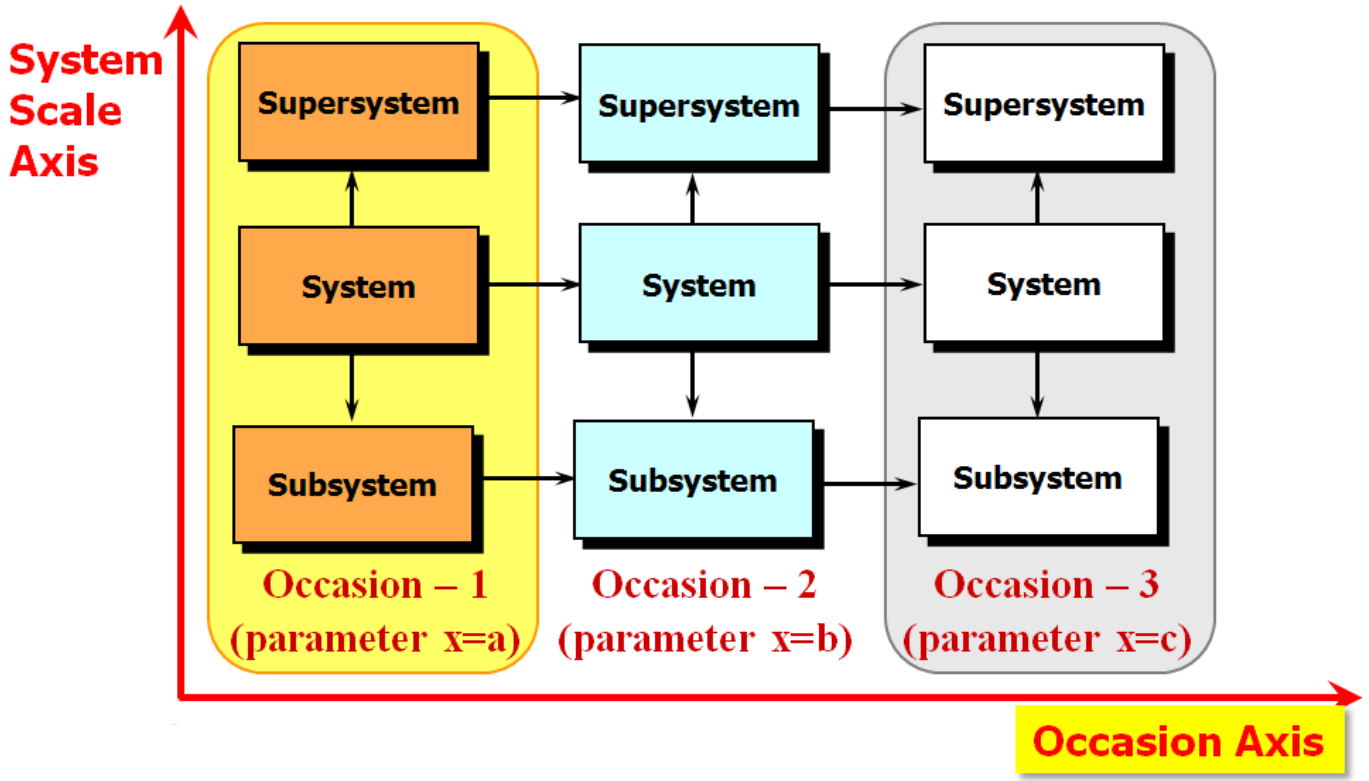




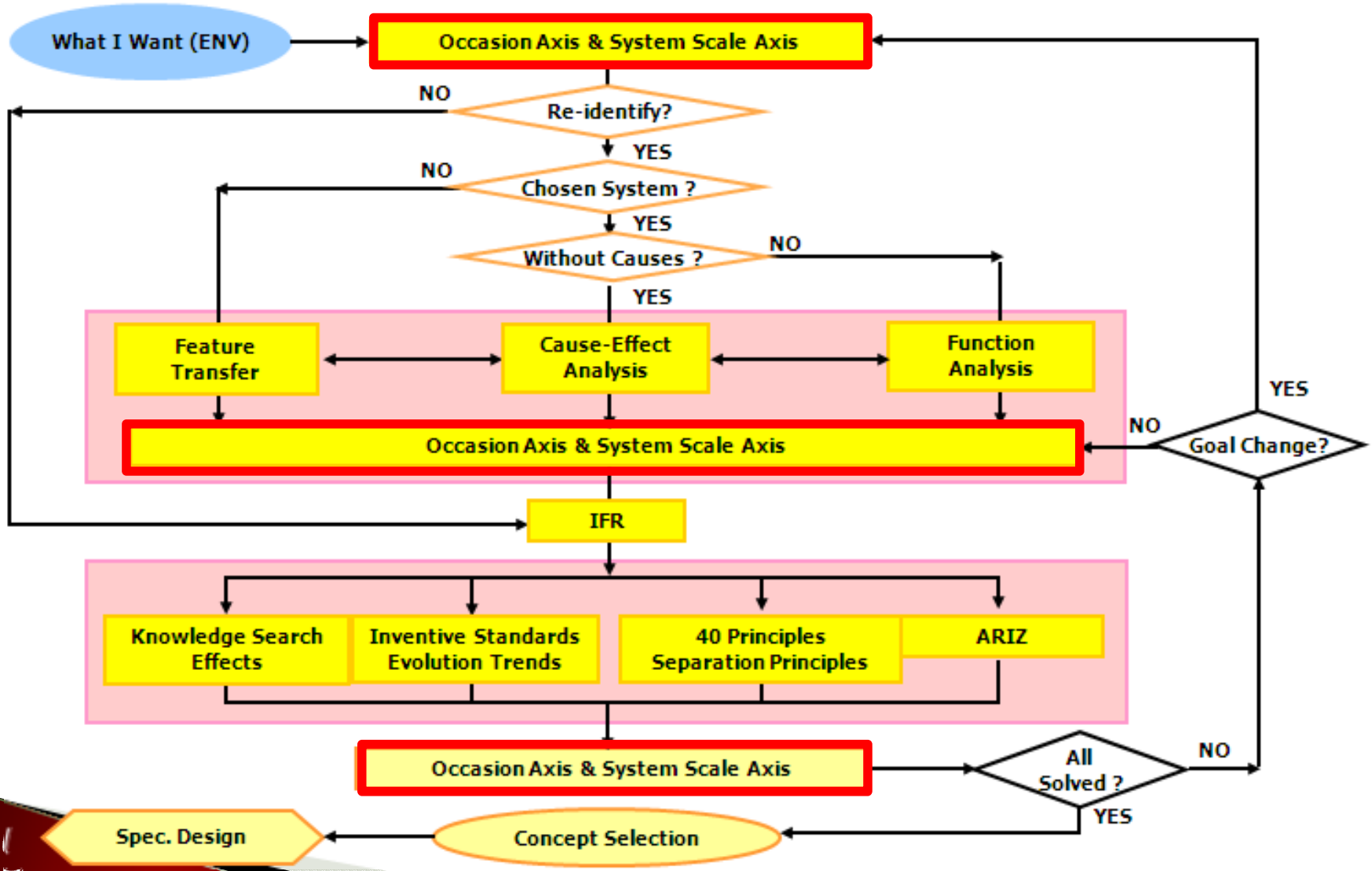


Application of 'Occasion Axis'

- 'Occasion Axis' can be used with any other TRIZ tools, especially with 'System Scale' as Multi Screen Thinking.
- 'Occasion Axis' might replace the classical 'Time Axis'[1]

