Relativized Systemic Genesis

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Gropings and questionning

Experienced hampering confusions in the industry

- Confusion between organization and method
- Overlapping domain of responsibility
- Inability to make timely informed decisions
- No objective definition given such notions as system, function, state, ….
- Incapacity to define unambiguous criteria to sort out what falls in need analysis, technical specification, design, or architecture
- Incapacity to consider and trace the specific answer given to a particular stake, individually considered
- Insufficient command of diversity and evolution: uncontrolled impacts and side-effects

Common practices and pitfalls

- Inability to turn local solutions into consistent contributions to a comprehensive Product/Project development process
- Local achievements (task, document, models) deprived of any methodological framework to ensures consistency and completeness
- No operational project/product/resources/organization configuration and evolution management to master the development process
- Multiple inputs of the same information without any guarantee of consistency
- Confusion of system and software engineering, difficulties to integrate classic physical engineering and ECU development
- Impossibility to use the specification and design artifact as unambiguous reference for integration and testing

Impacts on Product quality

- No methodological framework to formally integrate RAMS within System Engineering development process
- Non anticipated use-cases generating customers' frustration (services, availability, …)
- Uncovered Risks, inadequate alert system, faulty reliability
- Impossibility to prove that risk assessment was duly considered in the solution design
- Tricky trouble shooting and maintenance

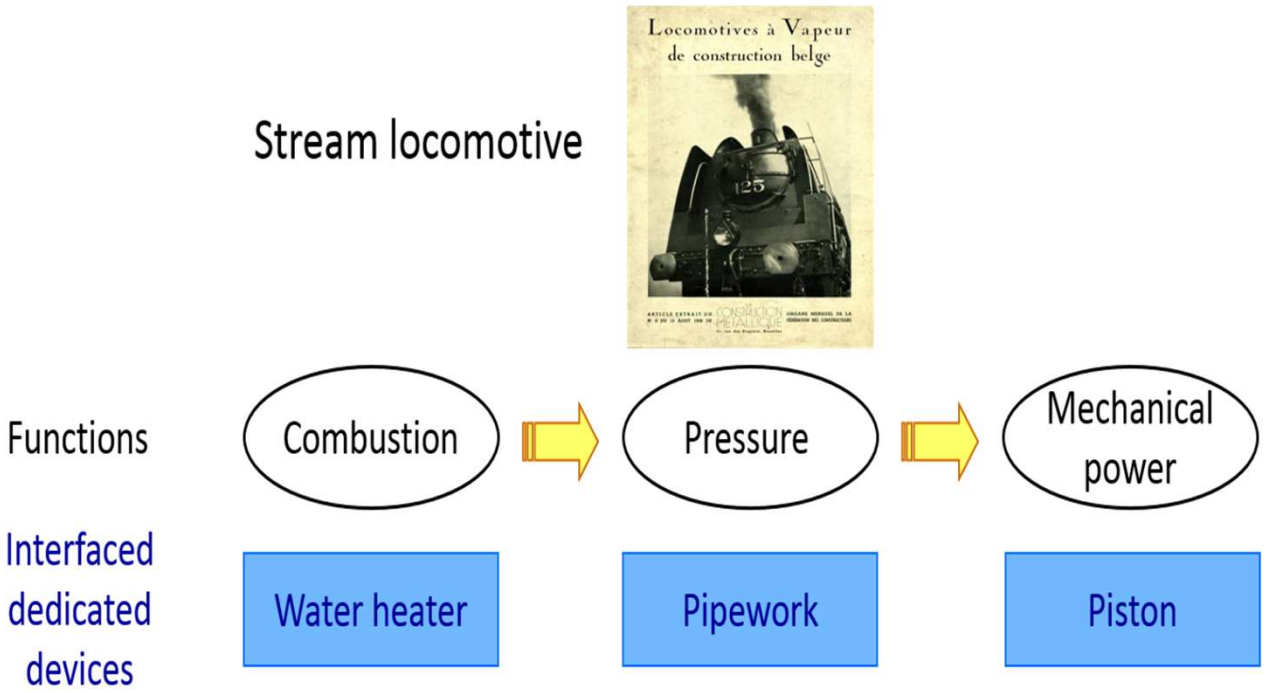
Impacts on cost and delay

- Weak productivity of the design work
- Tricky reuse of previous developments
- Insufficient experience capitalization
- Costly, partial and potentially inadequate validation with regards to the needs, stemming from the lack of reliable specification and design reference or misunderstandings
- Late, costly and punctual rectifications of defects detected when using the product, that may trigger unwanted side-effects
- Product recalls, warranty costs, legal exposure, deterioration of brand image

Functional analysis inadequacy

As soon as 1957 Gilbert Simondon was aware that functional analysis wasn't an appropriate framework to master innovation and complexity.

