Jean Vieille - Industrial systems control expert

Support to directorate general, engineering and IT departments of industrial companies for optimizing information technology support to their overall performance objectives.

Activities :

- Consulting, coaching, training, research.

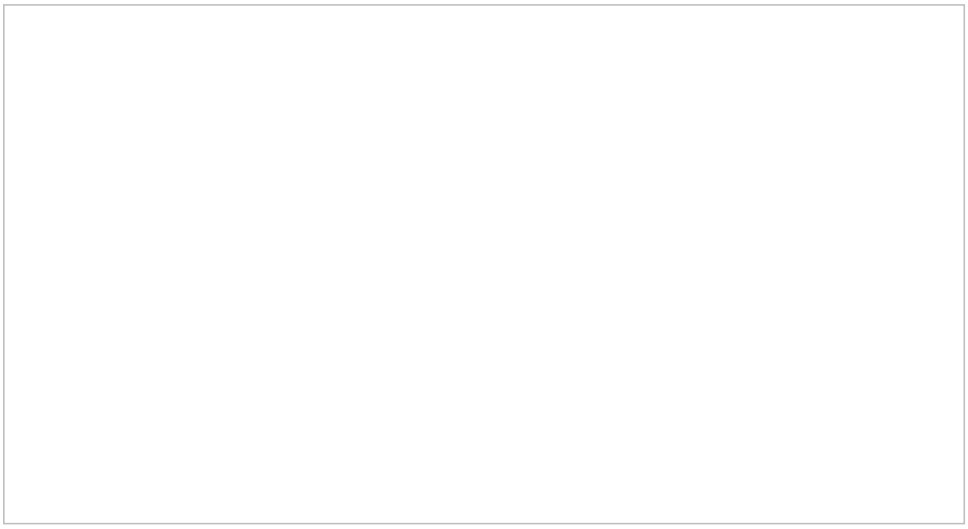
General interests:

- Industrial systems control, including industrial harware, physical, chemical and "business" processes, organization and systemic integration
- Information theories and technologies, systems theories and ontologies
- Macroeconomics, fundemental physics, biology and neurosciences

Expertise:

Performance and intelligence of industrial systems

Performance management to develop intelligence's organization



Performance management helps smart organizations to reach their goals. Emergent property of complex systems, intelligence is less dependent on individual geniuses than on systemic organizational, psychological and technical factors. At the forefront of industrial management, intelligence focus on industrial systems offers exciting prospects of progress relating to economic, environmental and social dimensions of their performance.

Topics of interest

- Intelligence definition
- Intelligence in the continuum of potential and kinetic information
- Organicsmic nature of industrial socio-technical system
- Opportunistic and deterministic factors of intelligence
- Flow / observer interest matrix
- Intellectual criteria related to the competition, the environment, society, employees, customers, suppliers ..
- Intelligence measurement
- Performance / intelligencerelationship

In collaboration with

Neuromorphic system ontology and semiotic interoperability

A neuronal and genetic approach to aligning organization and information technology on organismic, complex system nature of the industal enterprises

The concept of ProductProcess was coined by Bernard Tanous in early 1990's. The current smart/future/I4.0 industry interest denotes its relevance to address rapidly evolving technologies, products and business models.
The neuromorphic system ontology builds on the Nature's fractal structure and embedded evolution to provide a highly simple, robust and flexible modelling framework to design and monitor organizations, applications and their interactions.

Topics of interest

- Ontologies hierarchy
  - Neuromorphic reference ontology - Top level ontology
  - Neuromorphic domain ontology - Industry specialized ontology applying OBM/ABE methodology
  - Contextual inheritance : application, project, enterprise, network of enterprise
- Product and processes are the 2 faces of the same coin
- From genetic coding to morphogenetic execution
- Orchestrated and autonomous processing agents, BPMN, SFC, PFC, PPC...vs neuromorphic routing
- Fractal process homothety
- Triadic relationships and semiotic interoperability

These concepts and applications are promoted by AGHAREN under the OBM/ABE^{tm}.

MES-MOM functional design and interoperabiliy (ISA-95)

The international standard for interoperability and support for the operations of industrial facilities (MOM / MES)

IT must become a mature engineering discipline: manufacturers must take interoperability seriously. This is too often reduced to ad-hoc technical interfaces designed under the responsibility of system integrators. The robustness and scalability of IT architectures dictates the use of an enterprise language independent of applications to ensure their decoupling and facilitate interactions between equipment and between functions of the enterprise.The ISA-95 offers such a simple language to describe the industrial system, organize the requirements gathering and write messages understandable by people and machines.

Topics of interest

- Exegesis of ISA-88 and ISA-95 models
- Structural modelling
  - Physical, human and material/energy resources
  - Procedural knowledge
- Behavioral modelling
  - Physical processes
  - Operations processes
- Functional specification
- Messaging specification

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Industrie 4.0 cyber-physical systems and automation design (RAMI4.0, ISA-88, Delta-Nodes)

The fundamental principles of ISA-88 are more relevant today than ever

As early as 1995, the ISA-88 standard adopted the concept of cyber-physical system that is being promoted today by Industry 4.0 and the internet of industrial objects (IIOT) : an informational artifact integrates with the physical object that collaborates with others while participating in a deterministic orchestration.
This standard results from the experience of a large multinational automation community going well beyond recipe sequencers and batch processes.
DeltaNodes developed by Rhône Poulenc and Jean-Michel Rayon at the same era adds the formal modeling of physical flows that allows a strong coherence between the actual facility, its sensors, its actuators, the product and the processes. The set provides a solid foundation for cyber-physical and systemic automation.
Regardless these modern incentives, automation design is still poorly handled, thanks to easy, no-cost coding compared to expensive, hard wired electromechanical relays and pneumatic controllers of the past. Any automation engineers may benefit of thes principles.

Topics of interest

- Object-oriented design, equipment entity, cyber-physical system
- Physical model, procedural model, process model
- Equipment control
- Physical process control
- Specification of product development requirements
- Physical flows modelling
- Integration of physical processes with management processes
- Interoperability: SQL, XML, OPC data structures
- Procedural Function Chart (PFC): specification language and supervision of executable procedures, recipes
- Process Procedure Chart (PPC): specification language for physicochemical transformation processes
- Process Industrialization, PLM, from R & D to execution
- Historization of production information, audit trail and electronic signature
- TR88.00.02 / PackML: application to packaging machines
- Management of corporate knowledge
- Projects methoology
- Specification forms
- Process controllers and PLCs
- Batch managers,
- Design tools

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Process control

Process control mixes cybernetics and physical laws to master material and energy transformation

Process control is my initial expertise: I gradually expanded from the cybernetics of machines to organizations'. Meantime, process control information technology converged with non-physical control, from pneumatics, hydraulics, and electronics to digital.
Unfortunately, process control expertise does not exist anymore as a holistic engineering discipline, it is now split into system architects, cybersecurity specialists, software programmers, instrument engineers, process designers...
I still fascinated by industrial processes and very much enjoy developing and setting up process control strategies off and on site.
My rules and beliefs:

- A deep understanding of the process is a precondition of its control: One must identify himself as the machine, feeling being the machine, exhaust operators' knowledge, stare endlessly at measurement trends
- PID control is an old, yet incredibly powerful control means that needs to be mathematically and physically mastered befoere to envisage sensitive advanced control technics
- Control strategies bumpless switching conditions the success of neat, robust control
- When things become complicated, go back and follow another way (the number of code lines is a good precursor of failure)
- The most important artefacts of process control are measurement and actuators