

## UNAMBIGUOUS REQUIREMENT



Usually, an ambiguous character is associated with undefined acronym or potential interpretation problem raising from the vocabulary used or the sentence construction.

Beyond, one must understand that natural language is contextual by nature, what makes it pragmatically impossible to define “unambiguous” rule that would distinguish “ambiguity” from “non ambiguity”. We remain stuck in purely qualitative and instinctive approach that cannot be referred to as rules of general application, as testify the endless failures in the attempt to operationally reach that goal. In highly critical context, to overcome this pitfall, designers come to use pseudo-code.

Beyond this tricky, hardly readable formalism, this tendency is symptomatic of a most fundamental feature: the unique a-contextual and factual language that does exist are mathematics endowed with physical meaning. It is particularly meaningful that each time a requirement concerns classical energy-based physics, there is no problem whatsoever, since any observable “effects” may be regarded as the consequence of some physical events via some energy transfer, and all that may be formalized as an equation.

So, the challenge to generally meet this “unambiguous” character comes to set up a formal framework in which classical physics as mentioned, should be regarded as a specialization of a most global and fundamental formal (mathematized) construction.

Let’s observe that objectivation (unambiguous character) calls for a methodological framework rooted in the description of meaningful “traces”, located in space and time, such as they are captured and coded during the experiences. It is a condition for the “events” specified in a requirement be usable as reference to assess the conformance of the realized to the expectations and the repeatability of these experiences. The



validity of this reference is conditioned to the duly completion of the initial conditions and the operating mode, such as they are specified and may themselves be described. The physical “events” may be of any nature (classical physics observables, data in a buffer, HMI, ...) and the formalization of these “facts” must coincide with the data produced by devices used to measure.

Let's point at this stage that when “the human” is the measuring devices, “facts” may consist in spontaneous “qualitative” appreciations outside any metric representation space, but possibly guided by some qualification grid, scale... or the observation of the people used as “measuring device”. Individual occurrences of “facts” of this kind call are deprived of general meaning. Such a “fact” calls for a statistic convergence in the qualification to be granted an “objective” character (population/segmentation). This stresses the difference not in nature, but in the way of proceeding, between "technico-scientific" descriptions, in which a device that embodies scientific rules mediates the observation, and "bio-psyhic" descriptions, where Human is the measuring device. Technical qualifications do have an individual and general meaning associated with the standardized measuring unit, but they call too for statistical stability to be regarded as the general and valid qualification of some artifact, with the limit case (so common) of a unique experience if there is no doubt as to the repeatability and the stability.

To end with the "unambiguous" concept, we must remark there is usually a distance between the expression of facts that objectify the expectations, and the expression of the will (or the fear) that motivates the requirement. This calls for “event algebra” and “abstraction protocols” to bridge this gap. Let's point out that a given "fact" may be endowed with quite different meanings depending on the finality, on the standpoint. Such features make it possible to set-up specifications, to formalize some knowledge, without interfering with the inner causality construction that comes up with system design or natural phenomenon analytic explanation

All these features have been met by Relativized System Engineering, grounded through the formal “Relativized Systemic” framework in the most fundamental physics<sup>1</sup>.

---

<sup>1</sup> See [https://www.mersyse.com/en/isr\\_features.php](https://www.mersyse.com/en/isr_features.php)