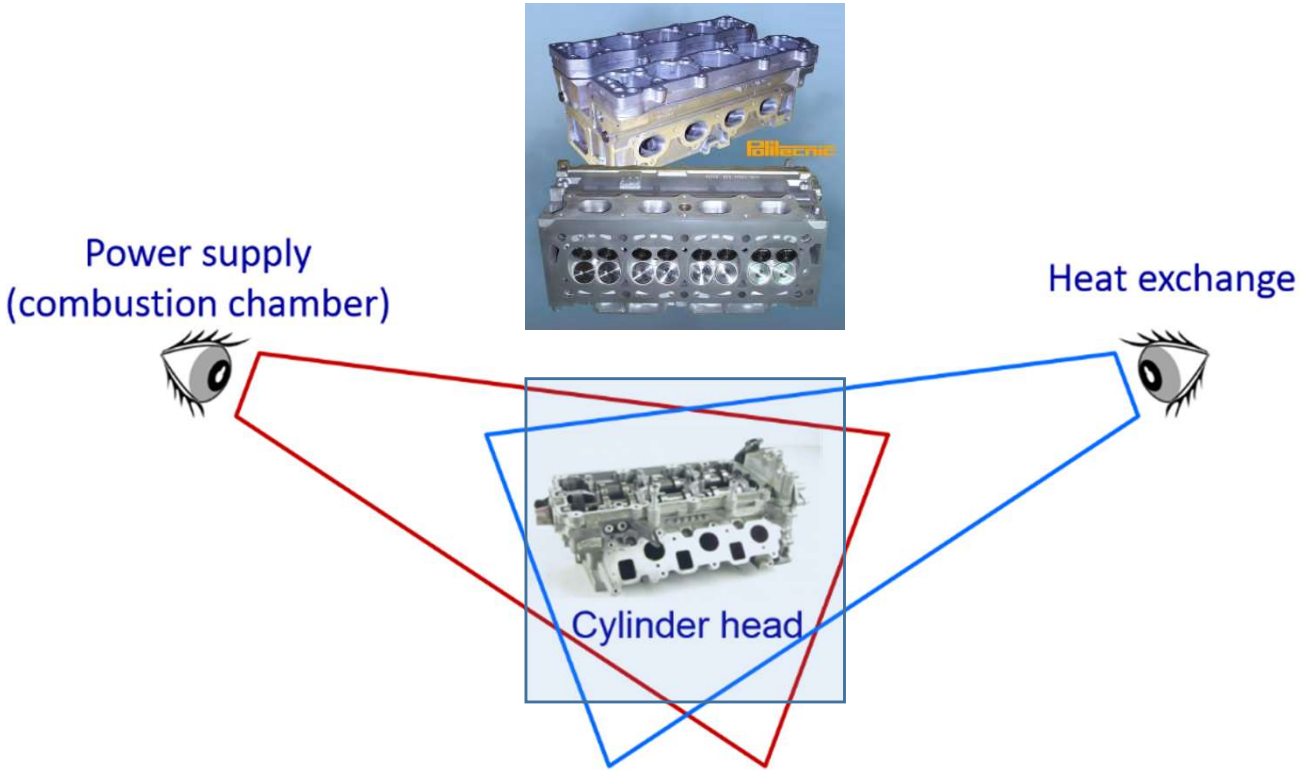
He took an example: the implicit paradigm he discerned underneath the stream locomotive on one hand, and the internal combustion engine on the other



Relativizing to master complexity

When the design of some artefacts results from competing points of view, it is no longer possible to think in terms of successions.

It is necessary to assess whether the Product objectifiable features do fit the timely requirements and constraints of each contributing points of view, separately considered: ***introduction of relativized points of view.***



Relativized Systemic foundation

Situation assessment from Relativized Systemic (RS) perspective

- Classical physics is used to deal with several autonomous point of views, that, together considered, express a knowledge on the considered physical entity
  - Energy is the basic concept that makes it possible to correlate these different points of view and to conceive causality chains that “explain” observable features
  - We know how to jump from a mechanical perspective to a thermic or a electromagnetic description

- Problems raise when correlation between observable features are no longer explained through algorithms that embody this kind of knowledge: such is the case for most embedded software
  - In the absence of any scientific framework, people tend to use functional analysis that inextricably mix the different points of view using “functions” and “flows” or software related technics, such as Object Oriented approaches, that don’t secure any formal correspondence with factual observations
  - More generally, whatever these methods, they consider that the “entity-to-be-developed” is already “there”, bypassing the fundamental constructive aspect that comes with any innovation

RS purpose

Coming up with a relativized, radically constructive and scientific methodological framework, in which energy-based physics is regarded as a modality of this more fundamental and general way of conceiving reality

In such a framework, knowledge building and innovative development both share the same constructive scheme
They are distinguished just by the freely chosen reference:

- Knowledge building process are supposed to yield model that fit factual observations that qualify some pre-existing physical reality
- Innovative process are supposed to yield factual observations as a result of the introduction of a new physical reality, conceived on the basis of pre-existing knowledge

RS starting ground

- The stake: overcoming the belief that “hard” science deals with « discovering » an existing reality while System Engineering deals with innovations, goals driven.

- Looking at the limits: is there any scientific domain where the physical entity appears as a built concept, because it cannot be perceived as a whole, but inferred from scattered traces in space and time?

- If such a domain exist, then we can look toward a unification of science and innovation : while the former one conceives an entity and its properties out of registered traces, the former one does the same, but out of wished traces that we aim at turning into facts.

RS starting ground

The adequate domain: quantum physics and the work of Pr. M. Mugur Schächter* to make intelligible Hilbert-Dirac formalism :

Any entity appears as a built concept, starting with a conventional index in an operating process that separates conventionally a generative phase from a qualifying phase that produces traces (from a given point of view, typically, momentum or position)

Process and results cannot be described, but through pre-existing built knowledge and the adopted qualification grid

Intersubjectivity and operational efficiency substitute for objectivity

(*) https://www.mugur-schachter.net/