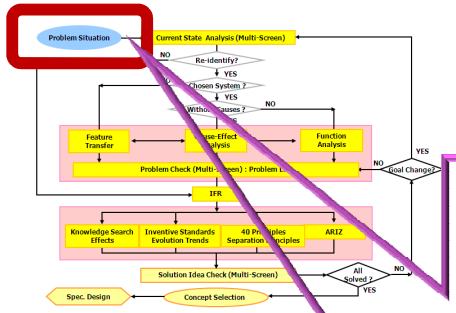


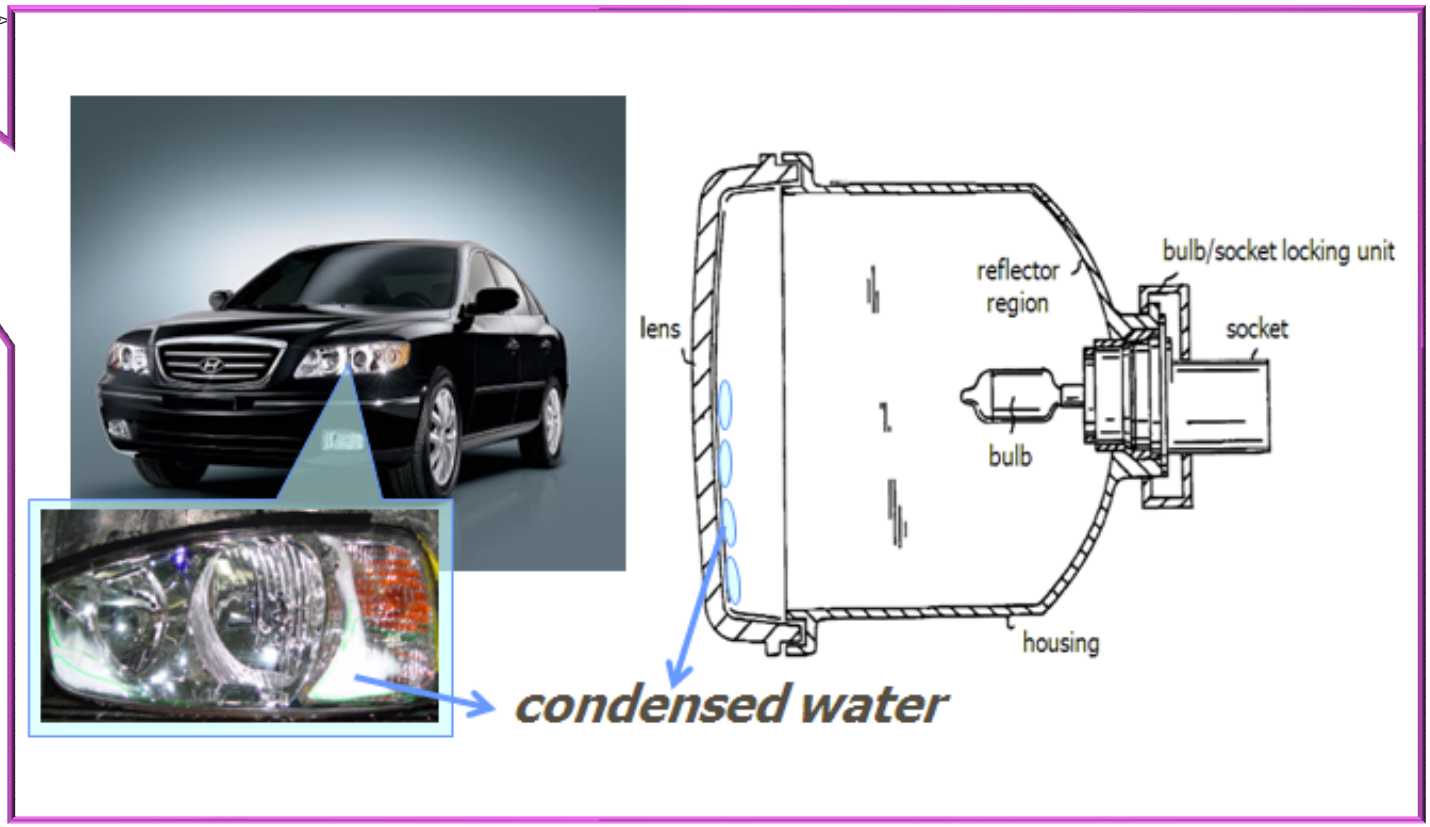
Application of 'Occasion Axis'



Application of 'Occasion Axis'

