

# Capricorn Haus



## PROJECT AT A GLANCE

### Location:

Düsseldorf, Germany

### Installations:

24.000 Physical Data Points  
2.800 Lighting Circuits  
1.400 TAC Xenta® Controllers  
1.280 Room Axes  
1.200 Controlled Sun-Blinds  
320 Floor-Mounted Distributors  
250 Motion Detectors  
150 Room Control Elements  
36 LON-Routers

### Applications:

HVAC Control  
Lighting Control  
Window Shade Control  
Sun Tracking  
Modern Room Control Concept  
Highly Flexible Room Axis Solution  
Energy Management / FM

### TAC Partners:

Syscontrol GmbH  
GTS GmbH Control Systems



Graceful curves and a striking facade enclosing large glass lobbies, define the compelling style of the 26,000 square meter (280,000 square foot), seven-story CAPRICORN HAUS office building in the Düsseldorf Media Harbor.

The owner and tenant of this energy efficient, low maintenance office building, Capricorn Engineering, has built a reputation for restoring and maintaining vintage racing vehicles since the mid-1980s. Expanding beyond their automotive roots and together with sister company Capricorn Development, they've also led in the development of forward-looking technologies for a number of different industries. Like Capricorn itself, this building is distinguished by trendsetting technology.

The CAPRICORN HAUS in Düsseldorf is the second project in which the client's high standards for utilization of new technologies and a modern design aesthetic were combined with attention to ecological responsibility. Even the smallest details conform to these requirements, as the building's architects, Gatermann + Schossig, made certain that each office have an outside area and that the soaring atriums contribute natural light, help regulate building's climate, and open the building up to the city.

The CAPRICORN HAUS façade incorporates all the technology and equipment to regulate the indoor climate. In this way, floor space is maximized as tenants have the entire floor area available for space planning. No pillars, utility rooms or other central equipment will interfere with the partitioning of the space or block the harbor view. Style and technology characterize the highly automated building, which has many structural components that were developed and patented to accommodate its advanced design.

### The Challenge

The premise behind the entire project was to create a low-energy building that would be ecologically friendly, energy efficient and contained design aesthetics that would stand the test of time; a building that would continue to offer the most up-to-date convenience for the owners and tenants throughout the building's useful life.

In order to guarantee the building's economic efficiency, the owner, architect and planner took a lifecycle view from the very beginning: Over a building's lifecycle, investment costs account for roughly 30% of the total, and consequential costs for 70%, with a large portion of this money going for energy costs. So from the start, it was clear that the project needed to have a significant focus on energy efficiency, energy optimization and the effective interaction of all components used, while leveraging complimentary and existing resources.

These competing objectives meant that building automation would play a key role in the development of the overall concept. To meet the owner's requirements for future marketability, cost efficiency and functionality, the two cooperating TAC-partners, Syscontrol GmbH and GTS GmbH Control Systems, faced the following challenges:

- Energy requirements of 65 euro cents/m<sup>2</sup> per month (approximately \$0.08/ ft<sup>2</sup>), or a further 20% below the requirements of EnEV (German Energy Saving Act)
- Virtually automatic operation of the entire building
- Low maintenance expense and disruption
- Custom solutions to keep the space utilization flexible and accommodate architectural design elements
- Adaptation to new space planning configurations
- Convenient access and layout
- Optimal temperature control
- High availability and reliability



### The Solution

Because of the building's requirement for a high level of automation it was necessary to accommodate more components than usual while using the smallest possible footprint. With approximately 2,000 integrated LONWORKS® nodes, 1,400 TAC Xenta™ controllers and the high level of integration resulting from the networking of various Lon® components from eight different manufacturers, the CAPRICORN HAUS was one of the TAC's most complex and challenging projects.

A primary design feature called for unrestricted partitioning and highly flexible space planning so that current and future tenants could quickly and easily repurpose the space without changing the hardware installation. For this purpose, the entire ground plan was separated into zones based on window areas. Each of the total 1,280 zones comprises comprehensive ventilation, heating, cooling, lighting, shading and heat recovery systems, as well as concrete core activation coupled with geothermals. In this way, the ambient conditions for each workplace can be individually adapted at any time, with capability to adjust fresh air supply, temperature and light.

In order to further optimize user convenience and comfort, in the evening hours special artificial light simulating daylight is used instead of conventional lighting. Even the façade is intelligent: Each zone has a separate ventilation system in the façade. This system is controlled and regulated locally via plug-in floor distributors. Four basic functions allow not only normal ventilation, which is manually activated by the user, but also characteristics such as building cooling, ventilation and daily operation.

The advanced TAC Vista™ building management system with multiple operating and inspection stations and internet connectivity ensures that all information from the 24,000 data points is available at all times. Custom programs and

control strategies ensure that the individual system components operate together with the lowest possible power consumption and the greatest possible convenience. With the integrated TAC Vista FM Facility Management System, continual monitoring and optimization of the system are user-friendly - from efficient maintenance planning, energy strategies and analyses, through to energy monitoring. This guarantees the system's stability and is especially critical for a building with so many smaller self-contained zones.

### The Bottom Line

With a mixture of economic efficiency, convenience, certainty and functionality, the CAPRICORN HAUS offers remarkable surroundings for the user, operator and owner. The harmonious combination of architecture and technology allows current and future tenants the greatest possible freedom in structuring their workspaces according to their individual needs, and change it again and again with minimal disruption.