SIMIT V7 – open simulation platform for virtual commissioning
The faster, more efficient way to operational maturity

Customers today demand highly individualized machines and plants with high availability and high efficiency, and they want delivery almost immediately. Moreover, existing machines and plants have to be adapted to altered production processes. And this certainly applies to development and testing of automation solutions as well. In fact, the complexity of machine and plant automation is constantly increasing, while run times for automation projects are growing shorter, and budgets tighter. For you this means increasingly complex and demanding projects with narrow time schedules and little financial flexibility. This poses three basic challenges:

Reducing times
Automation projects have to be planned, implemented and commissioned within ever-shorter time periods. The deadline for completion cannot be postponed, especially in the case of conversions. Implementation and commissioning of the application software has to be correspondingly fast.

Raising the quality level
While application software becomes increasingly comprehensive and complex, quality requirements have not become any less stringent; in fact, they are even higher. And today it’s truer than ever: The only way to win and strengthen the trust of customers is through guaranteed quality standards.

Reducing costs
Tighter budgets require a reduction in engineering expenditures. Application software must be realized and set into operation with minimum costs, and costly extra expenditures – which occur especially for commissioning of the application software as the machine or plant start-up date approaches – must be avoided.
**New approaches for success**

SIMIT allows application software to be tested and started up without an actual machine or plant. Instead, the machine or plant is simulated while SIMIT is connected to the control system via suitable interfaces. With SIMIT, you switch over from the real machine or plant to the virtual machine or plant.

**Independent of the availability of the real machine or plant**

By testing application software with a simulated machine or plant, you can identify and clear errors at an early stage, even before the machine or plant becomes available. This eliminates waiting times, and testing and commissioning of the application software can be carried out with very high efficiency.

**No risks for the real machine or plant**

Thanks to virtual commissioning, you benefit from being able to set up even highly critical situations for the machine or plant quickly and as often as you want. This lets you achieve a greater depth of testing without putting the machine or plant at risk, and so you also achieve higher quality.

This results in greater planning certainty and schedule reliability, and lower costs and risks – so it’s a lot easier to stay within budget.

**Good reasons for SIMIT**

- High quality and early detection of errors in the automation software
- Shorter project run times and lower project costs
- Reliable operation through testing of borderline cases and emergency situations
- High availability and security through high coverage of test cases
- Harmonized process and automation technology
SIMIT interface software
SIMIT interface software fulfills three functions. First, it supplements the interface hardware (Profibus DP, Profinet IO); second, it establishes a gateway to specific applications (PLCSIM, PRODAVE); and third, it offers a standardized communications interface (OPC). Via software interfaces the I/O signals of your automation system are coupled into the SIMIT basic system. Straightforward handling of the I/O signals ensures that you can exchange signal interfaces if necessary.

SIMIT basic software
The SIMIT basic software comprising the graphical user interface, the basic library and the real-time control system is also used for modeling and simulation, such as creating and running a simulation under a standard intuitive user interface. SIMIT’s basic software guides you through all aspects of a simulation in a suitable manner for the task at hand.

SIMIT interface hardware
The SIMIT interface hardware connects the SIMIT basic system to your automation systems. They simulate the slaves on the Profibus DP or devices in the Profinet IO. Communication between automation system and SIMIT is therefore carried out as in the real system at the field bus level.
**SIMIT add-ons**

With SIMIT add-ons, you can selectively increase the performance of SIMIT when creating and running a simulation: The **DGE** add-on provides you with graphical objects for simulation diagrams. By linking these graphical objects to signals, you can create vivid animations to illustrate sequences of motion of the machine or plant.

With **MCE**, you can encapsulate units of your simulations as macro components, which you can then use extremely easily over and over again in your simulation projects.

The **CTE** add-on offers you the option of adding any number of components to your pool of components and of adapting component libraries to your individual needs or company standards.

With **SMD**, you can create diagrams as templates and then paste them into your simulation projects with drag & drop or under spreadsheet control. In this way, for example, you can use IEA files of your PCS 7 projects unchanged in order to create a test bed for virtual commissioning fully automatically.

The **TME** add-on provides you with a convenient means of recording and displaying signals and messages from your simulation.

