Consulting-Engineering Feasibility Tests

A proven methodology

For the consulting-engineering part of its activities, Unitechnologies has formalized a methodology called SAM, “sysmelec® anticipating method”, which includes six study phases. These phases consist of anticipating and drawing parallels between the different actions of an automation process in a systematic and structured manner.

In addition, this methodology favors a global overview of the project, with which a continual and iterative adaptation of the various elements studied is possible.

Optimization of the automation process

In case of doubts as to how an application is best automated, or on how to best split operations between automated and manual tasks, as well as when questions remain on the feasibility of a process to be integrated in a future machine, the SAM method provides the means to lead to a solution which is both robust and economically viable. To this end, the work is carried out according to the following two approaches:

- A design approach with the objectives to optimize:
  a. the product design if possible
  b. the assembly sequences and to characterize the architecture of the machine in question

- An “identification and risk deconstruction” approach; this phase, crucial for the final success of the project, usually rests on the tests carried out either on the sysmelec® test benches or on a specific production pilot. In the second case, the customer quickly has access to small quantities of assembled products, produced according to the methods, the principles and the tooling which will then be integrated in the final machine.

Results which commit Unitechnologies

At the end of a consulting-engineering mandate, Unitechnologies establishes a study report with practical demonstrations and delivery of potential samples. In most cases, Unitechnologies also actively participates in the writing of the final technical specifications and, after validation by the customer, submits a final quotation for the optimal considered equipment.

Unitechnologies stands by its study results and commits to its customer to realize the corresponding sysmelec® production equipment.
Key competences

Automation and precision mastery
- Precise assembly of delicate or flexible miniaturized components.
- Assembly of complete micro-mechanisms.
- Dimensioning of specific and complex optical systems allowing measurements with high requirements.
- Realization of micro-mechanical tools capable of guaranteeing the pick up, respectively the positioning of small dimensions components, down to several teeth of micrometers.
- Tools with numerical functions making them programmable and auto-adaptable for applications with multiple variants.

Demanding processes
- Laser welding requiring complex toolings to put the components to be welded in contact with each other.
- Microdispensing of mono or two-components glue or resin onto miniaturized components, including an in-place polymerization.
- Press-fitting or insertion under force and position control of "esthetic" and/or delicate components.
- Crimping of components, for example rollings, punches or mechanisms.
- Shaping of wires and tubes before assembly.

Project management
- Supervision, coordination and ownership of the numerous internal disciplines as well as third-party partners where needed.
- Turnkey integration of complete assembly areas, including the incorporation of upstream and downstream product flow.
- Mastery and implementation of GAMP procedures.

High performance standardized modules
Understandably, integrates "tools" from its robotic AUTONAV™ product range to its machines in order to answer in a reliable and economic manner to the technical constraints of its customer's automation projects.
- High precision Cartesian robots.
- Horizontal delta robots with 5 degrees of freedom and very high rigidity.
- Press-fitting robots with integrated force and position controls.
- Modular and highly compact robotic modules, linear, hollow rotation, rotation with multiple pneumatic collectors and many others.
- Shock-free and clean room compatible transfer systems.

Typical applications

Example of a realized application
Automated processes
Concept, constraints and performances
Other examples of applications

Electronics/Defenses
Assembly of a fault current sensor
- Active assembly through adaptive measure of a distance between two electrically plates.
- Laser welding of several components, including a magnet.
- Assembly of a torison spring.
- Line of study, of which more is ISO in electronic class.
- Very high constraints for the positioning tolerances of the electrically plates after laser operation and after laser welding.
- Measuring features made of ceramics.
- Variant: 1 consisting of 30 components.
- Cycle time: 3.6 seconds.

Electromechanics
- Final assembly line for multivariants with automated switch over from one variant to the next.
- Placement of miniature inserts into mold for precision overmolding.
- Active calibration of sensors based on visual or analogue functional signals.

Medical
Assembly of a movement of a mechanical watch
- Press-fitting and insertion of miniature components onto this or delicate features, with a high coefficient of determination.
- Component press-fitting under combined force and position control.
- Assembly of complete watch movements and other watchmaking mechanisms.
- Group of several production lines and lines dedicated to the pre-assembly and the final assembly.
- Precision of most of the operations: ±0.03 mm.
- Variants: including between 2 and 5 at the beginning of the product life cycle.
- Cyclen time: between 3 and 10 seconds depending on equipment.
- Cleanliness class: ISO 6.

Medical
- Assembly and laser welding cell for radioactive titanium implants.
- Turnkey integration of complete area for the assembly of sensors for scanners.
- Assembly cells for MEMS chips under constraints of 5, 10, 15, 14A, T8B.
- Assembly of portable radiotherapy injection systems.

Automotive
Assembly of a multi-layer piez actuator
- Positioning of connecting wires onto each layer piez.
- Non-conventional combination of a winding and a sine cutting method.
- Thermocompression soldering of the wires.
- Integrated quality controls at several stages of the assembly process.
- Pre-engineering and test phase according to the SAI-Method.
- Line composed of 4 cells, of which 1 is manual.
- Typical /final precision to be reached: ±5 µm.
- Variants: several dozen in constant evolution.
- Cycle time: approximately 10 seconds.
- Cleanliness class: ISO 6.

Automotive
- Assembly lines for dashboard step motors.
- Assembly machines for adjustment microinstruments with memorization function.
- Assembly cells and lines for accelerometers and sensors.

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