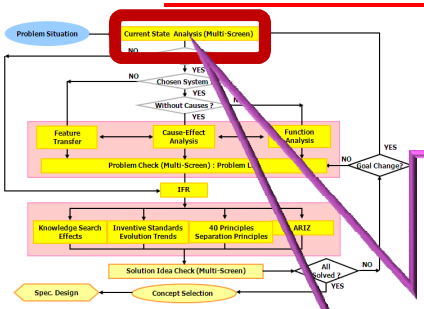
A Problem : Water condensation in a head light





Application of 'Occasion Axis'

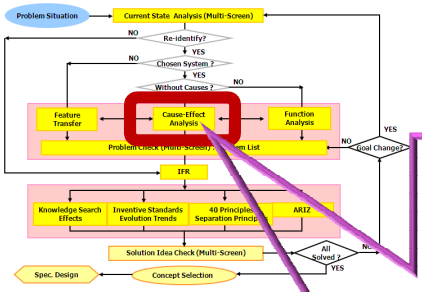
A Problem : Water condensation in a head light



	no moisture condensation	during moisture condensation	finding condensed water droplets
(Components of) Supersystem & Environment	air inside the lamp: temp. ↑ air outside the lamp : 40 ℃ humidity inside the lamp : ↓ humidity outside the lamp : 60% lamp power supply: on ambient light : normal light from the bulb	air inside the lamp: temp. ↓ air outside the lamp: 40 ℃ humidity inside the lamp : phase change condensed water inside the lamp:60% humidity outside the lamp lamp power supply: on ambient light: normal test cool water : : 15 ℃, during 5 min	air inside the lamp: about 25 ℃ air outside the lamp: < 20 ℃ humidity inside the lamp : ↓ condensed water inside the lamp: visible humidity outside the lamp:60% lamp power supply ambient light: refracted/scattered
System	*Vehicle Lamp*	*Vehicle Lamp*	*Vehicle Lamp*
Subsystems	lens reflector region bulb : ON during 30 min housing socket bulb/socket locking unit	Lens : contraction reflector region bulb : OFF housing: gap between other components socket bulb/socket locking unit	lens reflector region bulb : OFF housing socket bulb/socket locking unit

Application of 'Occasion Axis'

A Problem : Water condensation in a head light



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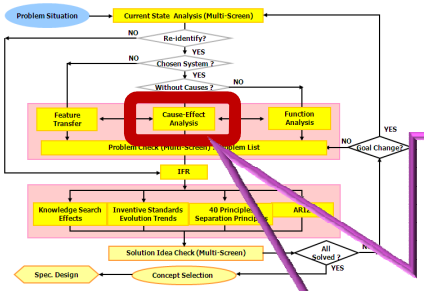
	Vehicle Lamp	*Vehicle Lamp*	*Vehicle Lamp*
Subsystems	lens refl bulb during 30 min housing socket bulb/socket locking unit	Lens : contraction reflector region bulb : OFF housing: gap between other components socket bulb/socket locking unit	lens reflector region bulb : OFF housing socket bulb/socket locking unit

Guide for Building Cause-Effect Chains

Application of 'Occasion Axis'

A Problem : Water condensation in a head light



Cause-Effect Analysis

- moisture droplets on lens of a lamp informs the driver
  - AND
    - Size of moisture droplet on lens > certain value
      - moisture droplets attract each other
        - AND
          - moisture droplets on lens
            - AND
              - Lens attracts moisture droplets
              - moisture changes it's phase
                - AND
                  - moisture concentration > X
                  - moisture temperature change
                    - Inside air cools moisture
                    - Lens cools moisture
                      - AND
                        - Lens' temperature < Tm
                        - Lens contacts moisture
                      - Lens cools inside air
                        - AND
                          - Lens' temperature < T air in
                          - Lens contacts moisture
          - High polarity of water molecules
    - ambient light : refracted/scattered
      - moisture droplets on lens refract/scatter ambient light
    - inside air temperature < Tm

Results and Discussion

- 'Occasion Axis' has been applied to real projects for problem solving of global companies like Samsung, Hyundai, POSCO, and Amore Pacific, etc. from 2005 [2-4]. Through 'Occasion Axis', the whole picture of the initial problem situation could be got systematically and the result of it gave problem solvers the directions of the following problem solving activities. 'Occasion Axis' can be integrated not only with TRIZ thinking tools but also with other problem solving tools.

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