

**Mechatronic**

**Comos Mechatronic –  
because interdisciplinary  
communication is decisive**

# Comos Mechatronic – perfect integration of all disciplines

**The growing fusion of mechanical engineering, information technology, and electrical engineering in present-day machine and plant construction requires perfect teamwork between the different disciplines. Only ideal communication can effectively avoid resource-intensive changes, iteration loops and needlessly extended project development times.**

Especially in mechatronics, the complete functionality of the system can only be achieved by intelligently linking all disciplines involved.

**The key to success – the common database.**

**Comos Mechatronic** allows the complete development of mechatronic systems, from the conception to the functional development and hardware design. From the conception to the commissioning, the different disciplines

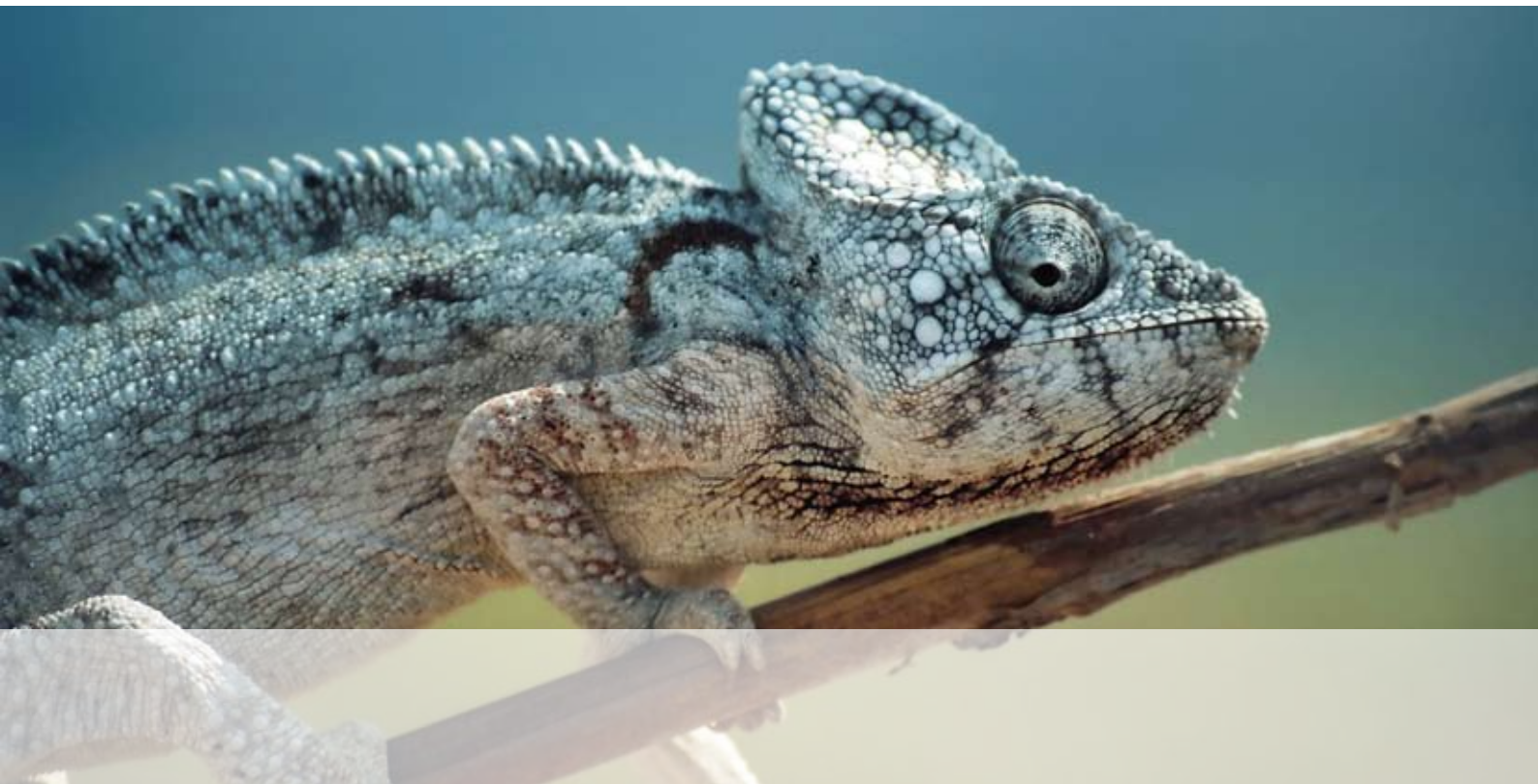
(mechanical engineering, fluid technology, hydraulics, pneumatics, electrical engineering, and software development) use a common database. Mechatronic systems can be divided into functional units which can be easily duplicated and adapted. All functionally interdependent pieces of information are also stored

together. Thereby, the barriers between the individual subjects and thus the iteration loops disappear. In this way maximum data consistency and ideal interdisciplinary cooperation are achieved.