**ACI** provides an easy-to-use script language for automating and recording simulation runs.

**SIMIT libraries**

SIMIT libraries facilitate simulation in specific application areas. **FLOWNET** provides you with a fast, simple means of simulating the dynamic characteristics of pressures, flows and temperature distributions in piping systems. Thanks to the simulation components of valves, pumps, heat exchangers, etc. contained in the libraries, it’s as easy to generate a simulation as it is to draw a pipeline diagram.

**SIMIT special packages**

Special packages offer you the SIMIT basic software with selected interface software and add-ons to cover typical areas of use.

**SIMIT service**

You can keep the status of your SIMIT software permanently up to date with software updating. Our hotline specialists provide you with expert support for all technical and application-specific questions related to SIMIT. With our consulting services you benefit from the many years of experience accumulated by our specialists with SIMIT and simulations, for example in the form of an initial SIMIT training course, introduction of SIMIT into your projects or assistance with setting up your simulation project.
**Realization**
The test environment provided by SIMIT supports software development in all project phases, regardless of the availability of the real machines and plants. The simulation gains increasingly in terms of depth and scope as the project progresses. And since SIMIT also runs on standard PCs, the test environment can be implemented at extremely low cost.

**Acceptance test**
SIMIT also offers you a suitable simulation basis for the acceptance test of software by your customers. By connecting SIMIT to the automation hardware you create a realistic test setup with high acceptance by your customer. The test depth can be set as desired, from simple signal simulations to drive simulations or comprehensive plant simulations. This makes verification of software functions simpler and more transparent. And even fault scenarios can be played through as often as you wish with no risk to personnel, machine or plant.

**Virtual commissioning**
Beyond an acceptance test it is even possible to carry out a virtual commissioning with plant simulations. Then all that remains to be done in the commissioning on site is to fine-tune the software to the dynamic characteristics of the machine or plant. During commissioning, you can also substitute real system components that are not yet available with simulations and so speed the commissioning. Simulation facilitates the analysis of errors and enables you to test software changes in their entirety completely.

**Training**
A simulation which has, for example, been drawn up for virtual commissioning can also be used for training purposes for operating personnel. Training-specific functions can be easily supplemented. Since even fault scenarios can be covered intensively in training, personnel skills can be significantly improved and unnecessary downtimes prevented through timely, targeted intervention.

In the ideal case, training simulation is available even before the actual machine or plant is ready for operation. Regular production start-up can therefore be carried out by trained personnel within a very short period of time.

**Service**
SIMIT also helps in the service area by providing a simulation that can be continuously updated to match changes in the machine or plant and always represents the latest machine or plant. Modifications and improvements to the automation software can thus be fully tested with the simulation without adversely affecting current operations.

**Acquisition**
Completed simulation projects are the best way to present references as part of the acquisition process. In this way you can illustrate your engineering expertise and demonstrate the flexibility of your solutions even in worst-case scenarios. And a complete plant model can be presented on a laptop directly on site at the customer thanks to simulation of the automation equipment (for example with PLCSIM).
SIMIT – at home in all industry sectors

Our wide and varied experience with simulations in many different areas of use and industry sectors is not only the basis for the development of SIMIT, but is continuously applied to its further development. As a result, SIMIT has proved its value as a standard simulation platform in a wide range of industrial sectors right from the start.

Process industry
SIMIT has long been established in nearly all sectors of the process industry and covers the entire simulation spectrum, from signal simulation to simulation of entire plants and processes, and from engineering to the training of operating personnel. Linking SIMIT to the engineering platforms helps reduce the costs for preparing the simulation to a minimum. FLOWNET provides an extremely simple means of generating dynamic simulations of flow processes.

What can SIMIT do for you?
Despite its enormous performance capability, SIMIT remains first and foremost a tool. Only when it is used in an application is its true value revealed. This brochure can therefore only describe the functionality of SIMIT in broad outline. In order to recognize its full potential, though, the intended application must be taken into account in each case. So let’s talk about your requirements together and you’ll find out how much more SIMIT has to offer you.

Manufacturing industry and mechanical engineering
In the manufacturing industry, SIMIT covers a broad spectrum of simulations with vivid visualization with its open, component-based concept. This includes visualization of automated processes on a production line as well as simulation of transport processes in conveyor systems. All sequences of motions of a machine or plant can be represented realistically with the aid of high-performance 3D visualization components and CAD-based kinematic 3D models.
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