**Comos Mechatronic** offers complete professional solutions for extensive mechatronic requirements.

You can find explanations of the technical terms in the glossary on page 8.

“ Ideal communication.  
Parallel development.  
Early configuration.  
More than just links  
between disciplines. ”



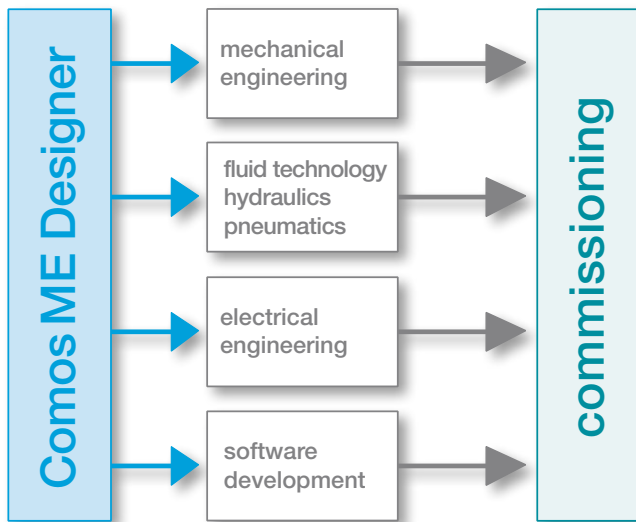
**Comos Mechatronic– a modular tool for modularly structured plants.**

**Comos Mechatronic** offers a complete package consisting of five modules for the interdisciplinary mechatronic designing of machines and plants. Each of the five modules can also be used as stand-alone software.

The **Comos ME Designer** with the integrated **machine configurator (Comos Express)** facilitates the completion of an entire machine with different options in record time – simply by mouse click. All documentation, such as circuit diagrams, parts lists, path-time

diagrams, state graphs, hydraulics/pneumatics plans etc., is available as soon as the sales department has agreed on the machine design with the customer. Ideal integration of fluid technology, electrical engineering and functional planning is achieved by means of intelligent links to the established modules **Comos ET**, **Comos Fluidics**, and **Comos Logical** as well as to the recent developments **Comos Express** and the automatic PLC code generation.

# From the “Gordian knot” to function-orientated engineering



Engineering-workflow with the Comos ME Designer

With tools in the form of isolated applications and without generally understandable mechatronic descriptions of the machine functionality, the highly important co-operation between the areas of mechanical engineering, electrical engineering, and software development with their sub-disciplines recalls the famous “Gordian knot”. The results are inadequate communication, many iteration loops, and long project lead times. With the **Comos Mechatronic** portfolio we offer our customers an efficient, object-orientated tool, which facilitates engineering processes without any friction losses.

## The centre piece of Comos Mechatronic – the Comos ME Designer

Function-orientated development and delineation of the machine or plant are the basic principles of the **Comos ME Designer** for interdisciplinary co-operation.

The function-orientated method is based on a concept developed by the iwB Munich (Institute for Machine Tools and Industrial Management) at the Technische Universität München (Munich Technical College) and on VDI (the Association of German Engineers) directive 2206. All components that are to be projected as well as a standardised delineation of the processes of the machine in the form of a path-time diagram, a network plan (operation chart) and also state graphs are derived from the description of the functionality of the machine through relevant program libraries.



### Function-orientated planning

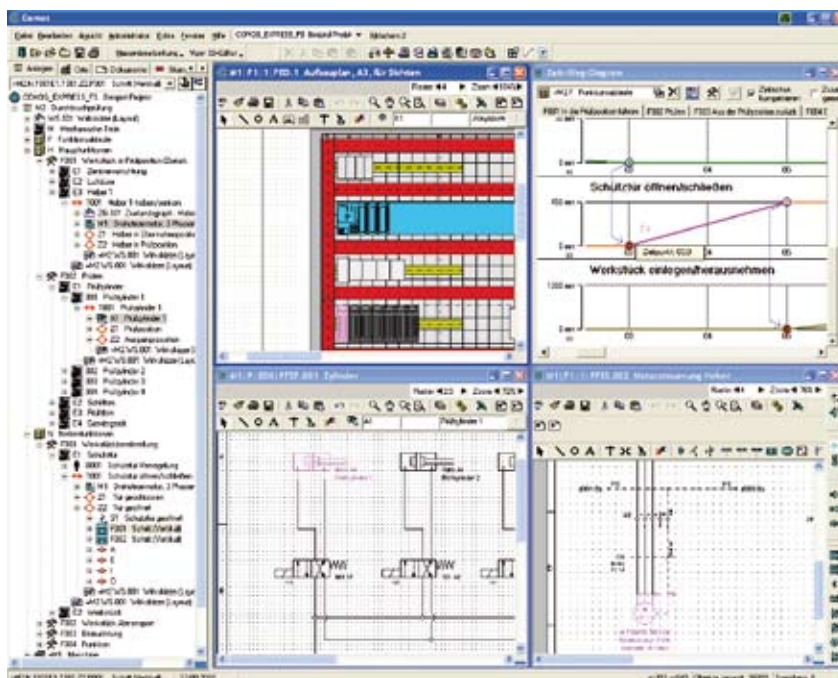
Following the definition of the main and secondary functions, the degree of freedom as well as the steady and temporary states are defined for each single function. The sequence and dependencies are shown in a state graph. Then the actuators for the degrees of freedom and the sensors for the steady-states are defined.

### Operation chart (network plan)

The operation chart shows the sequential order of the states, which in turn are allocated to a certain degree of freedom. The times required to achieve the state and the paths are defined.

### Path-time diagram

The standardised diagrams of the individual processes are generated automatically from the operation chart. This function facilitates the interactive optimisation of the process timing.



Comprehensive mechatronic planning with Comos



# Consistency in engineering throughout the complete life cycle

**Comos Mechatronic offers a wide range of functions that assure consistency and seamless data flow between mechanical engineering, electrical engineering, and information technology from the concept development to the commissioning.**

These features result from the ever stronger linking of the development processes. They allow an extensive parallelisation of the electrical and mechanical construction and form the foundation for multi-location project work.

The integrative software solution **Comos Mechatronic** can be implemented across business sectors in all process industries

that plan, produce and utilise mechatronic systems. Especially in mechanical engineering (medical technology, packaging machines, special machines), in plant construction (chemical, pharmaceutical) and in the automotive industry, the **Comos Mechatronic** portfolio makes a valuable contribution to efficient engineering and thus to securing the competitiveness.

### The decisive advantages at one glance

“The generally understandable description of the machines and plants facilitates the direct communication between the individual disciplines.”

“The standardised planning is carried out in accordance with established guidelines (function-orientated procedures in accordance with VDI directive 2206).”

“Trouble shooting is made easier by function-orientated delineations.”

“Versatility and user-friendliness through self-contained, multi-usable planning units (generating new modules by copy & paste).”

“Machine development in record time based on the modular system using the machine configurator.”

“Interfaces to all current CAD systems facilitate data exchange.”

### We face the challenges of the future.

Both, the requirements of function-oriented perspective and planning of machines and plants, as well as improving interdisciplinary communication will stay high on the agenda in the future. We will continue to develop and extend our engineering software based on the requirements of the market, in order to offer you ideal solutions in the future too and, through contributing to your success, prove our name which innovation is a part of a fitting one.

**Interested in finding out more?** Our experts will be glad to answer any questions and to tailor an offer to your needs. **We look forward to hearing from you!**



# Glossary

## Degree of freedom

Degree of freedom means the number of independent movements which a solid body can perform in space with reference to a co-ordinate system. Every degree of freedom is represented by an independent co-ordinate.

## Object-orientation

By object-orientation we mean the integrated description of an existing component and its true-to-life graphic delineation. The graphic and alphanumeric specification within the database form a unit – an object.

## Sensors and actuators

Actuators and sensors are connectors between process devices and the control. The sensors record the process states and communicate that information to the actuators, which process the information and transfer it to corresponding actions.

## Path-time diagram

The path-time diagram is used to illustrate and check processes in project management. The individual steps are entered on the y-axis (as true-to-scale lines), the x-axis functions as a time line.

As a world-leading provider of comprehensive Life Cycle Management systems, **Comos Industry Solutions** offers professional software solutions and services. The integrated **Comos** concept is designed to cater for both customer-specific requirements and established industrial processes. The individual modules can be used as either stand-alone software or as a complete software suite. **Comos** is the complete solution for end-to-end basic and detail engineering processes, catering for all industrial plant life-cycle phases. The **Comos** philosophy, products and services have long been trusted by plant designers, operators and contractors.

More information, as well as contact data for our company locations around the world, can be obtained here:

E-mail: [info@comos.com](mailto:info@comos.com)  
Internet: [www.comos.com](http://www.comos.com)

A Siemens Business